DOCUMENT ROUTING FORM

Routed On: 09/08/2017
Prepared by: KEWILSON

Folder: 17 120556 LB

Target Date: 04/14/2018

Folder Name: PSE Energize Eastside

Site Address: 13625 SE 26th St

Folder Type: Conditional Use

Sub Type: Nonresidential

Work Proposed: Use Approval

Description: Upgrade to existing transmission lines from 115kV to 230kV, including pole and conductor replacement. Construction of new 23okV to 115kV substation.

Quick Review?:

Project Contact: Puget Sound Energy Brad Strauch

Phone: (425) 462-3223

Subject: Application Intake Process

Materials Routed:

Routed On: 09/08/2017

XXX	Land Use
XXX	Clear & Grade
XXX	Utilities
XXX	Transportation
XXX	Fire

Development Services
Permit Processing | 425-452-4898

Application for LAND USE APPROVAL

APPLICATION DATE	TECH	CIP PROJ #	PROJECT FILE #
9/8/17	MW		17-120526 LB

☐Administrative Conditional Use-LA ☐Binding Site Plan-LF ☐Boundary Line Adjustment-LW ☒Conditional Use-LB ☐Conditional Use Shoreline Mgmt-WA ☐Critical Land Use Permit Admin-LO ☐Design Review-LD ☐Final Plat-LG ☐Final Short Plat-LF	☐Land Use Approval Amendment-LI ☐Land Use Exemption-LJ ☐Master Development Plan – LP ☐Planned Unit Development-LK ☐Planned Unit Dev. Combined w/Plat-LK ☐Preliminary Plat-LL ☐Preliminary Short Plat-LN ☐Preliminary SEPA Review-LM	☐Shoreline Development-WG ☐Shoreline Exemption w/o SEPA-WD ☐Shoreline Exemption w/SEPA-WE ☐Shoreline Variance-LS ☐Variance-LS ☐WCF in ROW - CA
	NOTICE OF COMPLETENESS: Your application is considered complete 29 days after submittal, unless otherwise notified.	

1. **Property Address** 13600 SE 30th Street Zoning LI

   Project Name (if applicable) PSE Energize Eastside Tax Assessor # 1024059130

2. **Applicant** Puget Sound Energy Phone (425) 456-2556

   Address PO Box 97034, PSE 9N City, State, Zip Bellevue, WA 98009

3. **Contact Person** Brad Strauch Phone (425) 456-2556

   E-Mail Address bradley.strauch@pse.com FAX # (425) 462-3223

   Address PO Box 97034, PSE 9N City, State, Zip Bellevue, WA 98009

4. **Engineer/Architect/Surveyor** Puget Sound Energy, Scott Kim Phone (425) 462-3503

   Address PO Box 97034, EST 4W City, State, Zip Bellevue, WA 98009

5. **Project Type:** ___Single Family Residential ___Multi Family Residential X Non-Residential

6. **Description of proposed project, use, exemption, or variance:**

   Upgrade to existing transmission lines from 115 kV to 230 kV, including pole and conductor replacement. Construction of new 230 kV to 115 kV substation

   Proposed Building Gross Square Footage N/A Proposed Structure Parking Gross Square Footage N/A

7. **Nature of Project (if applicable)**
   Current use of property and existing improvements: pole storage yard and transmission line right-of-way

   Identify any adjacent water area/wetlands or significant natural features (i.e., streams, wetlands, views, significant trees, water bodies, etc) on or within 200 feet of the property. see critical areas report

8. If **SHORT PLAT or SUBDIVISION** Application: Total Acreage N/A Number of Proposed Lots N/A

   Has this property been previously subdivided? If yes, Date N/A Recording # N/A

   If this is a Final Plat or Final Short Plat, what is the Preliminary project file # N/A

9. If **SHORELINE MANAGEMENT**: Total cost or fair market value of the project (whichever is higher) $ N/A

   If a single family residence or pier is proposed, is it intended for the owner's own personal use? ☐Yes ☐No

   If Shoreline Variance, the development will be located:
   ☐ Landward ☐ Waterward of the ordinary high water mark. **AND/OR** ☐ Outside ☐ Inside areas designated as marshes, bogs or swamps by the Dept. of Ecology. (Chapter. 173.22. WAC)

BCC 23.10.033 - Agreement regarding vested rights: The filing of an application for any of these required approvals prior to the filing of a valid and complete application for a building permit shall not establish or create a vested right to proceed with construction of any proposed project.

I certify that I am the owner or owners authorized agent. If acting as an authorized agent, I further certify that I am authorized to act as the Owners agent regarding the property at the above-referenced address for the purpose of filing applications for decision, permits, or review under the Land Use Code and other applicable Bellevue City Codes and I have full power and authority to perform on behalf of the Owner all acts required to enable the City to process and review such applications.
I certify that the information on this application is true and correct and that the applicable requirements of the City of Bellevue, RCW and the State Environmental Policy Act (SEPA) will be met.

Signature _____ Date Aug. 31, 2017
(Owner or Owners Agent)

Revised 7/16/13

Submittal Requirements

9/26/2016

CONDITIONAL USE APPROVALS

_____ **Administrative Conditional Use**: Review of certain use or development to ensure compatibility within the land use district or with surrounding properties and wireless communication facilities. **(LA)**

_____ **Conditional Use**: Review of certain use or development to ensure compatibility within the land use district or surrounding properties and wireless communication facilities. Requires a public hearing before the hearing examiner. **(LB)**

_____ **Land Use Approval Amendment**: Administrative amendment of a previously approved Conditional Use. **(LI)**

_____ **Land Use Code Exemption**: An activity, structure, minor addition or site modification to a previously approved project or decision exempt from further Conditional Use review as determined by the director—such as an awning; canopy; fence; mechanical equipment screening; exterior color, material, façade redesign or replacement; adjustments to site access, parking layout; or landscape area; or expansion of use. **(LJ)**

To submit your application online use www.mybuildingpermit.com.

If you are applying in person at City Hall, submit the number of copies specified below for your application type.

Initial for waiver by City of Bellevue Planner		Administrative Conditional Use	Conditional Use	Land Use Approval Amendment	Land Use Exemption
	This Chart	1	1	1	1
	Application	1	1	1	1
	"Bill To" Form	1	1	1	1
	Preapplication Conference Letter	1	1	1	
	Letter of Property Owner Authorization	1	1		1[H]
	Boundary & Topographic Survey	2	2	2	
	Site Plan A[A]	5	5		2
	Site Plan B[B]	5	5	5	
	Floor Plan	2	2	2	
	Building Elevations[B]	5	5	5	2
	Preliminary Clearing & Grading Plan	4	4	4	
	Preliminary Landscape Plan	5	5	5	Footnote C
	Exterior Lighting Plan	2	2	2	
	Geotechnical Report	2	2	2	
	Environmental Checklist	3	3	3	

City of Bellevue

Bill To Form

Permit/Approval # 17-120556 LB

Your application is a type that requires deposit(s) and may have billable hours.
This means you may receive bills in the mail for review or inspection time spent on your project, in addition to the fees you pay at submittal or will be required to pay at or prior to issuance.

Please send the bills to:

Name/Company:	Puget Sound Energy
Attention:	Molly Reed
Billing Address:	P.O. Box 97034, EST-03W
City, State and Zip:	Bellevue, WA 98009
10-digit Phone #:	425-462-3933
Email Address:	molly.reed@pse.com

- For address changes: Notify Billing Customer Service (425-452-6860)
- For ownership changes: The new owner must provide Billing Customer Service with the ownership transfer date before any billing information can be changed.
- For billing liability changes: Contact Billing Customer Service (425-452-6860)
- City/School/Agency Projects: Please use "City Applicant / Other Agency Form"

Signature: Molly Reed Date: 8/31/17

Alternative Siting Analysis

South Bellevue Segment

LUC 20.20.225.D

September 2017

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1.0 INTRODUCTION

1.1 PROJECT SUMMARY

Puget Sound Energy, Inc. (PSE) proposes the construction of a new substation in Bellevue (the "Richards Creek substation") and the upgrade of 18 miles of two existing 115 kV transmission lines with 230 kV lines (collectively the "Energize Eastside Project" or the "Project"). The new substation and upgraded lines are needed to address electrical system deficiencies identified during federally-required planning studies. Combined with aggressive conservation, the Project significantly improves electric reliability for Eastside communities, including the City of Bellevue (City), and will supply the additional electrical capacity needed for current and anticipated growth.

The existing system is not robust enough to maintain reliable service if the entire facility is taken out of service at one time. Therefore, the Energize Eastside Project will be constructed in two phases. This will allow PSE to keep the existing 115 kV facilities partially in service during construction, which will allow PSE to maintain reliable service to all customers during construction. This approach best ensures that PSE continues to deliver reliable electricity to all of PSE's customers during construction. The first phase (the "South Bellevue Segment") is the focus of this application and includes the following components:

- ***Construction of the Richards Creek substation, a new 230 kV to 115 kV substation in Bellevue.*** The Richards Creek substation will be constructed directly south of PSE's existing Lakeside Switching Station. Situated on parcel 1024059083, the 8.46 acre substation site is currently used as a PSE pole storage yard.

- ***Upgrading 3.3 miles (Bellevue Portion) of existing 115 kV lines with 230 kV lines between the Lakeside and Talbot Hill substations.*** This requires replacing existing wood H-frame poles with steel monopoles. After deliberate review and extensive stakeholder input, PSE proposes to undertake this work in the City's existing transmission line corridor rather than siting a new corridor through Eastside communities. Within the existing utility corridor, the proposed pole locations for the rebuilt lines will generally be in the same locations as the existing poles. Selective tree removal will also be required within the managed corridor to meet federal vegetation management requirements and PSE standards. Use of the existing corridor (which has housed transmission lines since the 1920s and 30s) minimizes environmental impacts and impacts to adjacent uses to the fullest extent feasible.

The Alternative Siting Analysis that follows summarizes the years of study (including dozens of technical studies and two-phases of review under the State Environmental Policy Act (SEPA)) required to reach a decision point on how to best meet growing demand and ensure PSE's compliance with federal performance standards.

1.2 ALTERNATIVE SITING ANALYSIS PURPOSE AND OBJECTIVES (LUC 20.20.255.D)

PSE proposes the Energize Eastside Project--the upgrading of 115 kV transmission lines to 230 kV lines in an existing transmission line corridor and the construction of the Richards Creek substation. In the Bellevue Comprehensive Plan, PSE's proposed route is on a "sensitive site." See Map UT-7. For new or expanded utility facilities on sensitive sites, an Alternative Siting Analysis is required in conjunction with the Conditional Use Permit process. *See* LUC 20.20.255.D.

Under the City's land use code, an Alternative Siting Analysis must: 1) identify, describe and map three alternative site options; 2) analyze whether each alternative site is feasible; 3) describe the technologies considered and how the proposed facilities will improve system reliability; and 4) describe community outreach related to the new or expanded facilities. *See* LUC 20.20.255.D. Where proposed sites are located within a Neighborhood Business or Residential Land Use District, the applicant must 1) describe whether the proposed location is a consequence of demands from customers within the district and 2) describe whether operational need requires locating the proposed facility in the district. *Id.* Using the location selection hierarchy, the applicant must then identify the preferred site alternative. *Id.* Finally, where the preferred site is in a Residential Land Use District, the applicant must demonstrate that the siting causes fewer site compatibility impacts than a nonresidential siting. *Id*.

2.0 ALTERNATIVES ANALYSIS

After extensive study, PSE determined that the most effective solution to meet increased electricity demand and to comply with federal performance requirements is the addition of a 230 kV/115 kV substation in the center of the Eastside load area -- the Richards Creek substation -- and the upgrading of 115 kV transmission lines with 230 kV transmission lines constructed between the Sammamish (Redmond) and Talbot Hill (Renton) substations.[1] These facility upgrades, combined with continued aggressive conservation measures, is the Energize Eastside Project.[2] As confirmed by the City's independent consultants, this Project will improve

[1] The existing transmission lines were last upgraded in the 1960s and are located in PSE's Sammamish – Lakeside – Talbot Hill transmission line corridor, which was established in the late 1920s and early 1930s.

[2] Notably, the City's Phase 2 DEIS concluded that "Under the No Action Alternative, PSE would continue to manage its system in largely the same manner as at present. This includes

reliability for Eastside communities and supply the needed electrical capacity for growth and development on the Eastside.

Siting of electrical transmission infrastructure through urbanized areas presents unique challenges. Finding the best way to route a transmission line is complex, as dozens of elements of both the natural and built environments need to be considered. This is especially true here as the proposed Project traverses the City from north to south.

The Project will be constructed in two phases, with the southern phase of the transmission line traversing 3.3 miles of the City. As a linear project, it necessarily travels through many land use districts. To limit the need to construct new facilities (and the associated environmental impacts), when looking at the entirety of the Energize Eastside Project, all transmission line route alternatives start at PSE's Sammamish substation in Redmond and end at the Talbot Hill substation in Renton. PSE considered various routing options for the entire line, including five route options in the South Bellevue Segment.

2.1 ROUTING ANALYSIS METHODOLOGY (LUC 20.20.255.D.1-2)

PSE determined that the best approach to route selection would be to use a modern tool that employed a graphical information system (GIS)-based Linear Routing Tool (LRT) to conduct a broad evaluation of possible transmission line routes.

To further evaluate the Transformer plus Transmission Line solution, PSE contracted Tetra Tech, a consulting and engineering firm, who has developed an LRT. Details of the LRT assessment can be found in the Eastside 230 kV Project Constraint and Opportunity Study for Linear Site Selection (December 2013) (Attachment C). The LRT is a tool developed by Tetra Tech based on commercially-available geospatial technology and Tetra Tech's linear routing experience. It is a collaborative process that combines powerful analytical software with project experience, system planning, engineering, land use and local knowledge considerations. The LRT's innovative geospatial tool identifies the most suitable route alternatives based on modeled environmental and infrastructure factors and constraints.

maintenance programs to reduce the likelihood of equipment failure, and stockpiling additional equipment so that in the event of a failure, repairs could be made as quickly as possible. *Implementation of the No Action Alternative would not meet PSE's objectives for the proposed project, which are to maintain a reliable electrical system and to address a deficiency in transmission capacity on the Eastside. Implementation of the No Action Alternative would increase the risk to the Eastside of power outages or system damage during peak power events*." Phase 2 DEIS at 2-3.

PSE and Tetra Tech began this process by identifying an approximately 255 square mile study area (Attachment A, Figure 1) that encompasses the Sammamish substation in the north and Talbot Hill substation in the south. The study area was bounded on the west by the eastern shore of Lake Washington and extending far enough east to include the BPA corridor near Soaring Eagle Regional Park (located north east of the City of Sammamish). Any new transmission line route had to connect to a new one of the potential 230 kV to 115 kV transformation sites (substation) within this area in order to solve the problem. For the study, three possible substation sites were identified.

The LRT combined GIS data layers and created an output file called the suitability grid, which represents a summation of all the constraints and opportunities for every point (grid cell) across the entire study area. The LRT processed and combined the data layers to model preferred corridors across the suitability grid, while still connecting the corridors to one of the transformation site (i.e., substation) options within the study area. The LRT analyzed more than 200 route and substation alternatives. From these, the preferred corridors identified by the LRT were used to develop route alternatives.

2.2 ALTERNATIVE SITES ANALYZED (LUC 20.20.255.D.1-2)

LUC 20.20.255D.1. Alternative Sites Analyzed. Prior to submittal of the application for Conditional Use Permit required pursuant to subsection C of this section, the applicant shall identify not less than three alternative site options to meet the system needs for the proposed new or expanding electrical utility facility. At least one of the alternative sites identified by the applicant shall be located in the land use district to be primarily served by the proposed electrical utility facility.

.

LUC 20.20.255D.2b. Map the location of the sites identified in subsection D.1 of this section and depict the proximity of the sites to Neighborhood Business Land Use Districts, Residential Land Use Districts, and Transition Areas.

As set forth in detail below, this Alternative Siting Analysis addresses the requirements of LUC 20.20.255.D for the South Bellevue Segment. First, using nomenclature developed during the 2014 community advisory group process, PSE discusses three siting alternatives considered for the South Bellevue Segment:

1) Willow 1 route (Figure 2, entirely within the existing corridor),
2) Willow 2 route (Figure 3), and
3) Oak 1 route (Figure 4).

The Willow 1, Willow 2, and Oak 1 routes are all feasible; however, based on the information obtained through the EIS process and extensive public outreach, PSE will proceed with the

Willow 1 route to limit environmental impacts and new impacts to adjacent uses. In addition, pipeline safety experts concluded that the Willow 1 route gives PSE the greatest assurance that the Energize Eastside Project will operate safely in the same corridor as BP's Olympic Pipeline.

2.3 ALTERNATIVE SITE DESCRIPTIONS

LUC 20.20.255D.2.a. Describe the sites identified in subsection D.1 of this section and the land use districts within which the sites are located.
[...]

LUC 20.20.255D.2.c. Describe which of the sites analyzed are considered practical or feasible alternatives by the applicant, and which of the sites analyzed are not considered practical or feasible, together with supporting information that justifies that conclusions reached. For sites located within a Neighborhood Business Land Use District, Residential Land Use District, and/or Transition Area (including the Bel-Red Office/Residential Transition (BR-ORT), the applicant shall:

i. Describe whether the electrical utility facility location is a consequence of needs or demands from customers located within the district area; and
ii. Describe whether the operational needs of the applicant require location of the electrical utility facility in the district or area.

The Energize Eastside Project serves all of the potentially impacted land uses as in general, all land uses require electricity. The Energize Eastside Project will provide an upgraded, reliable transmission system serving the Eastside generally and adjacent uses specifically. The Project is needed because cumulatively, demand on the Eastside is increasing, including in areas along the South Bellevue Segment. The transmission line component of the project must run between the Sammamish and Talbot Hill substations. It must also connect with the proposed Richards Creek substation. The location of the substation is not dependent on being sited in a specific district; however, it does need to be situated in a location that the most reliable operation. Based on operational best practices, the ideal location for the new 230 kV substation is located in close proximity to PSE's existing 115 kV Lakeside substation. In addition, operationally, the transmission line must transverse through the City of Bellevue from the north to the south, making it impossible to completely avoid areas of residential zoning. The existing corridor (Willow 1) provides the shortest distance through the city and therefore, crosses the least amount of residential zoning.

As required under LUC 20.20.255.D.1 and LUC 20.20.255.D.2.c.i-.ii, all siting alternatives are located in land use districts served by the South Bellevue Segment. The City of Bellevue's and

the Eastside's growing demand for power is a primary driver of the need for the Energize Eastside Project.

This conclusion was confirmed by the City's independent experts. Utility System Efficiencies, Inc. (USE) was engaged by the City in December, 2014 to conduct an independent technical analysis of the purpose, need, and timing of the Energize Eastside Project. In April 2015, USE published a report summarizing its findings. *See* Independent Technical Analysis of Energize Eastside for the City of Bellevue, WA (April 28, 2015) ("USE Report"). The USE Report answered the following questions:

> **IS THE EE PROJECT NEEDED TO ADDRESS THE RELIABILITY OF THE ELECTRIC GRID ON THE EASTSIDE? Yes.**
>
> Although the new 2014 forecast resulted in an 11 MW decrease in the Eastside area's 2017/18 winter forecast, the reduced loading still resulted in several overloaded transmission elements in winter 2017/2018, which drive the project need. ...
>
> Although the corrective action plan (CAP) required in the 2017/18 winter to avoid facility overload doesn't require dropping load (turning off customers' power), by winter 2019/20 approximately 63,200 customers are at risk of losing power. …
>
> **IS THE PROJECT NEEDED TO ADDRESS REGIONAL GRID POWER FLOWS, SPECIFICALLY POWER FLOWS ON THE NORTHERN INTERTIE (TO AND FROM CANADA)? The project is necessary to address local need.**
>
> The Optional Technical Analysis examined this issue by reducing the Northern Intertie flow to zero (no transfers to Canada). Although this scenario is not actually possible due to extant treaties, it was modeled to provide data on the drivers for the EE project, to examine if regional requirements might be driving the need. The results showed that in winter 2017/18, even with the Northern Intertie adjusted to zero flow, the Talbot Hill 230/115 kV transformer #2 would still be overloaded by several contingencies (several different outage scenarios). Again, the projected overloads indicate a project need at the local level to meet reliability regulations.

Use Report at 5-6.

The USE Report went on to confirm PSE's conclusion that, applying federal electrical system planning requirements, transformers serving uses adjacent to the South Bellevue Segment will experience overloads (i.e., reduced reliability) in foreseeable planning scenarios. USE Report at 52 (containing tables summarizing PSE's forecasting results that show overloads at the Talbot and Lakeside substations).

In addition to the USE Report, in 2012, Bellevue retained Exponent to perform an electrical system reliability assessment. Exponents report stated "As a minimum, the following capacity additions have been identified as being needed within the next 5 to 10-year time frame:

- Upgrade of existing 115 kV lines to 230 kV
- Addition of transformer banks to support expected growth in various areas of the City (Downtown, Bel-Red, and Somerset/Eastgate)
- Addition of new 115 kV lines to reinforce the overall electric system."

City of Bellevue Electrical Reliability Study, Phase 2 Report at 140. In sum, following construction, uses adjacent to the proposed transmission line will benefit from improved reliability now, and into the future.

As described above, numerous route alternatives were developed and evaluated in the public review processes described in Section 4.0 of this document.[3] Three of the options for the South Bellevue Segment are described below (LUC 20.20.255.D.1). *See* Attachment A (mapping PSE's proposed alternatives). These include the two existing transmission line corridors and a new corridor. The two existing corridors include Seattle City Light's Eastside 230 kV corridor and PSE's Sammamish-Lakeside-Talbot Hill 115 kV corridor. The third alignment was developed during the LRT work and provides for an alternative located west of the SCL and PSE transmission line corridors. These corridors were chosen as potential alternatives based on the public outreach processes.

2.3.1 Willow 1, Existing PSE 115 kV Transmission Line Corridor

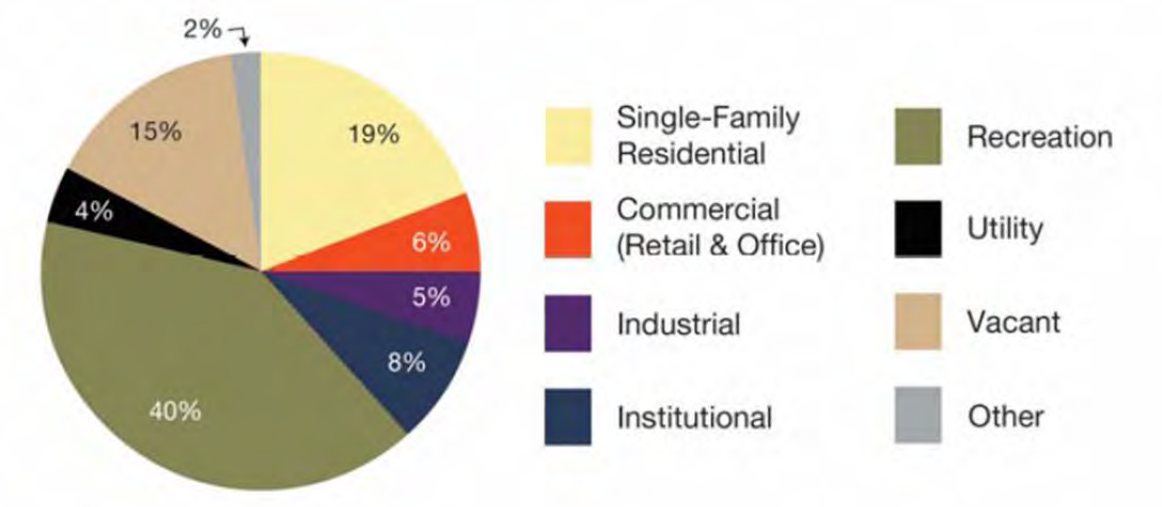
"Willow 1" was one of the original two routes recommended by the community advisory group in 2014. The route utilizes the existing Sammamish-Lakeside-Talbot Hills 115 kV corridor (Attachment A, Figure 2). The corridor was established in the late 1920s and early 1930s. In the 1960s, the line was upgraded from 55 kV to 115 kV, which included replacement of original poles with the existing H-frame poles. As noted in Section 2, PSE identified in the early 1990s

[3] In addition to the three routes evaluated herein, the City's Phase 2 DEIS analyzes two additional routing options in the South Bellevue Segment. *See* Attachment B (comparing environmental impacts of each of the four South Bellevue Segment alternatives). This additional analysis is excluded from the ASA as they go above and beyond what is required under LUC 20.20.255.D, however, the review of the Phase 2 DEIS may also be useful in ensuring PSE's compliance with LUC 20.20.255.D.

that the lines within the same corridor would need to be upgraded to the next higher transmission voltage (230 kV). This 230 kV upgrade has been included in Bellevue Comprehensive Plans since the adoption of the Growth Management Act in 1990. The route crosses through the following land use districts in the South Bellevue Segment: LI, OLB, R-1, R-3.5, R-5, and R-15. *See* LUC 20.20.255.D.2.a. In sum, Willow 1 would be located in six different zoning districts in the City including commercial, industrial, multi-family residential, and single family residential districts. Consistent with the City's Phase 2 DEIS, PSE considers this route to be feasible. *See* LUC 20.20.255.D.2.c.

As described in the City's Phase 2 DEIS:

> Existing land uses are predominantly recreation, single-family residential, and vacant lands (see the chart below for the percentage of the total study area in the Willow 1 route that each land use represents). Approximately 212 parcels are immediately adjacent to the existing corridor. Unique land uses include Tyee Middle School, Forest Hill, King County Solid Waste Division, the I-90 crossing, Somerset Recreation Club, and Sunset Park.



> The route goes through the neighborhoods of Eastgate, Somerset, and Newport Hills. The Eastgate Subarea is characterized by the I-90 business corridor with commercial offices, high-tech industries, and commercial shopping centers. Outside of the commercial center of Eastgate is single-family housing. The Somerset Subarea is a community of hilltop single-family homes. The Newport Hills Subarea is made up of single-family and multi-family neighborhoods with a core commercial district in the center of the community. Several parks (including Sunset Park and Coal Creek Park), a government building, and a school (Tyee Middle School) are along the Willow 1 route.

> The Bellevue Comprehensive Plan designates community business and light industrial in Eastgate, while the Somerset and Newport Hills communities would remain as single-family developments, with a commercial center in Newport Hills. The subarea plan policies of Eastgate, Somerset, and Newport Hills support growth in similar land use patterns as those that currently exist.
>
> There are 180 single-family and 10 multi-family residences within this option.

Phase 2 DEIS at 3.1-15. Approximately 19% of the Willow 1 route would impact Single Family uses. *Id.* All of these residences currently have two 115 kV transmission lines as an adjacent use. The use of an existing corridor does not impose a new transmission line on new areas, does not require the acquisition of new easements, and is specifically identified on Bellevue's Comprehensive Plan UT-7 map as being expanded to 230 kV.

PSE has selected the Willow 1 route as its preferred alternative. All of the proposed routes, including Willow 1, traverse residential land use districts. By constructing the proposed transmission line facilities in the existing 115 kV transmission line corridor, site compatibility impacts are limited by this alternative. *See* LUC 20.20.255.2.d. By using the existing corridor, PSE minimizes tree removal and management within the corridor (see Attachment B) as compared to establishing a new corridor and can better assess and limit potential interactions with a co-located petroleum and natural gas pipeline (*AC Interference Analysis – 230 KV Transmission Line Collocation with Olympic Pipelines OPL16 & OPL20*; DNV-GL 2016). It also avoids the creation of new impacts to adjacent uses, including residential uses. As properties adjacent to the transmission line corridor already have utility facilities in their viewsheds and neighborhoods, Willow 1 significantly limits new impacts.

2.3.2 Willow 2

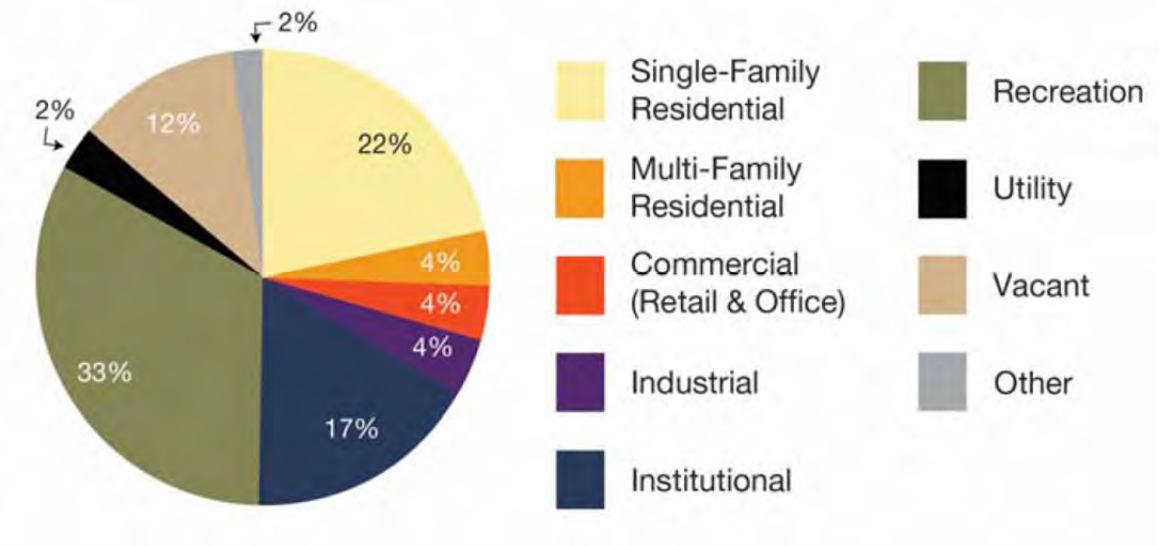
"Willow 2" is a result of one of the original two routes recommended by the community advisory group in 2014. This route was developed to address comments heard during the community advisory group process, primarily to address topographic and visual concerns in the Somerset area. It has also been evaluated as part of the City's SEPA review process. Willow 2 uses PSE's existing Sammamish-Lakeside-Talbot Hill 115 kV corridor; in addition to moving lines to SE Newport Way, Factoria Boulevard SE, and Coal Creek Parkway SE (Attachment A, Figure 3). More specifically, from the new Richards Creek 230 kV substation south to SE Newport Way, the existing two 115 kV lines would be removed and the replaced with two 230 kV lines. In addition, the Somerset substation would need to be rebuilt in order to connect to the 230 kV system.

South of where the existing transmission corridor crosses SE Newport Way, the two existing 115 kV lines would be removed and replaced with a single 230 kV line. From the same crossing at SE Newport Way, the existing double circuit distribution (12.5 kV) and communication lines could be relocated underground because PSE would build a 230 kV line along the road. This new 230 kV line would continue to Factoria Blvd. SE where it would join the existing 115 kV line along Factoria Blvd. SE. The section between SE Newport Way and Coal Creek Parkway SE would be rebuilt to a double circuit line on steel poles. The existing 115 kV line between Coal Creek Parkway SE and PSE's Somerset substation, located at the intersection of Coal Creek Parkway SE and Forest Drive SE, would be rebuilt as a 230 kV line, where it would rejoin with the Sammamish-Lakeside-Talbot Hill corridor.

The Willow 2 route crosses through the following land use districts in the South Bellevue Segment: R-1, R-3.5, R-5, R-15, R-20, R-30, OLB, and LI. See LUC 20.20.255.D.2.a. In sum, Willow 2 would be located in a total of eight different zoning districts in the City of Bellevue.

As described in the City's Phase 2 DEIS:

> Existing land uses mostly include recreation, single-family residential homes, and institutional (see the chart below for the percentage of the total study area in the Willow 2 route that each land use represents). Approximately 309 parcels are immediately adjacent to the corridor (existing and new). Unique land uses include Newport Children's School, Holy Cross Lutheran Church, Newport Covenant Church, King County Solid Waste Division Factoria Transfer Station, Sunset Park, and the I-90 crossing.
>
> The Willow 2 route would go through the same neighborhoods of Eastgate, Somerset, and Newport Hills as in the Willow 1 route. However, at SE Newport Way, the option route would also follow SE Newport Way on the border of Factoria, heading south at Coal Creek Parkway SE. The Factoria/Somerset border is characterized by single-family residential developments and small commercial spaces. Several parks (including Sunset Park and Coal Creek Park), government buildings, and schools (Newport Children's School, and Tyee Middle School) are along the Willow 2 route.



The subarea plan policies of each of the subareas within the Willow 2 route support growth in similar land use patterns as those that currently exist.

There are 257 single-family and 221 multi-family residences within this option. Approximately 26% of the Willow 2 route would impact Single and Multi-Family uses.

Consistent with the City's Phase 2 DEIS, PSE considers this route to be feasible. See LUC 20.20.255.D.2.c. PSE ultimately eliminated this route from consideration, however, because from a safety perspective, the Willow 1 route has the lowest potential AC interaction with the petroleum pipelines that share the corridor. Additionally, the Willow 1 route requires the fewest number of trees to be removed in order to comply with NERC standards and uses an existing transmission line corridor.

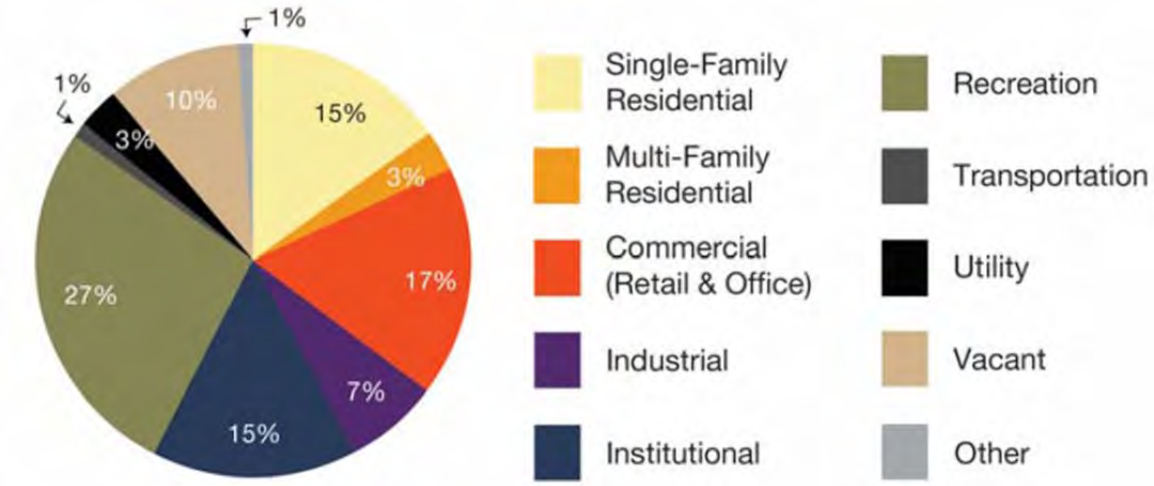
2.3.3 Oak 1

"Oak 1" was also one of the original two routes recommended by the community advisory group in 2014. It has also been evaluated as part of the City's SEPA review process. Oak 1 utilizes portions of the PSE's existing Sammamish-Lakeside-Talbot Hills 115 kV corridor (Attachment A, Figure 4). This alternative departs from the existing corridor just south of PSE's existing Lakeside substation (the proposed Richards Creek substation), which is located on the parcel south of the Lakeside substation, currently used as a pole storage yard. From the Pole Yard, the route heads west along SE 30th Street and then continues south along Factoria Blvd. SE and Coal Creek Parkway, where it converges back with the existing 115 kV corridor. Oak 1 entails maintaining the existing 115 kV transmission lines in the existing corridor through the Somerset area and replacing the existing single 115 kV transmission line circuit with new double circuit 230 kV/115 kV lines on the alignment described above. The new 230 kV route crosses

through the following land use districts in the South Bellevue Segment: R-1, R-2.5, R-3.5, R-5, R-20, R-30, O, CB, PO, F-1, F-2, and LI. *See* LUC 20.20.255.D.2.a. In sum, Oak 1 would be located in a total of twelve different zoning districts in the City of Bellevue, including commercial, industrial, mixed use, multi-family residential, and single-family residential districts.

As described in the City's Phase 2 DEIS:

> Existing land uses along Oak 1 mostly include recreation, commercial, and single-family residential homes (see the chart below for the percentage of the total study area in the Oak 1 Option that each land use represents). Approximately 318 parcels are immediately adjacent to the corridor (existing and new). Unique land uses include Sunset Park, King County Solid Waste Division Factoria Transfer Station, the I-90 crossing, Coal Creek Park, Tyee Middle School, Forest Hill Neighborhood Park, a large industrial/commercial area on Factoria Blvd SE, KidsQuest Children's Museum, Bellevue Fire Station 4, St. Margaret's Episcopal Church, Newport High School, Newport Covenant Church, and the Factoria Police Station.



> The option goes through the neighborhoods of Eastgate, Factoria, northwest Somerset, and Newport Hills. The Eastgate Subarea is characterized by the I- 90 business corridor with commercial offices, high-tech industries, and commercial shopping centers. Factoria is characterized by single-family residential developments and small commercial spaces. The northwest Somerset area is a single-family residential development on a hilltop. The Newport Hills Subarea is made up of single-family and multi-family neighborhoods with a core commercial district in the center of the community. Several parks (including Sunset Park and Coal Creek Park), government buildings, and schools (Newport High School and Tyee Middle School) are along the Oak 1 Option.

The subarea plan policies of each of the subareas within the Oak 1 Option support growth in similar land use patterns as those that currently exist.

There are 212 single-family and 287 multi-family residences within this option.

Phase 2 DEIS at 3.1-13. Approximately 18% of the Oak 1 route would impact Single and Multi-Family uses.

Consistent with the City's Phase 2 DEIS, PSE considers this route to be feasible. *See* LUC 20.20.255.D.2.c. PSE ultimately eliminated this route from consideration, however, because from a safety perspective, the Willow 1 route has the lowest potential AC interaction with the petroleum pipelines that share the corridor. Additionally, the Willow 1 route requires the fewest number of trees to be removed in order to comply with NERC standards and uses an existing transmission line corridor. The use of an existing corridor does not impose a new transmission line on new areas, does not require the acquisition of new easements, and is specifically identified on Bellevue's Comprehensive Plan UT-7 map as being expanded to 230 kV.

2.3.4 Substation Alternatives

The substation yard needs to be large enough to accommodate a new 230 kV-115 kV transformer and associated electrical equipment such as circuit breakers, electrical bus, and connections to the new transmission lines. It is expected that the substation's fenced yard will be approximately 2 acres. The main function of the substation is to step down the 230 kV voltage (bulk power) from the new transmission lines to 115 kV needed for use by the local distribution system. All substation locations are considered to be feasible. LUC 20.20.255.D.2.c.

Three 230-115 kV substation sites were considered for the Energize Eastside Project - referred to as Westminster, Vernell, and Richards Creek. These sites were selected for consideration because they are all owned by PSE; meet the objectives to site the 230 kV transformer at a central location between the existing 230 kV power sources at Sammamish substation in Redmond and Talbot substation in Renton; accommodate the necessary improvements to serve the required 230 kV transmission lines to bring power to the centralized transformer; and distribute power to the existing network of 115 kV transmission lines.. Of the three substation sites, only Richards Creek is located within the Southern Phase; however, since the primary objective of the Energize Eastside Project is to install a new transformation source in the central Bellevue area, their inclusion is relevant.

2.3.4.1 Westminster

The Westminster substation site is on property owned by PSE and located at 13649 NE 24th Street in the City of Bellevue (Parcel 2725059166) in the Bridle Trails Subarea (Attachment A, Figure 5). Currently, the approximately 6 acre site is undeveloped and primarily forested. The north half of the property is zoned for Professional Office (PO) with the southern half zoned Office (O) Surrounding properties to the north and west are zoned as Single-Family Residential Estate (R-1). The properties located to the east is zoned General Commercial (GC) with the properties located south of SR-520 being zoned Bel-Red General Commercial (BR-GC). The Westminster site is mapped as a "sensitive site" in the City's Comprehensive Plan (Map UT-7). When considering use of the existing corridor, it was determined that since the Westminster site was farther away from the Lakeside 115 kV station, there was no benefit in using the Westminster site over the Richards Creek site. In addition, to make the Westminster site work, additional 115 kV lines would be required between the site and the 115 kV lines located 140th Avenue NE.

2.3.4.2 Vernell

The Vernell substation site comprises two properties located at 2380 116th Avenue NE (Parcels: 2825059278 (1.32 acres) and 5268300010 (0.66 acres) in the Bel-Red Subarea (Attachment A, Figure 6). The site is zoned BR-MO (Bel-Red Medical Office) as are the properties located to the south and the west. The site currently contains an office building, parking areas and a sport court. The site is adjacent to SR-520 to the north and the former BNSF rail corridor the east. The property located to the east across the rail corridor is zone Bel-Red General Commercial (BR-GC). The Vernell site is mapped as a "sensitive site" in the City's Comprehensive Plan (Map UT-7). The existing 115 kV Sammamish to Lakeside transmission line corridor would not be an option for this substation site. Therefore, since the use of the existing corridor provides a number of benefits, Vernell was not selected as either Westminster or Richards Creek are along the existing PSE corridor and using Vernell would require additional transmission lines between the site and the existing transmission line corridor.

2.3.4.3 Richards Creek

The Richards Creek site is PSE's selected substation site. It is located adjacent to and south of the PSE's existing Lakeside substation at 13600 SE 30th Street (parcel 1024059130) (Attachment A, Figure 7). The 8.46 acre property is zoned Light Industrial (LI) as are the properties to the north, west, and south. Properties locate east of the site are zoned Office and Limited Business (OLB) and Multifamily Residential (R-10).

The central portion of the site is currently used as a pole storage yard. It is partially fenced and has a flat storage area consisting of paved driveways and gravel.

The Richards Creek substation is essentially an expansion of the Lakeside substation, which is mapped as a "non-sensitive" site in the City's Comprehensive Plan (Map UT-7). Normal practice is to have the 230 kV station co-located with the adjoining 115 kV station; however, due to topographic and environmental considerations located south of the Lakeside substation, expanding the station in that direction would be challenging. Therefore, placing the two stations on separate parcels was determined to be the most effective approach. Since the two yards have separate access points, they are required to have different names for operational and emergency purposes.

2.4 SELECTED SITE AND ROUTE

LUC 20.20.522D.2.d. Identify a preferred site from the alternative locations considered for the proposed new or expanding electrical utility facility. The following location selection hierarchy shall be considered during identification of the preferred site alternative: (i) nonresidential land use districts not providing transition, (ii) nonresidential Transition Areas (including the Bel-Red Office/Residential Transition (BR-ORT), and (iii) residential areas. The applicant may identify a preferred site alternative in a Residential Land Use District or Transition Area (including the Bel-Red Office/Residential Transition (BR-ORT) upon demonstration that the location has fewer site compatibility impacts than a nonresidential land use district location.

After years of study and extensive community dialogue, PSE selected the Richards Creek substation site and the Willow 1 transmission line corridor as the location for the Energize Eastside Project. Because PSE's project requires reconstruction of miles of transmission lines through the City, all routes evaluated by PSE traverse residential uses. As such, PSE cannot avoid residential uses by selecting a site reflective of the City's selection hierarchy. *See* LUC 20.20.255.D.2.d. The Willow 1 route, however, minimizes compatibility impacts by using an existing utility corridor that has been in operation since the 1920s and 1930s. By doing so, it does not require acquisition of additional easements, it removes the fewest number of trees, and it prioritizes safety by having the lowest potential AC interaction with the two petroleum pipelines that share the corridor. Moreover, the Phase 2 DEIS identified that Willow 1 impacts 309 fewer residences than the Oak 1 route and 288 fewer residences than the Willow 2 route.

Willow 1 is more consistent with the City's selection hierarchy which seeks to limit impacts to residences. When considering the location selection hierarchy (LUC 20.20.225.2.d.), there is no possible way to route a transmission line, between the Richards Creek substation and the Bellevue/Newcastle city border, entirely within nonresidential land use districts not providing transition or non-residential Transition Areas. This is a result of city zoning that does not provide any congruent nonresidential north-south corridors. However, Willow 1 crosses or has adjacency to the least amount of residential and residential transition area. The Willow 1 route was originally established in the late 1920s and early 1930s when little to no development in the

area had occurred. The residential areas that exist today have developed around the transmission line corridor. Additionally, the proposed upgrade of the existing 115 kV lines to 230 kV has been incorporated in the City's comprehensive plan since the early 1990s; therefore, using the Willow 1 route is the most compliant with the Comprehensive Plan.

In sum, as Willow 1 upgrades an existing transmission line and follows the existing route, this alternative creates the fewest new impacts (including compatibility impacts) as compared to the Oak 1 route. *See* LUC 20.20.255.D.2.d. These are the key factors that make Willow 1 the preferred alternative for Energize Eastside.

2.4.1 Other Rejected Transmission Line Options

The 2015 Solutions Study and 2014 Solutions Report concluded that the preferred solution to solve the Eastside's transmission deficiencies was aggressive conservation combined with construction of a new 230/115 kV transformer and the development of 230 kV transmission lines to connect existing facilities. Transmission line alternatives evaluated, but rejected, by PSE included the use of the Seattle City Light 230 kV corridor, underwater transmission lines (Phase 1 DEIS), the undergrounding of transmission lines, as well as numerous overhead alternatives. These are discussed below.

2.4.1.1 Seattle City Light 230 kV Corridor

Seattle City Light (SCL) operates a dual 230 kV transmission line through the Energize Eastside Project area. The use of these transmission lines/corridor was evaluated in the Phase 1 DEIS. The SCL corridor traverses approximately 7.3 miles within the city of Bellevue, with about 3 miles in the south phase (excluding the lines necessary to connect to the Richards Creek substation). To connect the SCL lines to the 230 kV Richards Creek substation, two new 230 kV lines would need to be constructed, which would require establishing a new transmission corridor. The exact length of that alignment has not been determined, but the proximity of the Richards Creek and Sammamish substations to the SCL lines suggests that each connection would be approximately 1 mile.

PSE explored the idea of using the SCL lines as an option; however, the SCL facility is not under PSE ownership, and SCL stated that it needs these lines to serve its customers (Gentile et al., 2014). For the foregoing reasons (lack of sufficient capacity, need for new transmission line facilities that will provide sufficient capacity for less than 10 years, and lack of permission from SCL), PSE does not consider this alternative to be feasible. See LUC 20.20.255.D.2.c.

2.4.1.2 Lake Washington Submarine Cable Alternative

The option of using a submerged or underwater transmission line in Lake Washington was also included in the Phase 1 Draft EIS. Additional detail about constructing a submarine cable in

Lake Washington is included in the Eastside 230 kV Project Lake Washington Submarine Cable Alternative Feasibility Report (Power Engineers, 2015). A submerged line would be prohibited by shoreline regulations in two of the communities north of the proposed Richards Creek substation (Beaux Arts Village and Hunts Point), because new utility corridors are prohibited in the aquatic environments of these communities.

South of the Richards Creek substation site, the City of Renton shoreline regulations (RMC 4-10-095) prohibit utilities in some shoreline environments, but it appears technically feasible to avoid prohibited environments if this option were chosen. However, this option would also require the construction of approximately 5 miles of new transmission corridors from the Talbot Hill substation to Lake Washington, and from Lake Washington to the Richards Creek substation, in order to avoid impacts to 8 miles along the existing corridor. As described in the Phase 1 Draft EIS, development of new corridors is expected to have higher environmental impacts than use of existing corridors, including permanent displacement of existing uses, vegetation removal, visual impacts, and construction duration. As such, this alternative was not seen as a reasonable alternative to using the existing corridor as proposed by PSE. For these reasons, an underwater line in Lake Washington was not carried forward as a viable alternative.

2.4.1.3 Underground Alternative

The option of placing the new 230 kV transmission lines entirely underground was evaluated in the Phase 1 Draft EIS. Underground transmission lines involve several technical and economic challenges that would necessitate acquiring a new or expanded right-of-way, including greater restrictions on surface vegetation and uses than are present in PSE's existing 115 kV right-of-way. Factors contributing to the need for additional right-of-way include the need for heat dissipation from each conductor, and the need for separation from the Olympic Pipeline, which is collocated in much of PSE's existing 115 kV corridor, in order to prevent corrosion of the pipeline. For heat dissipation, underground transmission lines must be placed approximately 12 to 15 feet apart and 3 feet below the surface (Power Engineers, 2014), which means there can be no trees or large shrubs planted over them. The potential for the electrical line to cause unacceptable corrosion of the pipeline is greater if the electrical line is underground than for overhead lines because soils are more conductive than air. Large access vaults are also required every quarter mile, and must remain unobstructed by surface structures.

While PSE has an easement for their overhead lines, placing a transmission line underground would require permission from both the Olympic Pipe Line Company and each property owner along the route. Gaining such permission would likely require extensive legal action that would delay the project and thus not meet the project objectives regarding timing. A study of potential undergrounding of the transmission lines prepared for PSE by Power Engineers (2014) states

that installation adjacent to the pipeline is technically viable, but that the Olympic Pipe Line Company has stated to PSE that they will not consent to other underground facilities being installed longitudinally in their easements. PSE would therefore have to place its transmission lines outside the Olympic Pipeline easement which is, in some places, nearly as wide as the PSE corridor. Even in places where the pipeline easement is substantially narrower than PSE's corridor, PSE generally does not have enough easement area to provide the necessary separation without the pipeline being relocated. As such, an underground line would require a new corridor to avoid colocation with the Olympic Pipeline (Power Engineers, 2014). This would need to be in a street or on other public or private property that PSE would have to obtain rights to use.

The construction costs for an overhead transmission line are about $3 million to $4 million per mile; versus $20 million to $28 million per mile to construct the line underground (PSE, 2016). When a new line is constructed overhead, project costs are distributed evenly between PSE's 1.1 million customers and paid for overtime. If a transmission line were to be constructed underground, PSE can't justify asking customers across its entire service territory to pay the significant cost increases. As a result, per state-approved tariff rules, the requesting party, often the local jurisdiction, must ultimately decide whether to make this investment. The requesting party is then responsible for paying the difference between overhead and underground costs.

Given the high cost of acquiring and developing an entirely new underground corridor, and the likely delays it would entail, this option was not considered reasonable as an alternative for the entire corridor, although it is considered as an option for mitigation in limited areas, should one or more jurisdictions determine that it was necessary to avoid significant impacts. Impacts generally associated with the undergrounding of the transmission lines are addressed in the Phase 1 Draft EIS (in the analysis of Option C).

3.0 TECHNOLOGIES CONSIDERED AND RELIABILITY NEED (LUC 20.20.255.D.3)

LUC 20.20.255D.3.a: Describe the range of technologies considered for the proposed electrical utility facility.

PSE studied a range of potential solutions to resolve the Eastside transmission deficiencies; these included additional conservation, additional generation, demand response (DR), distributed generation (DG), energy storage, expansion of existing transmission substations, transmission line upgrades, and new transmission lines. PSE's analysis of alternative technologies is documented in detail in PSE's Solutions Report (2014), Pre-Screening Study (Feb. 2014), Underground Feasibility Study (2014), Supplemental Eastside Solutions Study

Report (2015) (“Solutions Study”), the Lake Washington Submarine Cable Alternative Feasibility Study (June 2015), and Eastside System Energy Storage Alternatives Screening Study (*Strategen*, 2015). All of these studies can be accessed at https://energizeeastside.com/documents. Non-wire technology solutions are also evaluated in detail in the Phase 1 DEIS (available at http://www.energizeeastsideeis.org/library.html).

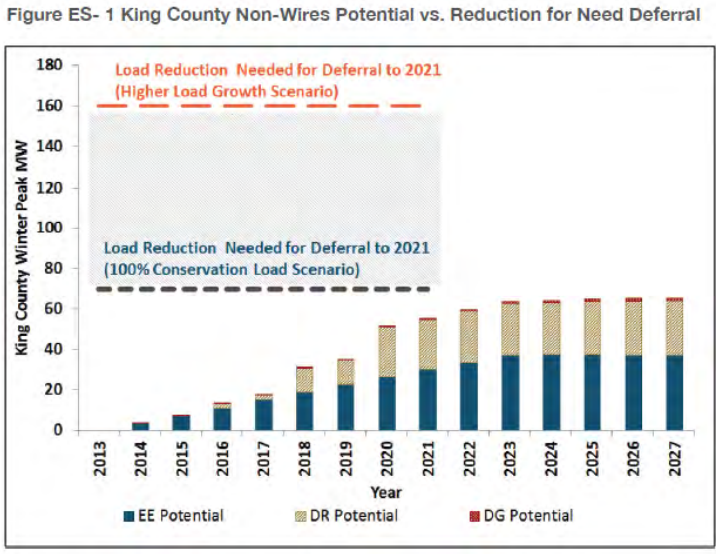
The following section summarizes PSE’s analysis with respect to each alternative technology.

3.1 INCREASING CONSERVATION

PSE retained Energy and Environmental Economics, Inc. (E3) to conduct a Non-wires Alternatives Screening Study. E3 included energy efficiency, demand response and distributed generation measures in its evaluation of cost-effective non-wires potential in the Eastside area. The study concluded that the cost-effective non-wires potential for the Eastside is not large enough to provide sufficient load reduction to allow even a 4-year deferral of Eastside transmission upgrade needs (see Figure 8).

DSD 001769

Figure 8: King County Non-wires Potential vs. Reduction for Needed Deferral



3.2 CONSTRUCTION OF NEW GENERATION FACILITIES

PSE studied both conventional generation and distributed generation (DG) in its 2015 Solutions Study. To be effective, this alternative would require at least 300 MW of generation located in the Eastside. Locating conventional generation of this size on the Eastside has major siting and environmental challenges, as a facility with necessary capacity would require a site of approximately 12 to 15 acres and would have significant supporting infrastructure, noise, emissions, and permitting challenges. For DG to meaningfully impact the identified needs, DG must be installed in the right locations, available when needed and be of significant magnitude. Locating 300 MW or more of distributed renewable generation within the Eastside area by the winter of 2017/2018 or summer of 2018 was not practical and highly impactful to the environment and surrounding communities. Additionally, the Cities' Phase 1 DEIS determined that this alternative did not meet SEPA requirements to provide a reasonable alternative that could feasibly attain or approximate a proposal's objectives at a lower environmental cost or decreased level of environmental degradation (WAC 197-11-440(5)(b)). Phase 2 DEIS at 2-56.

3.3 ENERGY STORAGE AND BATTERY ALTERNATIVES

PSE contracted with Strategen to perform an Eastside System Energy Storage Alternatives Screening Study, which concluded that an energy storage system with power and energy storage ratings comparable to PSE's identified need has not yet been installed anywhere in the world. In addition, Strategen determined that the existing Eastside transmission system does not have sufficient capacity to charge energy storage systems to a level sufficient to meet PSE's operating standards.

Chemical (battery) storage was determined to be potentially the most appropriate and commercially-viable technology for application within the Eastside. Chemical storage technology is rapidly advancing, but the only system of comparable size to what PSE requires is a 100 MW/400 MWh lithium-ion ESS recently procured by Southern California Edison ("SCE"), which is not expected to be operational until 2021. The largest currently deployed and commissioned chemical storage project (by power rating) in the United States is SDG&E's Expedited Energy Storage Project in Escondido, CA, a 37.5 MW/150 MWh lithium ion battery SCE's Tehachapi Wind Energy Storage ESS, an 8 MW/32 MWh lithium ion battery. Confidential interviews with various vendors indicate that the technology and capability exists for batteries to be deployed for this application and at this magnitude exists. However, since no similarly-sized system has ever actually been built or commissioned, it is difficult to estimate the time necessary for development, procurement, construction and deployment. Procurement of battery cells in particular may result in long lead times, especially for the two larger systems contemplated would constitute a significant portion of the global market for batteries.

Based upon the results of the study, Strategen concluded that the existing Eastside transmission system does not have sufficient capacity to charge a large chemical battery to a level sufficient to meet PSE's operating standards. Specifically, the Eastside system has significant constraints during off-peak periods that could prevent an energy storage system from maintaining sufficient charge to eliminate or sufficiently reduce normal overloads over multiple days. In other words, an energy storage system is not capable of meeting Energize Eastside's need, nor does an example of this scale of energy storage exist anywhere in the world. Strategen further estimated that deferring the Eastside transmission system upgrade until 2021 would cost ratepayers approximately $1.44 billion.

3.5 THE ENERGIZE EASTSIDE PROJECT ENSURES A LONG-TERM SOLUTION TO NEAR-TERM RELIABILITY DEFICITS

LUC 20.20.255.D.3.b. Describe how the proposed electricity utility facility provides reliability to customers served.

The Energize Eastside Project is needed to meet local demand growth in the eastside of King County, including Bellevue, Redmond, Kirkland, Renton, Newcastle and Issaquah. It is PSE's responsibility to plan and operate the electrical system while complying with federal standards and guidelines.

Electricity is currently delivered to the Eastside area[4] through two 230 kV/115 kV bulk electric substations – the Sammamish substation in Redmond and the Talbot Hill substation in Renton – and distributed to neighborhood distribution substations using 115 kV transmission lines. No 230 - 115 kV transformer upgrades have been made and the primary 115 kV lines connecting the Sammamish and Talbot Hill substations (the backbones of the Eastside electrical system) have not been upgraded since the 1960s. Since then, the Eastside population has grown from approximately 50,000 to nearly 400,000. This growth is expected to continue. The Puget Sound Regional Council estimates that the Eastside population will likely grow by another third and employment will grow by more than three-quarters over the next 25 years.

The Eastside's rapid growth is also documented in the City's Phase 1 and Phase 2 DEISs:

> Based on U.S. Census and Puget Sound Regional Council population forecast data, PSE's analysis concluded that the population in PSE's service area on the Eastside is projected to grow by approximately 1.2 percent per year over the next 10 years and employment is expected to grow by 2.1 percent per year, resulting in additional electrical demand (Gentile et al., 2015). If electrical load growth occurs as PSE has projected, PSE's system would likely experience loads on the Eastside that would place the local and regional system at risk of damage if no system modifications are made.

Phase 1 DEIS at 2-13.

As required by federal regulations, PSE performs annual electric transmission planning studies to determine if there are potential system performance violations (transformer and line overloads) under various operational and forecasted electrical use scenarios. These exercises are generally referred to as reliability assessments.

The need for additional 230 kV to 115 kV transmission transformer capacity and 230 kV support in the Eastside was identified in the 1993 reliability assessment, and has been included in PSE's Electrical Facilities Plan for King County ("Plan") since that time.[5] It was first determined

[4] For the purpose of this project, the Eastside is defined as the area between Renton and Redmond, bounded by Lake Washington to the west and Lake Sammamish to the east.

[5] As explained in the Plan, "[t]he 230 kV sources for the 115 kV system in northeast King County are primarily the Sammamish and Talbot Hill substation. The loads on the 230-115 kV transformers in these stations will be high enough to require new sources of transformation." Additionally, the "Lakeside 230 kV Substation project [now the Energize Eastside Project] will rebuild two existing 115 kV lines to 230 kV between Sammamish and Lakeside [where PSE proposes the construction of the Richards Creek substation], and between Lakeside and Talbot Hill."

during PSE's 2009 annual reliability assessment, that if one of the Talbot Hill Substation transformers failed, it would significantly impair reliability on the Eastside. Replacement of a failed 230 kV transformer can take weeks, or even months, to complete depending on the level of failure and other site specific parameters. Since 2009, other reliability deficits have been identified. These include concerns over the projected future loading on the Talbot Hill Substation and increasing use of Corrective Action Plans (CAPs) to manage outage risks to customers in this portion of the PSE system.

In total, since 2009, five separate studies[6] (Attachment C) performed by four separate parties have confirmed the need to address Eastside transmission capacity:

- Electrical Reliability Study by Exponent, 2012 (City of Bellevue)
- Eastside Needs Assessment Report by Quanta Services, 2013 (PSE)
- Supplemental Eastside Needs Assessment Report by Quanta Services, 2015 (PSE)
- Independent Technical Analysis by Utility Systems Efficiencies, Inc., 2015 (City of Bellevue)
- Review Memo by Stantec Consulting Services Inc., 2015 (EIS consultant).[7]

The studies performed by PSE in 2013 and 2015 confirmed that the Eastside's existing grid will not meet federal reliability requirements by the winter of 2017/2018 and the summer of 2018 without the addition of 230 kV to 115 kV transformer capacity in the Eastside area.

3.6 ELECTRICAL UTILITY FACILITY COMPONENTS

LUC 20.20.255.D.3c. Describe components of the proposed electrical utility facility that relate to system reliability.

PSE's proposal is to install and operate a new 230 kV to 115 kV electrical transformer in the center of the Eastside load area. The ideal location for the new transformer is in close proximity to PSE's existing Lakeside 115 kV substation, which provides the connection to the existing 115 kV electrical system that serves the surrounding distribution substations. The new 230 kV to 115 kV transformer is the principal component that will allow the Eastside electrical system to reliably operate and meet Federal Planning standards. To operate the new transformer it must be served by approximately 18 miles of new high-capacity electric transmission lines (230 kV) extending from Redmond in the north and Renton to the south. The transformer would be

[6] These studies provide evidence relevant to the City's review under LUC 20.20.255.E.4 and LUC 20.20.255.D.3.b & c.

[7] The City's consultants evaluation concluded as follows: "...PSE['s] needs assessment was overall very thorough and applied methods considered to be the industry standard for planning of this nature. Based on the information that the needs assessment contains, I concur with the conclusion that there is a transmission capacity deficiency in PSE's system on the Eastside that requires attention in the near future." (DeClerck, Review Memo by Stantec Consulting Services Inc., July 31, 2015).

placed at a new substation site near the center of the Eastside, referred to as the Richards Creek substation. Electrical power would be transmitted to the new substation and the voltage lowered, or "stepped down" (transformed), from 230 kV to 115 kV for distribution to local customers. In sum, and as confirmed by independent experts, all of the proposed Project components will benefit all Bellevue customers by improving reliability of the entire electrical system on the Eastside.

3.7 TECHNOLOGY BEST SUITED TO MITIGATE IMPACTS TO SURROUNDING PROPERTIES

LUC 20.20.255.D.3d. Describe how the proposed facility includes technology best suited to mitigate impacts on surrounding properties.

As proposed, the Energize Eastside Project uses the existing transmission line corridor that was originally established in the late 1920s and early 1930s. By building within the existing corridor, new environmental impacts are avoided. As part of the Energize Eastside Project, PSE has also aggressively sought to mitigate impacts by reducing pole height and moving pole locations where feasible and requested by a stakeholder. Post-construction and consistent with the City's code, PSE will fully mitigate all vegetation impacts by replanting both on and off-site. PSE is also in the process of obtaining input on pole color to limit contrast with the skyline or adjacent uses.

The Richards Creek substation location itself also gives PSE a significant mitigation opportunity. PSE is planning to replace and upgrade a culvert beneath a driveway that provides access to its existing pole yard site and proposed Richards Creek Substation. A pair of aging and undersized culverts (two side-by-side, 18-inch diameter corrugated metal pipe culverts) have proven inadequate to carry the combined flow and sediment loading along the stream. Construction associated with proposed culvert replacement and stream realignment will result in temporary disturbance to the stream, wetlands, and associated buffers, but will also result in net habitat benefits following project implementation. Significantly, fish passage will be greatly improved following the culvert replacement.

4.0 COMMUNITY OUTREACH CONDUCTED

LUC 20.20.255.D.4: Upon submittal of the Conditional Use Permit application required pursuant to subsection C of this section, the applicant shall provide a description of all methods of community outreach or involvement conducted by the applicant prior to selecting a preferred site for the proposed electrical utility facility.

The Energize Eastside Project was designed specifically to address system reliability deficits identified in multiple PSE and independent review studies. Overall, the Eastside's electrical grid will become less reliable in the near-term during times of peak demand without an upgrade in transmission facilities from 115 kV to 230 kV. Both elements of the South Bellevue Segment (Richards Creek Substation and the associated 3.3 miles of 230 kV transmission line upgrade) are designed to implement this change and improve reliability.

4.1 PSE HAS FULLY ENGAGED THE PUBLIC IN EVALUATING ENERGIZE EASTSIDE PROJECT ALTERNATIVES

Since launching the Energize Eastside Project in December 2013 and consistent with LUC 20.20.255.D.4, PSE has engaged the Eastside community in a robust public involvement process. This process has included mailings, public meetings and direct outreach efforts to ensure that stakeholders are informed about the project and have had plentiful and diverse opportunities to participate. PSE's public involvement process, especially with regards to routing, goes well beyond environmental review and permitting requirements, including a year-long route selection process with a Community Advisory Group (CAG).

To date, public outreach, and involvement has included:

- **22** CAG-related meetings, including **6** public open houses, **2** question and answer sessions, and **2** online open houses at key project milestones
- **500+** briefings with individuals, neighborhoods, cities and other stakeholder groups
- More than **2,900** comments and questions received
- **30+** email updates to more than **1,500** subscribers
- **8** project newsletters to **55,000+** households
- Ongoing outreach to **500+** property owners, including door-to-door and individual meetings
- Participation in **16** EIS-related public meetings

In addition, PSE's Energize Eastside website (https://energizeeastside.com) provides project updates and functions as a repository for project materials, including maps, technical studies, the CAG Final Report, fact sheets, newsletters, meeting summaries and other materials. An overview of the public engagement process is provided in the following sections.

4.1.1 PHASE 1: PUBLIC ROUTE DISCUSSION (2014)

To analyze and narrow the potential route alternatives to a reasonable number to study in detail and remove routes with considerable constraints, PSE engaged the CAG in 2014 to consider community values when evaluating the route options. The advisory group was comprised of

representatives from various interests within the study area, including potentially affected neighborhood organizations, cities, schools, social service organizations, major commercial users, economic development groups, and other interests. The advisory group spent a year learning about the Eastside's electrical system, participating in meetings and workshops and evaluating 18 route options identified by PSE using a Linear Routing Tool (see Section 2.2 for discussion).. The advisory group looked at the factors used to develop different route options, narrowed the route options based on values and constraints, and prepared route option recommendations for further consideration.

In addition to the CAG, PSE involved the community through public meetings, neighborhood meetings, briefings and comments, which provided Eastside residents opportunities to share their community values and ask initial questions about the project. The details about the advisory group process can be found in the Community Advisory Group Final Report (2015) (Attachment D).

4.1.2 PHASE 2: FIELDWORK AND ENVIRONMENTAL REVIEW (2015 – 2018)

In 2015, PSE began collecting field information necessary for design and environmental review. PSE kept stakeholders informed about these fieldwork activities to ensure residents knew when crews were expected to perform surveys near their homes and businesses.

In 2015, the City began its review under the State Environmental Policy Act (discussed in greater detail below). The City of Bellevue is leading the EIS process in cooperation with Newcastle, Kirkland, Redmond and Renton.

PSE has provided supplemental EIS notifications about major milestones and comment periods to keep stakeholders informed and to support community engagement in addition to those provided by the City of Bellevue and other jurisdictions. PSE has also participated in eight scoping meetings and eight draft EIS hearings over the two-phased EIS process where input on EIS alternative solutions and route options was solicited from the public.

4.1.3 PHASE 3: PROPERTY-OWNER CONSULTATIONS (2016 – TODAY)

As project design progressed, PSE began reaching out to individual property owners to share information and answer questions. In spring 2016, the project team visited neighborhoods along the existing corridor and Factoria area to talk with residents and business owners about the project. This door-to-door outreach was conducted to help inform customers about the project status and to address questions and concerns from property and business owners.

In September 2016, PSE began meeting with property owners and tenants along the existing corridor to discuss property-specific design and tree replacement plans. We shared our current

design for that specific property, including pole locations and how we plan to access those locations during construction. These conversations have helped us refine our project design and better understand customer interests and concerns.

In May 2017, PSE began meeting with property owners to begin developing property-specific landscaping and tree replacement plans with property owners. We are currently reaching out to affected property owners about these efforts.

Input received through the CAG process, neighborhood and stakeholder briefings, the Environmental Impact Statement process, one-on-one property owner meetings, and the nearly 3,000 comments and questions received to date has helped to shape the Energize Eastside Project and PSE's decision making.

4.2 STATE ENVIRONMENTAL POLICY ACT REVIEW

The City rigorously evaluated the Energize Eastside Project, including the South Bellevue Segment, under the State Environmental Policy Act (SEPA). In conjunction with the cities of Redmond, Kirkland, Renton, and Newcastle, the City published a Phase 1 and Phase 2 Draft Environmental Impact Statement (DEIS). These documents can be found online at http://www.energizeeastsideeis.org/.

The Phase 1 DEIS contained a programmatic review of project alternatives including analysis of the feasibility of an overhead transmission line (such as the one currently proposed), use of the Seattle City Light transmission system, the construction of underwater transmission lines, and an integrated resource approach (i.e., employing non-transmission line technologies such as additional aggressive conservation and demand response technologies, new distributed generation facilities, and/or energy storage systems). *See Phase 1 DEIS*, Ch. 2. A thorough analysis of all project alternatives relative to defined project objectives (e.g., meeting demand growth and being environmentally acceptable to impacted cities), resulted in a narrowing of reasonable alternatives to an overhead transmission solution.

The Phase 2 DEIS contains the City's focused review of overhead transmission line route alternatives and impacts. It contains a detailed analysis of six route segments and seven route options within those segments. The Phase 2 DEIS analyzes four different routing options in the South Bellevue Segment. *See* Attachment B (comparing environmental impacts of each of the four South Bellevue Segment alternatives). Ultimately, PSE deviated from its originally preferred route in South Bellevue and chose to move forward with a plan to build its proposed system upgrades in the existing transmission line corridor. This route is the least impactful (particularly because it minimizes *new* environmental impacts) and prioritizes safety by limiting the potential for interactions with Olympic's petroleum pipelines.

5.0 CONCLUSION

PSE has selected the Richards Creek substation site and the Willow 1 transmission line corridor as the site for the Energize Eastside Project. The substation site is owned by PSE and is located in an industrial area adjacent to the existing PSE Lakeside 115 kV substation. The Willow 1 route uses an existing transmission line corridor that has been in operation since late 1920s and early 1930s. By using this substation site and corridor, additional easements or properties are not required. Even though the existing vegetation within the corridor is managed, which includes trimming and periodic removal, conversion of the existing transmission lines from 115 kV to 230 kV requires removal of taller growing tree species in order to meet federal vegetation management standards (NERC FAC-003). By using the existing corridor, the fewest number of trees will need to be removed. The use of the Willow 1 route combined with optimized transmission line design and 230/230 kV operation, allows for the lowest potential AC interaction with the two petroleum pipelines that share the corridor. These are the key factors that make Richards Creek substation site and the Willow 1 transmission line route the preferred alternative for Energize Eastside.

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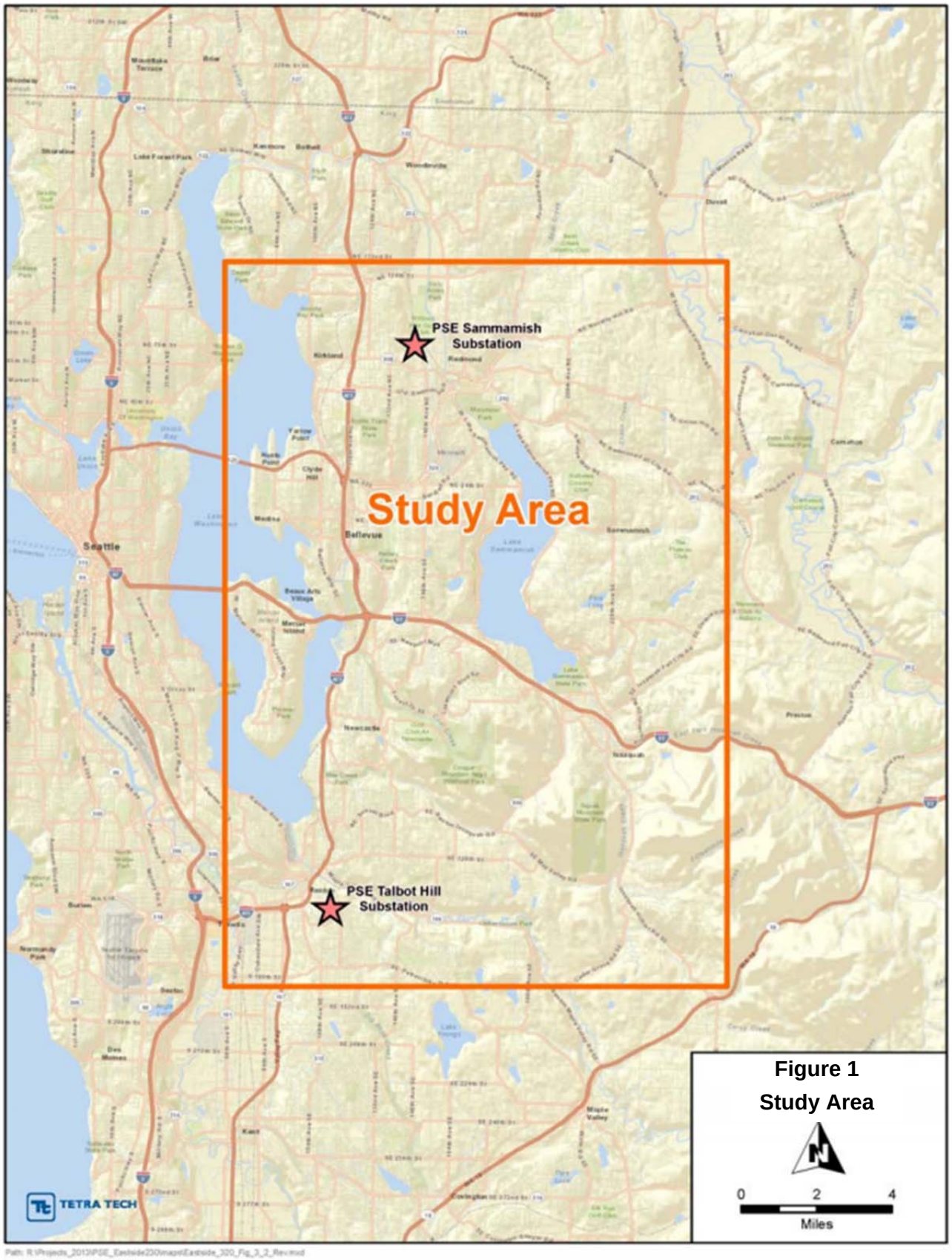
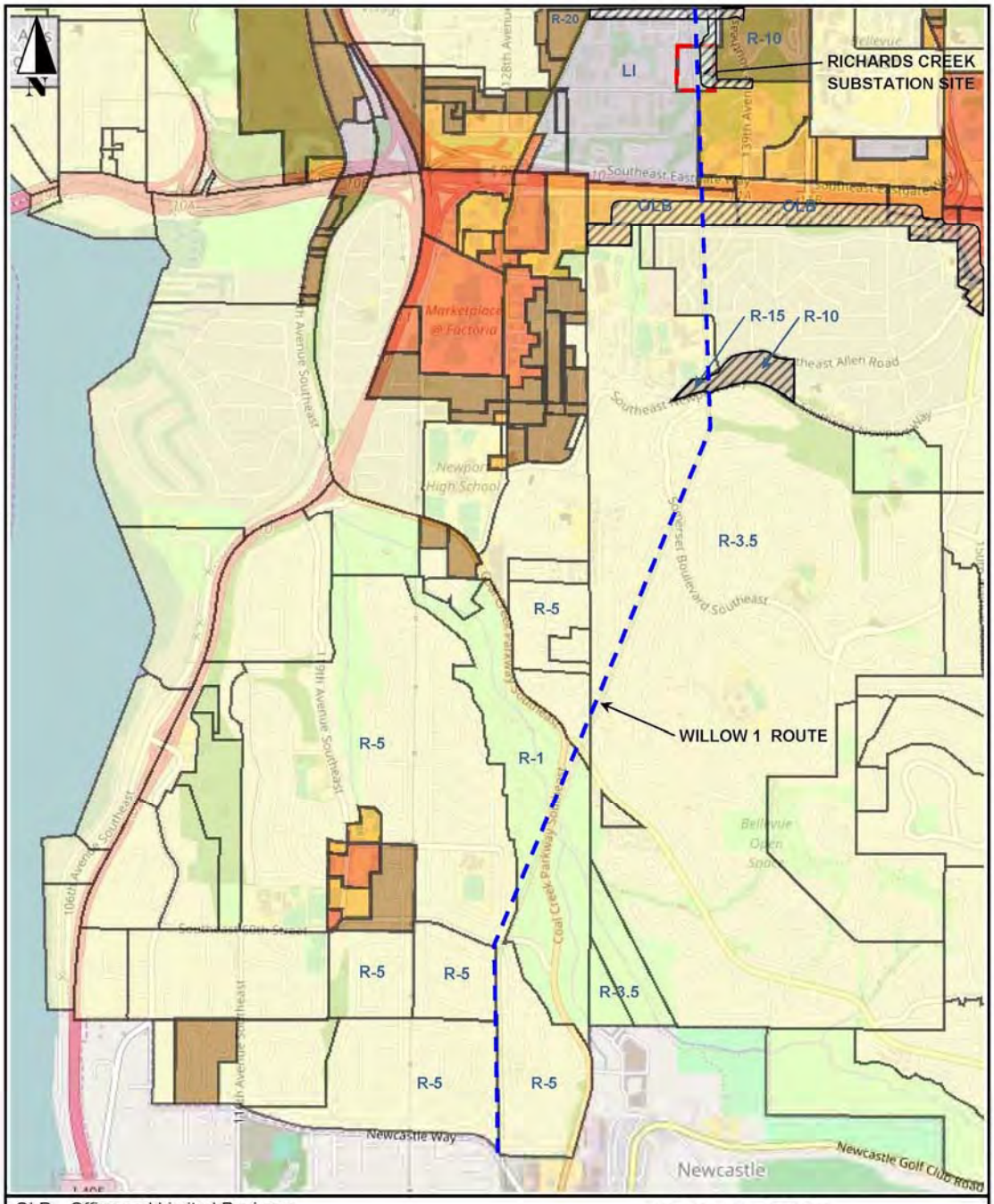
ATTACHMENT A
Figures


PSE Sammamish Substation
Study Area
PSE Talbot Hill Substation
Seattle
Bellevue
Kirkland
Redmond
Issaquah
Renton
Newcastle
Maple Valley
Kent
Des Moines
Burien
Normandy Park
Lake Forest Park
Shoreline
Woodinville
Mercer Island
Bellevue Arts Village
Yarrow Point
North Point
Clyde Hill
Medina
Sammamish
Preston
Carnation
Dorset
TETRA TECH
Figure 1
Study Area
0
2
4
Miles



OLB—Office and Limited Business
LI — Light Industrial
R-1 through 7.5—Single Family Residential
R-10 through 15—Multi Family Residential
Transition Area (crossed by route)

FIGURE 2 ZONING

WILLOW 1—SOUTH PHASE

(Bellevue/Newcastle Line to Richards Creek)

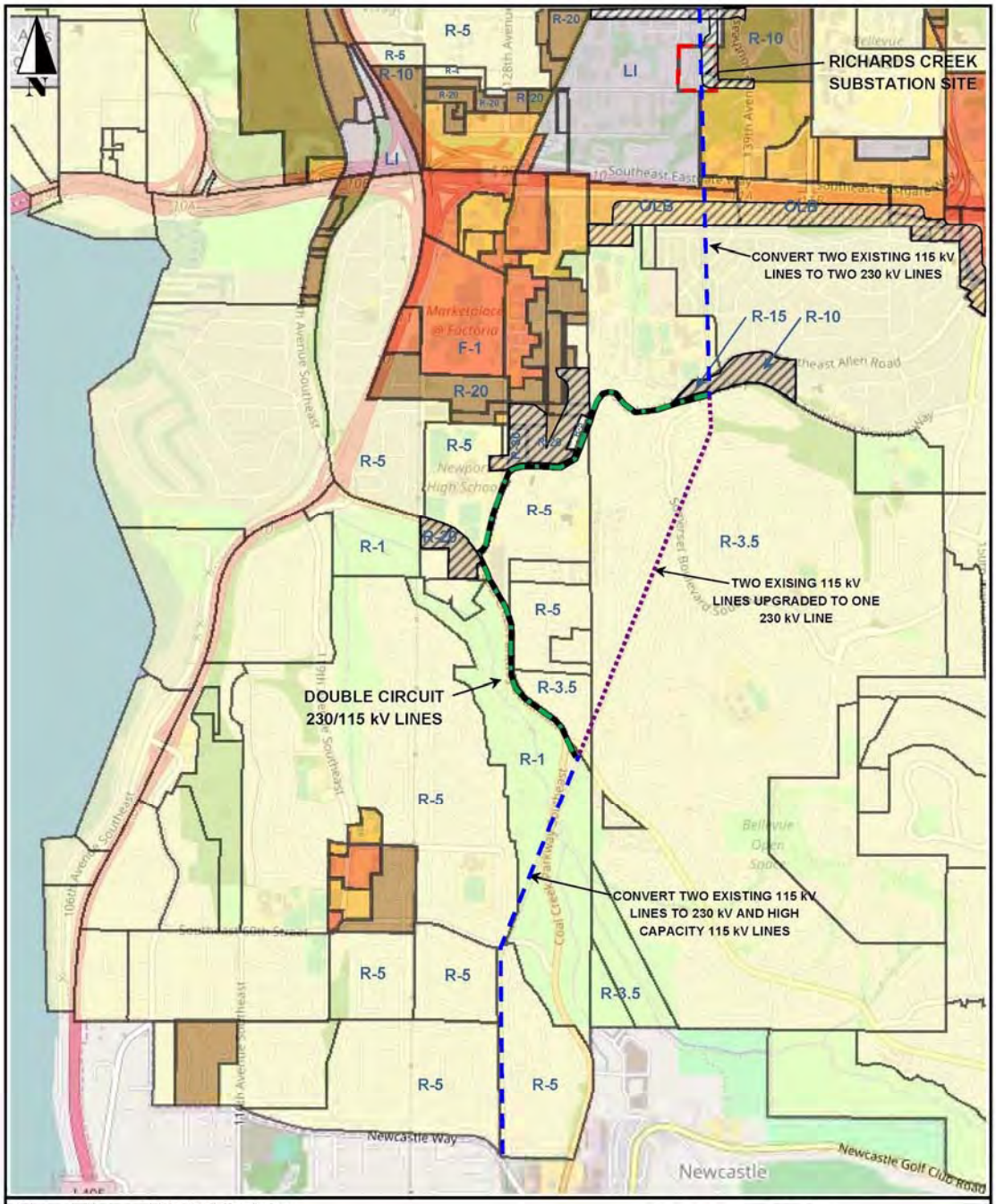
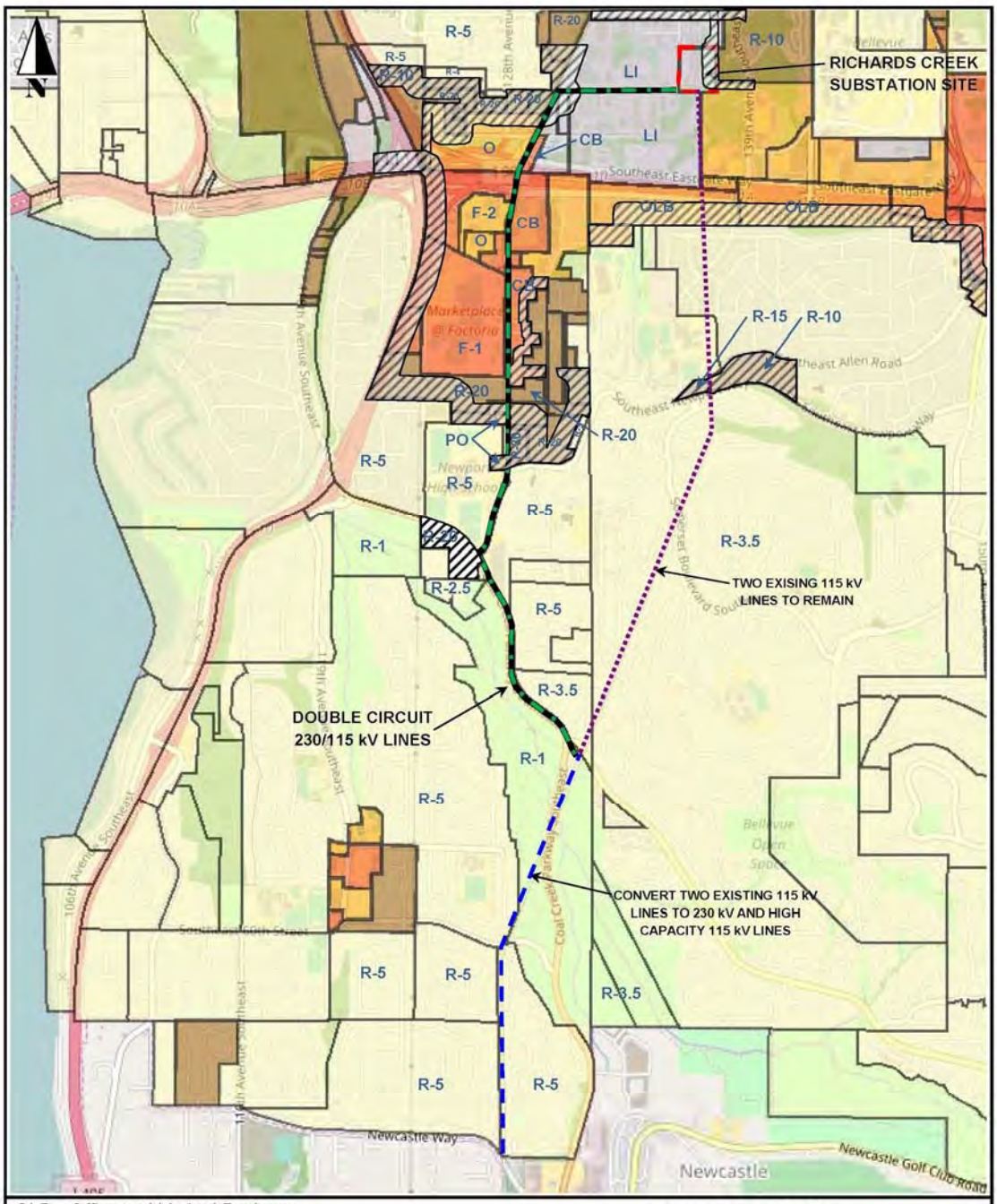


FIGURE 3 ZONING

WILLOW 2—SOUTH PHASE

(Bellevue/Newcastle Line to Richards Creek)

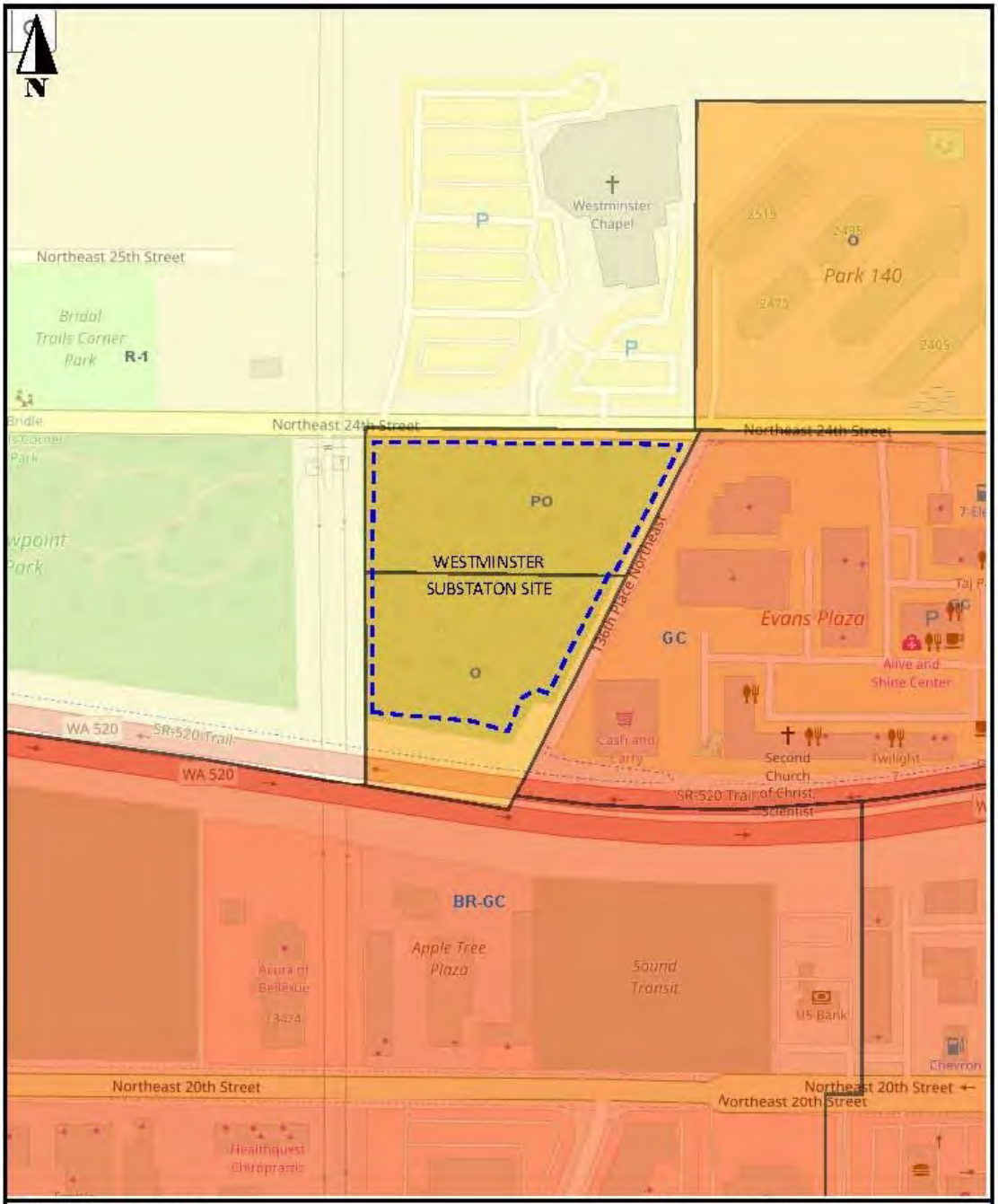


OLB—Office and Limited Business
LI — Light Industrial
R-1 through 7.5—Single Family Residential
R-10 through 15—Multi Family Residential
Transition Area (crossed by route)

FIGURE 4 ZONING

OAK 1—SOUTH PHASE

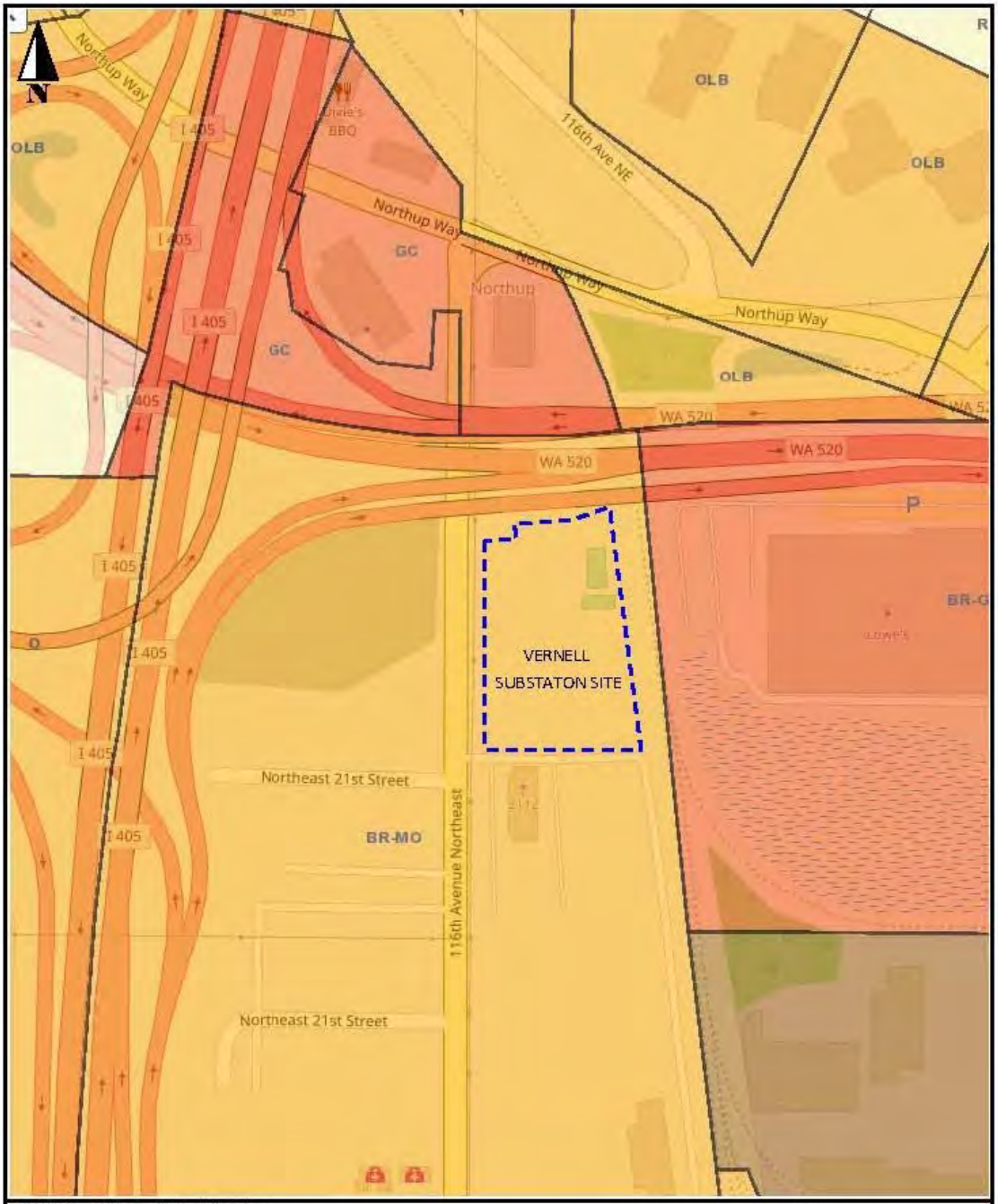
(Bellevue/Newcastle Line to Richards Creek)



PO—Professional Office
O-Office
BR-GC—Bel-Red General Commercial
GC—General Commercial
R-1—Single Family Residential Estate

FIGURE 5 ZONING

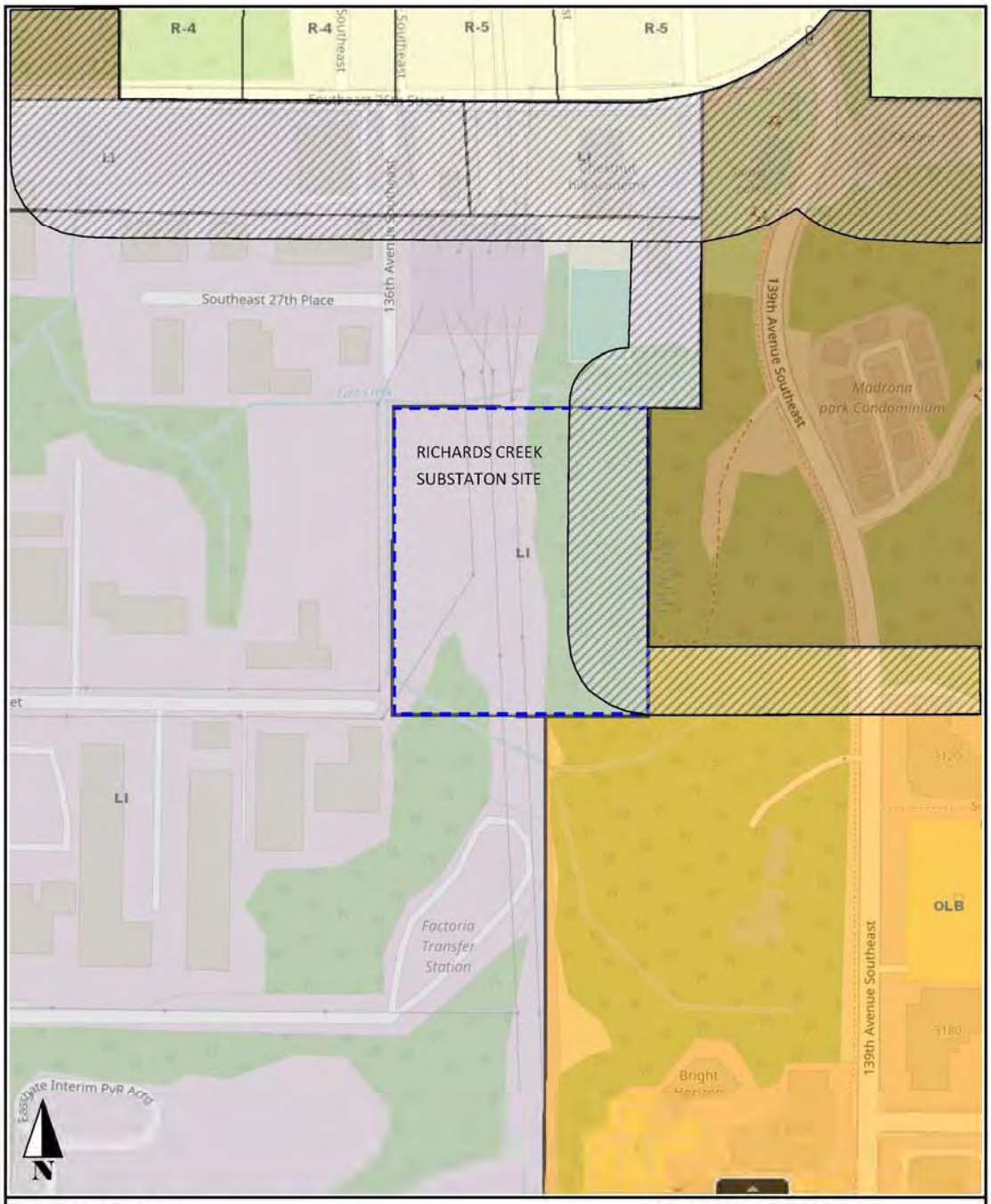
WESTMINSTER SUBSTATION SITE



BR-MO—Bel-Red Medial Office
BR-GC—Bel-Red General Commercial
GC—General Commercial
O—Office
OLB—Office and Limited Business

FIGURE 6 ZONING

VERNELL SUBSTATION SITE



LI—Light Industrial
OLB—Office and Limited Business
R-4, 5, 10—Single-Family Residential
Transition Area

FIGURE 7 ZONING
RICHARDS CREEK SUBSTATION SITE

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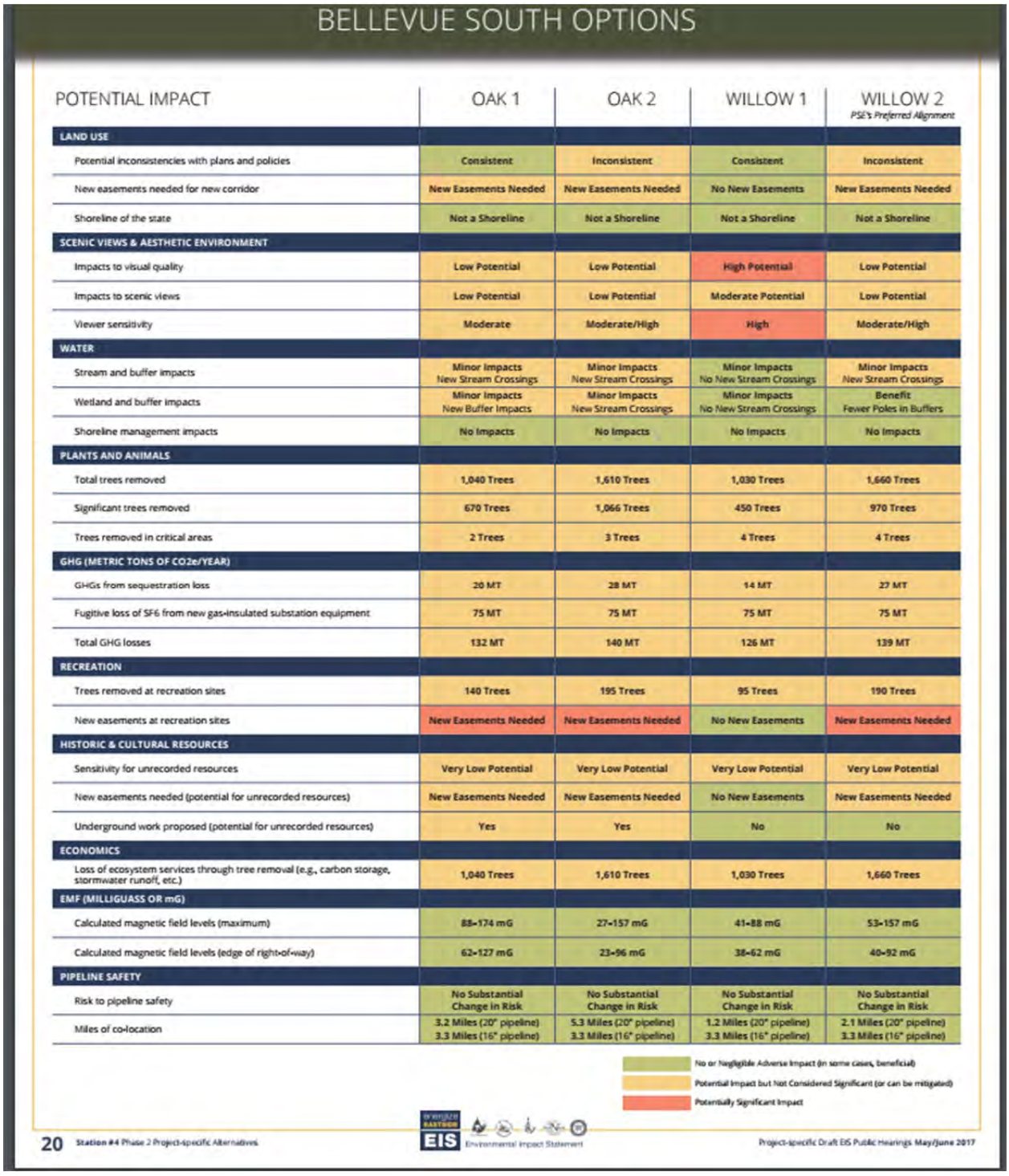
ATTACHMENT B
Phase 2 DEIS Impact Table

Potential Impact Table from Phase 2 DEIS



BELLEVUE SOUTH OPTIONS

POTENTIAL IMPACT	OAK 1	OAK 2	WILLOW 1	WILLOW 2 *PSE's Preferred Alignment*
LAND USE				
Potential inconsistencies with plans and policies	Consistent	Inconsistent	Consistent	Inconsistent
New easements needed for new corridor	New Easements Needed	New Easements Needed	No New Easements	New Easements Needed
Shoreline of the state	Not a Shoreline	Not a Shoreline	Not a Shoreline	Not a Shoreline
SCENIC VIEWS & AESTHETIC ENVIRONMENT				
Impacts to visual quality	Low Potential	Low Potential	High Potential	Low Potential
Impacts to scenic views	Low Potential	Low Potential	Moderate Potential	Low Potential
Viewer sensitivity	Moderate	Moderate/High	High	Moderate/High
WATER				
Stream and buffer impacts	Minor Impacts New Stream Crossings	Minor Impacts New Stream Crossings	Minor Impacts No New Stream Crossings	Minor Impacts New Stream Crossings
Wetland and buffer impacts	Minor Impacts New Buffer Impacts	Minor Impacts New Stream Crossings	Minor Impacts No New Stream Crossings	Benefit Fewer Poles in Buffers
Shoreline management impacts	No Impacts	No Impacts	No Impacts	No Impacts
PLANTS AND ANIMALS				
Total trees removed	1,040 Trees	1,610 Trees	1,030 Trees	1,660 Trees
Significant trees removed	670 Trees	1,066 Trees	450 Trees	970 Trees
Trees removed in critical areas	2 Trees	3 Trees	4 Trees	4 Trees
GHG (METRIC TONS OF CO2e/YEAR)				
GHGs from sequestration loss	20 MT	28 MT	14 MT	27 MT
Fugitive loss of SF6 from new gas-insulated substation equipment	75 MT	75 MT	75 MT	75 MT
Total GHG losses	132 MT	140 MT	126 MT	139 MT
RECREATION				
Trees removed at recreation sites	140 Trees	195 Trees	95 Trees	190 Trees
New easements at recreation sites	New Easements Needed	New Easements Needed	No New Easements	New Easements Needed
HISTORIC & CULTURAL RESOURCES				
Sensitivity for unrecorded resources	Very Low Potential	Very Low Potential	Very Low Potential	Very Low Potential
New easements needed (potential for unrecorded resources)	New Easements Needed	New Easements Needed	No New Easements	New Easements Needed
Underground work proposed (potential for unrecorded resources)	Yes	Yes	No	No
ECONOMICS				
Loss of ecosystem services through tree removal (e.g., carbon storage, stormwater runoff, etc.)	1,040 Trees	1,610 Trees	1,030 Trees	1,660 Trees
EMF (MILLIGUASS OR mG)				
Calculated magnetic field levels (maximum)	88-174 mG	27-157 mG	41-88 mG	53-157 mG
Calculated magnetic field levels (edge of right-of-way)	62-127 mG	23-96 mG	38-62 mG	40-92 mG
PIPELINE SAFETY				
Risk to pipeline safety	No Substantial Change in Risk	No Substantial Change in Risk	No Substantial Change in Risk	No Substantial Change in Risk
Miles of co-location	3.2 Miles (20" pipeline) 3.3 Miles (16" pipeline)	5.3 Miles (20" pipeline) 3.3 Miles (16" pipeline)	1.2 Miles (20" pipeline) 3.3 Miles (16" pipeline)	2.1 Miles (20" pipeline) 3.3 Miles (16" pipeline)

No or Negligible Adverse Impact (in some cases, beneficial)
Potential Impact but Not Considered Significant (or can be mitigated)
Potentially Significant Impact

20 Station #4 Phase 2 Project-specific Alternatives

EIS Environmental Impact Statement

Project-specific Draft EIS Public Hearings May/June 2017

ATTACHMENT C
Supporting Studies

Eastside 230 kV Project
Constraint and Opportunity Study
for Linear Site Selection

Prepared for

Puget Sound Energy

Prepared by

Tetra Tech, Inc.
19801 North Creek Parkway
Bothell, WA 98011

December 2013

DSD 001790

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1. Executive Summary

PSE's System Planning evaluated a variety of options for addressing the Eastside's growing energy needs including conservation, local generation, and infrastructure improvements (e.g., transmission lines and substations). They found that even with aggressive conservation efforts, demand will outstrip supply in a few years. Additionally, local generation would be difficult to execute in a timely manner and ultimately would not meet long-term needs.

Based on PSE's technical evaluation of potential solutions, the most effective way to ensure the Eastside's power system will meet growing demand is to add a new 230 kV transmission line to connect PSE's Sammamish (Redmond) and Talbot Hill substations (Renton). With these endpoints in mind, PSE contracted with Tetra Tech, Inc. to employ a geographic information system (GIS)-based Linear Routing Tool (LRT) to conduct a broad evaluation of possible transmission line routes.

The LRT is a tool developed by Tetra Tech based on commercially available geospatial technology and Tetra Tech's linear routing experience (see Appendix A). It is a collaborative process that combines powerful analytical software with project experience, system planning, engineering, land use and local knowledge considerations. The LRT is an innovative geospatial tool that identifies the most suitable route alternatives based on modeled environmental and infrastructure factors. PSE and Tetra Tech began this process by identifying a study area of approximately 255 square miles that encompasses the Sammamish Substation in the north and the Talbot Hill Substation in the south. The study area is bounded on the west by the eastern shore of Lake Washington and extends eastward to include the BPA corridor near Soaring Eagle Regional Park (located northeast of the City of Sammamish). Any new transmission line route must connect to a new 230 kV to 115 kV transformation site within this area in order to solve the problem. Potential transformation sites within the study area include Lakeside, Westminster, and Vernell substations, which are all located in the City of Bellevue.

Tetra Tech staff collected existing available data and GIS files for land ownership, land use, public and private rights-of-way (ROW), wildlife, vegetation, threatened and endangered (T&E) species, environmentally critical areas, topography, historical resources, and other factors that would influence the location of the proposed transmission line, such as structure locations. The data collection process was designed to provide geospatial information on

criteria that could represent credible baseline opportunities and/or constraints for the location of an above-ground transmission line.

A team of LRT experts, system planners, engineers, land use planners and environmental professionals (Project Team) individually weighted various data layers of the model to reflect the varying degree of constraints or opportunities for each data set. The team assigned values to the data layers using a progressive scale of values ranging from the greatest constraint, such as endangered species, residences and safety hazards, to the greatest opportunity, such as existing PSE transmission lines.

The LRT combined these data layers and created an output file called the suitability grid, which represents a summation of all the constraints and opportunities for every point (grid cell) across the entire study area. The LRT modeled preferred corridors across the suitability grid that pass through the transformation site options within the study area. These preferred corridors were used to develop alternative routes. To provide for more flexibility in the route analysis, each route was partitioned at the crossing points of routes to create unique segments. Each unique LRT segment was validated using professional engineering judgment and available ancillary resources such as aerial photographs, to help assess whether they were feasible options. Once the segments were generated and validated, a composite score was calculated for each segment from the underlying suitability grid. A deterministic model was then used that considered more than 500 combinations of segments and transformation sites. If parallel segments (i.e., typically less than a block apart) were identified during the model evaluation, LRT scores were compared to determine which segment would be used to develop routes.

The LRT scores were used to eliminate from further consideration routes that were not considered viable options. Approximately the top five percent of the positive routes were then mapped to facilitate further discussion and evaluation.

The mapping exercise revealed that there are four general subareas, which when combined, formed a "ladder" of route alternatives. The "leg" components of the ladder comprised the north-south running routes connecting Sammamish, Talbot Hill, and one of the new transformation substations. Moving east to west between the "legs" could be accomplished by using one of the three cross-over segments or "rungs." The only exception to this being an additional north-south segment situated in the central part of the study area, south of I-90. To simplify future discussion, each of the fourteen legs and rungs were given a unique identifier (Figure 1-1). All of the mapped segment combinations can be used to develop a route that meets the goal of connecting the Sammamish with the Talbot Hill substation,

while connecting to any one of the three intermediary substations. Further route refinement will continue during the on-the-ground data collection phase and public process, culminating in the selection of a preferred route.

Table 1-1. Route Segment Composition

Vernell 248	Vernell 249	Westminster 217	Lakeside 155	Lakeside 160	Lakeside 166
A	A	A	A	A	A
B	B	C	C	C	C
F	F	D	E	E	E
H	H	F	G2	G2	J
K1	L	H	G1	I	M
K2	N	L	H	K1	N
M		N	L	L	
N			N	N	

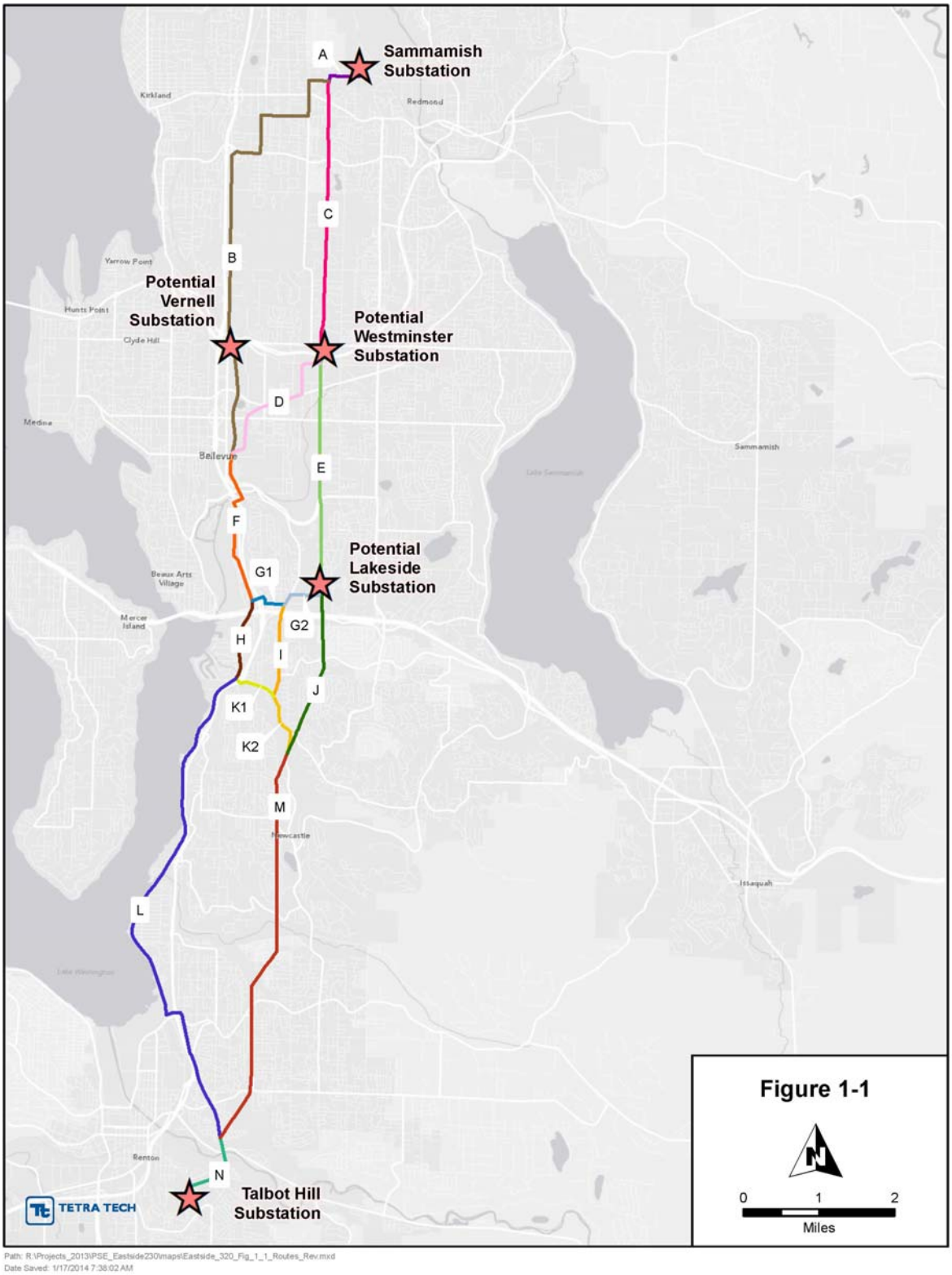

Figure 1-1. General Corridor for Eastside 230 kV Project

2. Overview

PSE System Planning conducted a needs assessment reviewing population trends, electric load growth, economic development patterns, conservation programs, energy efficiency improvements, and other key trends pertaining to power demand. Studies reveal that different parts of the transmission system will overload, or be close to overloading, within the 10-year study period (2012-2022) and more specifically, by 2017.

PSE's System Planning evaluated a variety of options for addressing the Eastside's growing energy needs including conservation, local generation, and infrastructure improvements (e.g., transmission lines and substations). They found that even with aggressive conservation efforts, demand will outstrip supply in a few years. Additionally, local generation would be difficult to execute in a timely manner and ultimately would not meet long-term needs.

System Planning's review determined that system infrastructure improvements must be made to resolve the deficiency issue. These system infrastructure improvements will address the following issues:

- Overload of PSE electrical facilities in the Eastside Area;
- Small margin of error to manage risks from inherent load forecast uncertainties;
- Increasing use and expansion of Corrective Action Plans;
- Emerging regional impacts identified by the ColumbiaGrid.

To meet the objectives above, PSE had to first identify 230 kV sources and then identify potential transformation sites (to convert 230 kV to 115 kV for distribution) between those sources. The new transformation site will be a 230 kV to 115 kV substation. The next step was to determine a study area between the source endpoints and evaluate the possible routes to make this connection using a 230 kV transmission line (Figure 2-1).

Seeking an objective fact-based evaluation, PSE contracted with Tetra Tech, Inc. to employ a geographic information system (GIS)-based Linear Routing Tool (LRT) to conduct a broad evaluation of possible transmission line routes. The LRT is a collaborative process that combines powerful analytical software with project experience, system planning, engineering, land use and local knowledge considerations. The LRT is an innovative geospatial tool that identifies the most suitable route alternatives based on modeled

environmental and infrastructure factors that are available in GIS format. The purpose of this study was to do a high-level review of significant and well known factors that affect route siting using available data in GIS format, to develop possible routes for further study.

The first steps of the LRT process were to define elements that were positive or negative for siting the proposed 230 kV transmission line and to collect the related data. These elements were defined as constraints and opportunities. GIS available data was collected for land ownership, land use, public and private rights-of-way (ROW), wildlife, vegetation, threatened and endangered (T&E) species, environmentally critical areas, topography, historical resources, and other factors that would influence the location of the proposed transmission line, such as structure locations.

With the GIS data compiled, a team of LRT experts, system planners, engineers, land use planners and environmental professionals (Project Team) individually weighted various data layers of the model to reflect the varying degree of constraints or opportunities for each data set. The LRT combined these data layers to create a suitability grid, summarizing all the constraints and opportunities for every point (grid cell) across the entire study area. This grid was used to develop suitable corridors and routes, and in turn those routes were broken down into segments. These segments were individually weighted so that more than 500 routes could be put together and mathematically considered.

The result of all this evaluation and modeling was that the top recommended segments could be combined to form five possible route options for further evaluation through public input, stakeholder review, further land use/zoning and environmental requirements review, and real estate review.

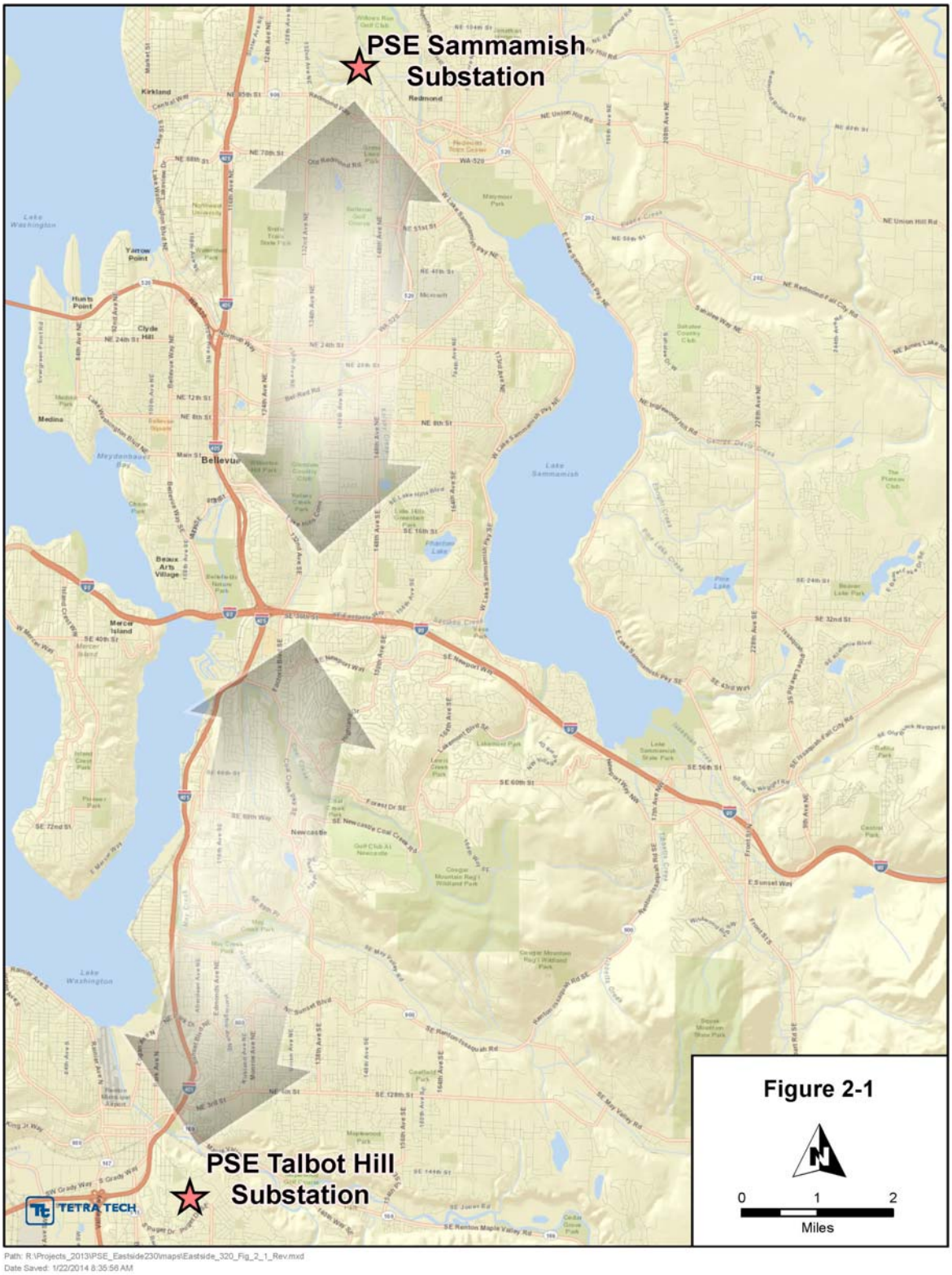

Figure 2-1. General Corridor for Eastside 230 kV Project

3. Process

The development of possible transmission line routes followed a six-step process that culminated in a set of alternatives that could be further evaluated. The steps included:

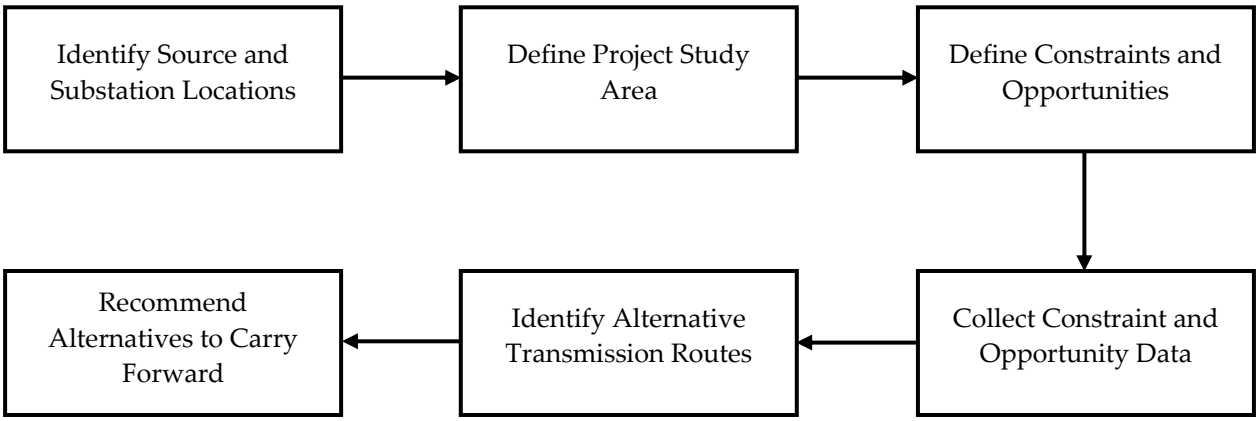

Figure 3-1. Route Development Process

3.1 IDENTIFY 230 KV SOURCE AND SUBSTATION LOCATIONS

At the beginning of the routing effort, the Sammamish and Talbot Hill Substations were defined as the 230 kV source for the project. Potential intermediate transformation (new 230 kV to 115 kV substation) sites between the Sammamish and Talbot Hill Substations were identified by PSE and used to help define the study area. The potential new transformation sites included PSE-owned property at the future Vernell and Westminster substations, and the existing Lakeside Substation. In addition, a new site referred to as Woodridge was considered based on its location. Ultimately the Lakeside, Westminster, and Vernell sites were selected as they meet the necessary minimum dimensions and are owned by PSE.

3.2 DEFINE PROJECT STUDY AREA

The next step was to establish a study area that was defined as a boundary that generally encompassed the 230 kV source substations locations and the potential routes to connect them. Therefore, the study area encompasses the Sammamish Substation in the north, the Talbot Hill Substation in the south, the eastern shore of Lake Washington in the west, and eastward to near Soaring Eagle Regional Park in King County, east of the City of Sammamish. Figure 3-2 shows the extent of the study area used during the constraint and opportunity analysis.

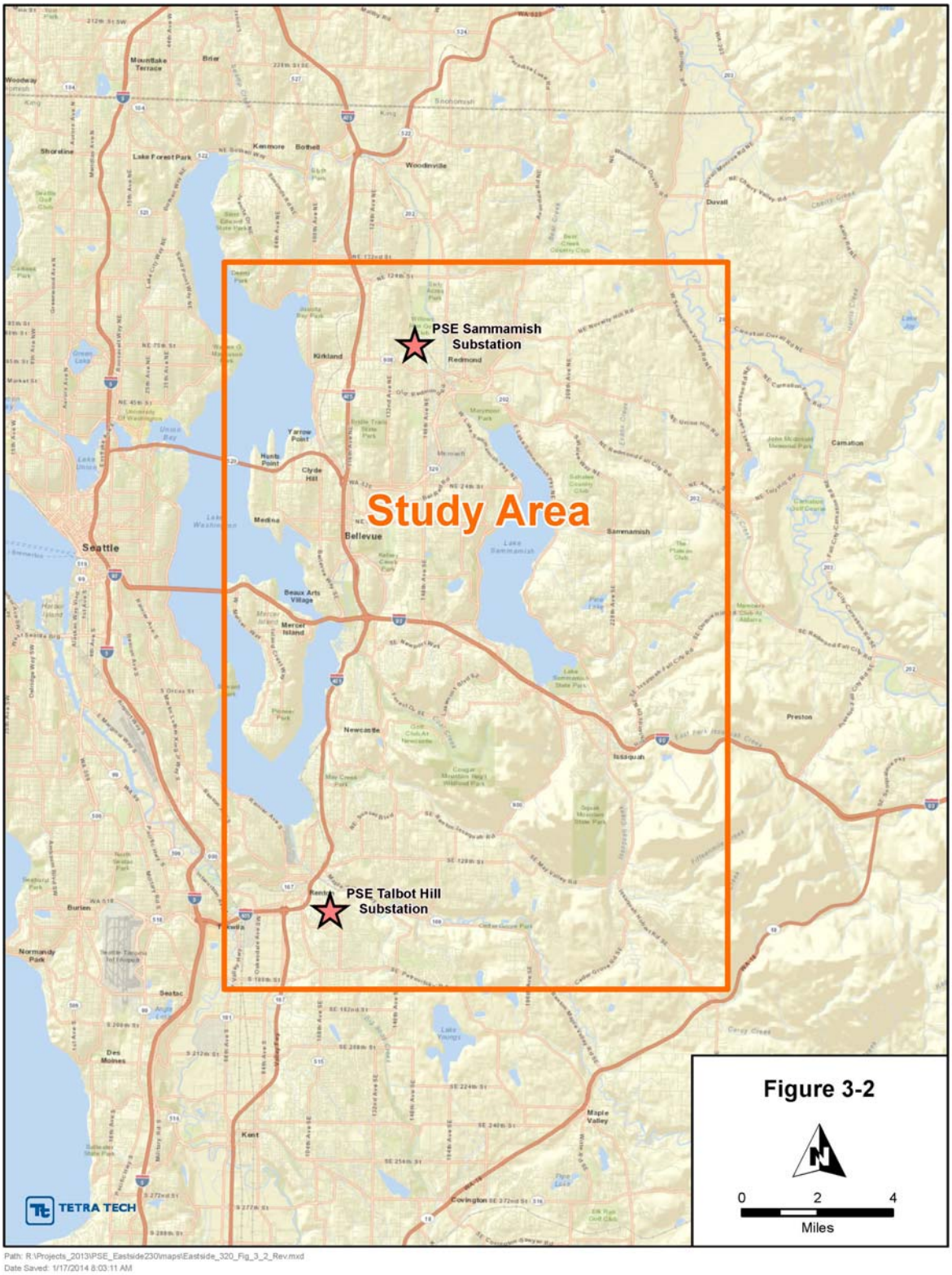

Figure 3-2. Study Area

Once the boundaries of the study area were established, the Project Team identified and delineated constraints and opportunities to siting the transmission line. Constraints are defined as resources or conditions that potentially limit project siting because of regulations or engineering requirements associated with facility construction and operation. Opportunities are defined as resources or conditions that can accommodate facility permitting, construction, or operation. The following sections describe the GIS data sets that were collected to analyze these constraints and opportunities, describe the key categories of constraint and opportunity factors in the study area based on GIS data sets, and summarize how the GIS data were processed in preparation for route development.

3.3 AVAILABLE GIS DATA BASES USED FOR CONSTRAINTS AND OPPORTUNITY ANALYSIS

Based on the defined study area, Tetra Tech collected readily available GIS data sets to use in the LRT model. Data collection was based on the constraint and opportunity factors used in the analysis. The data used in routing were subjected to a defined process of preparation and analysis before being used in the LRT as described below. Preparation of data began with the compilation of multiple layers into a geodatabase. Data layers were then quality checked and evaluated for project usefulness, including reliability and accuracy based on available maps. If the data passed the quality check, the data then went through several additional geoprocessing steps in order to be ready to input into the LRT. Where appropriate, buffer areas were added to the data based on how the feature would impact the transmission line route. These buffers were necessary to ensure line routes would not go over the top of structures, down the center of vehicular travel lanes, as well as allowing for adequate area to physically accommodate a 230 kV line. Buffers added to specific data layers are described in Section 3.6 Existing Conditions and in Table 3-1, below.

Data for the constraint and opportunity analysis were obtained from a variety of county, state, and federal GIS database sources (see Table 3-1). These GIS databases included the Washington Department of Natural Resources (WDNR), Department of Fish and Wildlife (WDFW), Department of Transportation (WSDOT), and State Parks and Recreation Commission (WSPRC); the US Fish and Wildlife Service (USFWS); the King County Assessor's Office, Department of Development and Environmental Services (DDES), and Department of Natural Resources (DNR); and Tetra Tech. This information was supplemented by the review of aerial photography and local knowledge. The following discussion outlines specific data sets collected for this project and their sources.

Table 3-1. Analysis Attributes and Data Sources

Attribute	Data Source
Existing and Proposed Linear Corridors	
PSE transmission corridors	PSE
PSE 55 kV corridor	PSE
BPA transmission corridors	PSE
Natural gas pipeline	Photo interp. and King County
Highways and roads	King County
Arterial road corridors	Interp. of King County roads
Railroads	ESRI Streetmap, King County, Sound Transit
Abandoned rail corridor	Photo interp. and King County parcels
Land Ownership, Land Use and Special Designated Uses	
Land Ownership	
Rights-of-way	King County
Parcels	King County Assessor
Transfer of development rights	King County Assessor
BNSF Railroad parcel boundaries (active)	King County
Land Use/Future Land Use	
Structures	King County
Coal mine	King County
Renton municipal airport	Photo interp. and King County parcels
Airports clear zone	Photo interp. and analysis
Residential	King County
Special Land Use Designation	
Parks	King County
Recreational trails	King County
Scenic byways	WSDOT
Soils, Topography, and Geology	
Unspanable slope 20 to < 40%	King County LiDAR and analysis
Unspanable slope >= 40%	King County LiDAR and analysis
Slopes 20%+	King County LiDAR and analysis
Slopes 40%+	King County LiDAR and analysis
Landslide potential	WDNR
Elevation – LiDAR	King County
Water Resources	
Lakes	King County
Floodways and floodplains	King County
Wetland Resources	
Wetlands – large	USFWS, National Wetlands Inventory

Attribute	Data Source
Wetlands – SAO	King County
Wildlife	
Chinook salmon streams	USFWS
Waterfowl areas	WDFW
Great blue heron rookeries	WDFW
Bald eagle management areas	WDFW
Natural Heritage locations	WADNR
Historic Resources	
Historic register and districts	WADAHP
Historic property inventory - named	WADAHP
Heritage barns	WADAHP

Various King County agencies maintain extensive GIS databases on natural and built environment conditions within the county. Tetra Tech purchased several King County GIS data sets on DVD for use in the analysis. Many of these GIS data sets were used directly in the analysis, or processed to derive new data to represent constraints and opportunities, including the following:

- Airpark
- Airport clear zone
- Arterial road corridors
- Water pipeline corridors
- BPA substation
- Railroads and railroad corridors
- Public right-of-way
- Parcels
- Structures (based on address points)
- Residential areas
- Coal mine
- Parks
- Recreational trails
- Streams and rivers
- Lakes
- Floodways and floodplains

- Wetlands – SAO
- Historic points
- Contours
- Unspanable slope 20 to < 40%
- Unspanable slope >= 40%
- Slopes 20%+

For the purpose of this process, only data sets that were readily available and in GIS form were used. Constraints of opportunities that were not easily identified in an available GIS data set (such as cultural resources, real estate issues, electric distribution lines, or non-high pressure natural gas pipelines) were not considered for the purposes of this study, but will be evaluated in future steps.

3.4 PRIMARY GIS CATEGORIES CONSIDERED FOR CONSTRAINTS AND OPPORTUNITIES

Study area conditions applicable to the key categories of constraints and opportunities are described below, along with a description of how the data were preprocessed for analysis.

3.4.1 Utilities

3.4.1.1 Transmission

The existing PSE 115 kV corridor runs between the Sammamish substation, the Lakeside substation, and the Talbot Hill substation (Figure 3-3). Transmission line corridors owned by BPA run along the north, east and south boundaries of the study area.

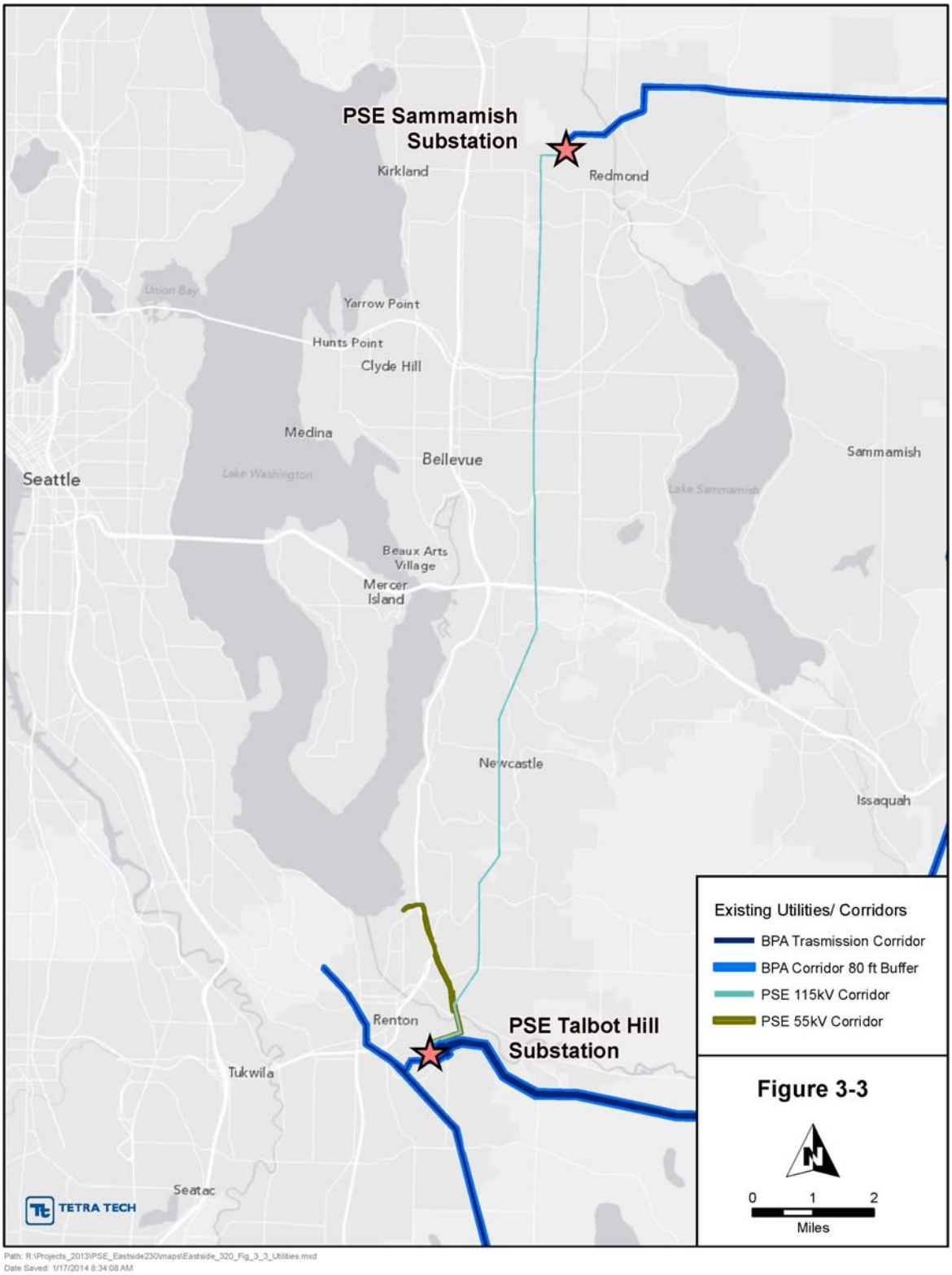

Figure 3-3. Utilities

PSE provided the locations of existing transmission corridors between the Sammamish and Talbot Hill Substations. PSE 115 kV and 55 kV transmission corridor systems were considered opportunities in the analysis. PSE's transmission system is primarily operated at 115 kV; however, a remnant 55 kV corridor still exists in the southern portion of the study area. This corridor can be upgraded to a higher voltage without a change in land use, so it was considered an opportunity. In order to accommodate the space requirements for the proposed 230 kV line, a buffer was applied to the 55 kV line corridor before including it in the analysis.

Based on past experience, BPA does not allow additional third party transmission lines within their corridors; therefore, existing BPA transmission corridors were considered a constraint. However, an 80 ft corridor (minimal area required for a transmission line) was created adjacent to BPA corridors and used in the analysis as an opportunity, since paralleling existing corridors is typically considered favorable during the permitting process.

3.4.1.2 High Pressure Natural Gas Pipeline (Northwest Pipeline)

High-pressure natural gas pipelines run along some arterial roads in the study area. The north-south trending sections potentially provide the most benefit, such as along 148th Ave. NE between NE 70th St. and Bel-Red Rd.; however, these sections are only small opportunities and do not contribute significantly to the siting analysis.

3.4.1.3 Fuel Pipeline (Olympic)

The Olympic Pipeline (fuel products) corridor is co-located with PSE's existing 115 kV corridor (between Sammamish and Talbot Hill) for most of its length in the study area. As a result, it was not included in the analysis so that the existing 115 kV corridor would not be double counted as an opportunity.

3.4.2 Transportation

3.4.2.1 Roads

The major vehicular routes through the study area are Interstate Highway 405 (I-405), I-90 and Washington State Route (SR) 520. Nineteen miles of I-405 runs north-south through the west side of the study area; I-90 runs east-west through roughly the center of the study area; and SR 520 meanders roughly east-west through the northern third of the study area (Figure 3-4). I-405 runs through the study area from Kirkland, through Bellevue, along the east side of Lake Washington, and finally through Renton in the south. I-90 runs across the north end of Mercer Island in the west, through Eastgate (Bellevue), past the southern tip of Lake Sammamish and finally through Issaquah and High Point in the east. SR 520 starts in Hunts

Point alongside Lake Washington, passes through Clyde Hill and Bellevue, and then terminates in Redmond along the northern edge of Marymoor Park. Based on past experience, the Interstate travel routes are considered impedances, as installation of transmission lines within those corridors has not been allowed. Additionally, in some locations spanning of such travel routes is restricted by WSDOT. Throughout the study area, there are several smaller state highways with similar restrictions. However, the study area is dominated with arterial roads, which are typically considered opportunities for transmission line routing. Arterial roads are often paralleled by existing transmission lines or distribution lines that can be overbuilt with transmission line, thereby affording a viable passage route through areas that have existing development.

To prepare arterial road corridors for analysis, King County's Transportation Network layer was buffered by 45 ft on either side of the road centerline. This provided the area necessary to place a 230 kV line along the roadways. A second buffer of 20 ft on both sides of the road centerline was then removed from the 45 ft buffer to create the polygons that roughly represent the buildable opportunity while excluding the paved surface. This approach was used to create an opportunity for routing along paved roadways.

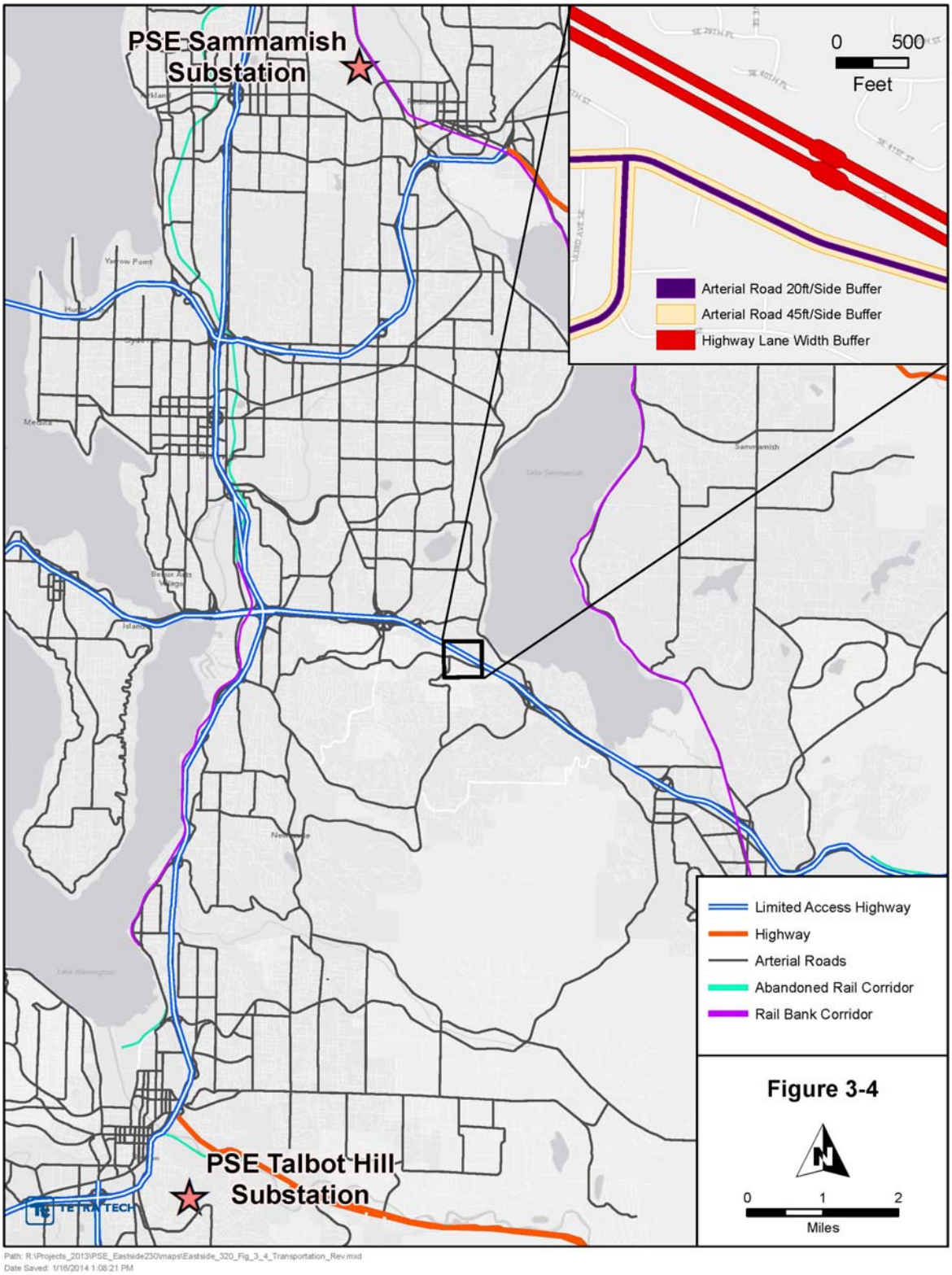

Figure 3-4. Transportation

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3.4.2.2 Railroads

The Eastside Rail Corridor, which was formerly the BNSF railroad line, runs parallel to I-405 and Lake Washington in the western part of the study area. Although portions of this corridor have been mapped as "parks" lands, PSE has purchased easement rights along the majority of the corridor. This corridor offers routing opportunities for the proposed line because it is considered abandoned throughout the study area, and it runs in a north-south direction. There are some segments, such as along the southeastern edge of Lake Washington, that are also considered "rail banked," however, since this was considered only a minor impedance, the combined values of abandoned plus rail banked still leave this corridor as a relatively strong opportunity. Rail banks constitute rail corridors that can be converted to trails and other uses, while still preserving the ability to revert back to rail use under certain conditions.

Where active rail corridors existed, a 50-foot buffer was applied to provide an adjacent area of opportunity that would parallel them. For abandoned rail corridors, no buffer was applied because the corridor itself provided the opportunity.

3.4.3 Slope and Slope Stability

3.4.3.1 Slope

The topography of the study area is composed of mostly flat terrain and rolling hills separated by small valleys. The most significant topographic features running east-west are the incised drainages created by the rivers draining into Lake Washington. These include the Cedar River, May Creek, Coal Creek, and Richards Creek.

PSE design standards and experience indicate that transmission line construction on slopes greater than 20 percent is difficult, requiring special engineering measures, while slopes greater than 40 percent should be avoided. Areas with slopes greater than or equal to 20 percent were calculated from the elevation model. All slope areas greater than or equal to 20 percent were not included in the steep slope layer if at least 200 ft per slope was not present to site the transmission line. The remaining high-slope areas are wider than the standard structure span for the project, and were therefore considered "unspanable." The same process was done for slopes greater than or equal to 40 percent (Figure 3-5). If an area with a steep slope can be spanned within standard design limitations, then the slope is not considered an impediment to a specific route. Figure 3-6 explains graphically how the final result was attained.

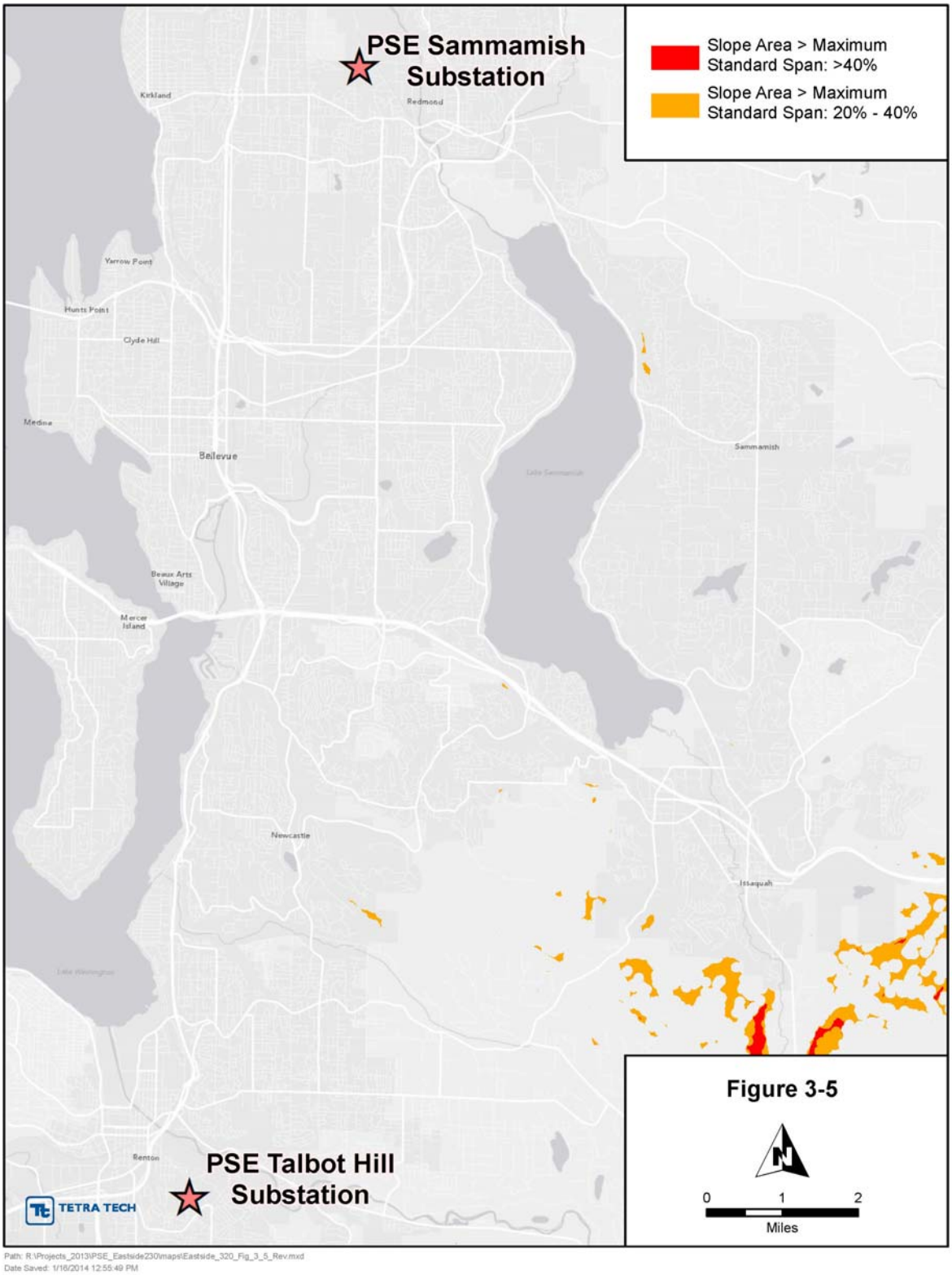

Figure 3-5. Unspanable Slope

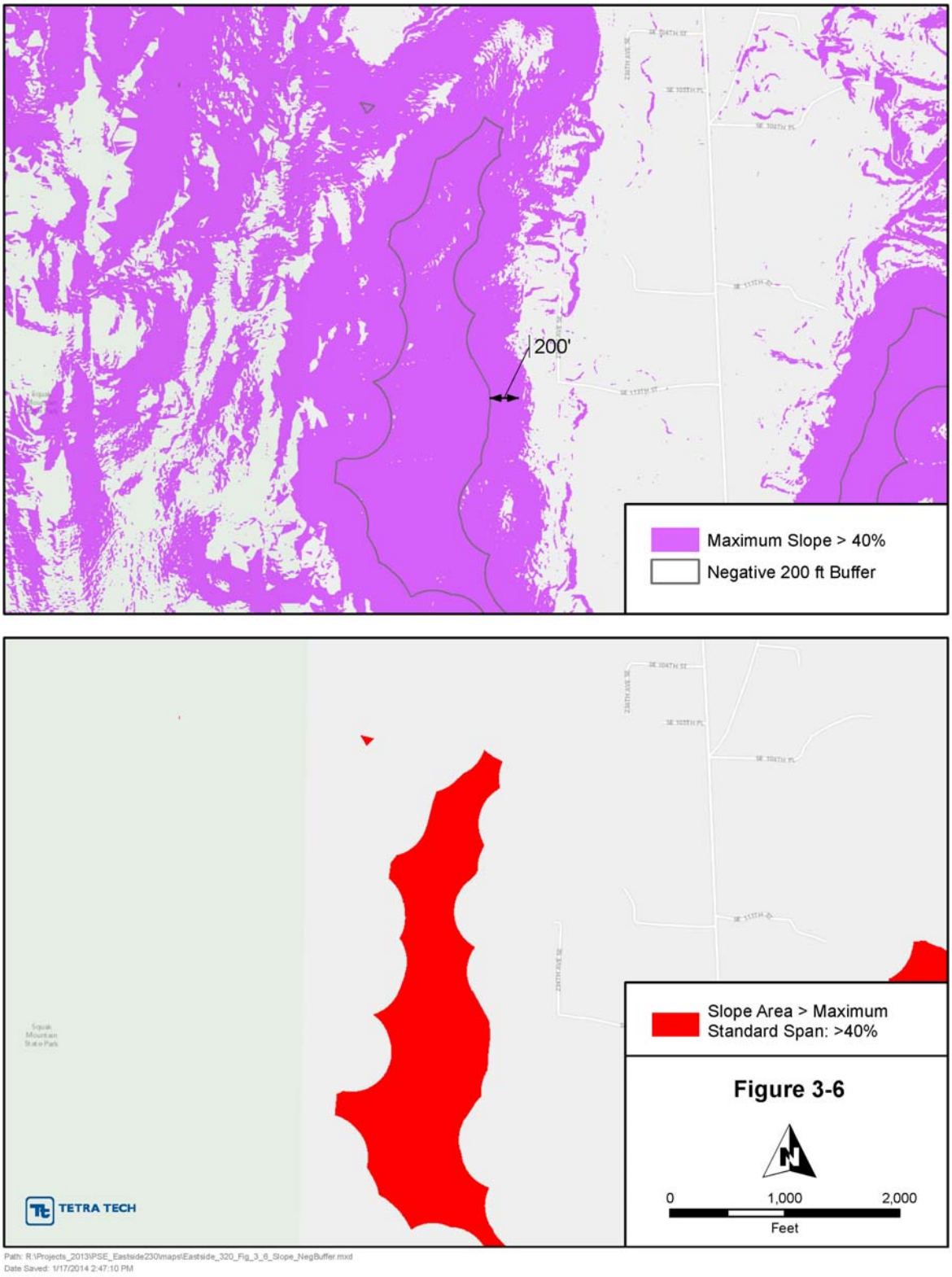

Figure 3-6. How Unspanable Slope Is Derived

3.4.3.2 Slope Stability

Figure 3-7 shows the various levels of slope stability. As shown, the large majority of land has stable slopes, including the existing PSE corridor. Areas of high instability occur mostly along valley walls. To reduce potential impacts, GIS mapped unstable slopes were avoided to the extent possible. This factor is important, especially during construction.

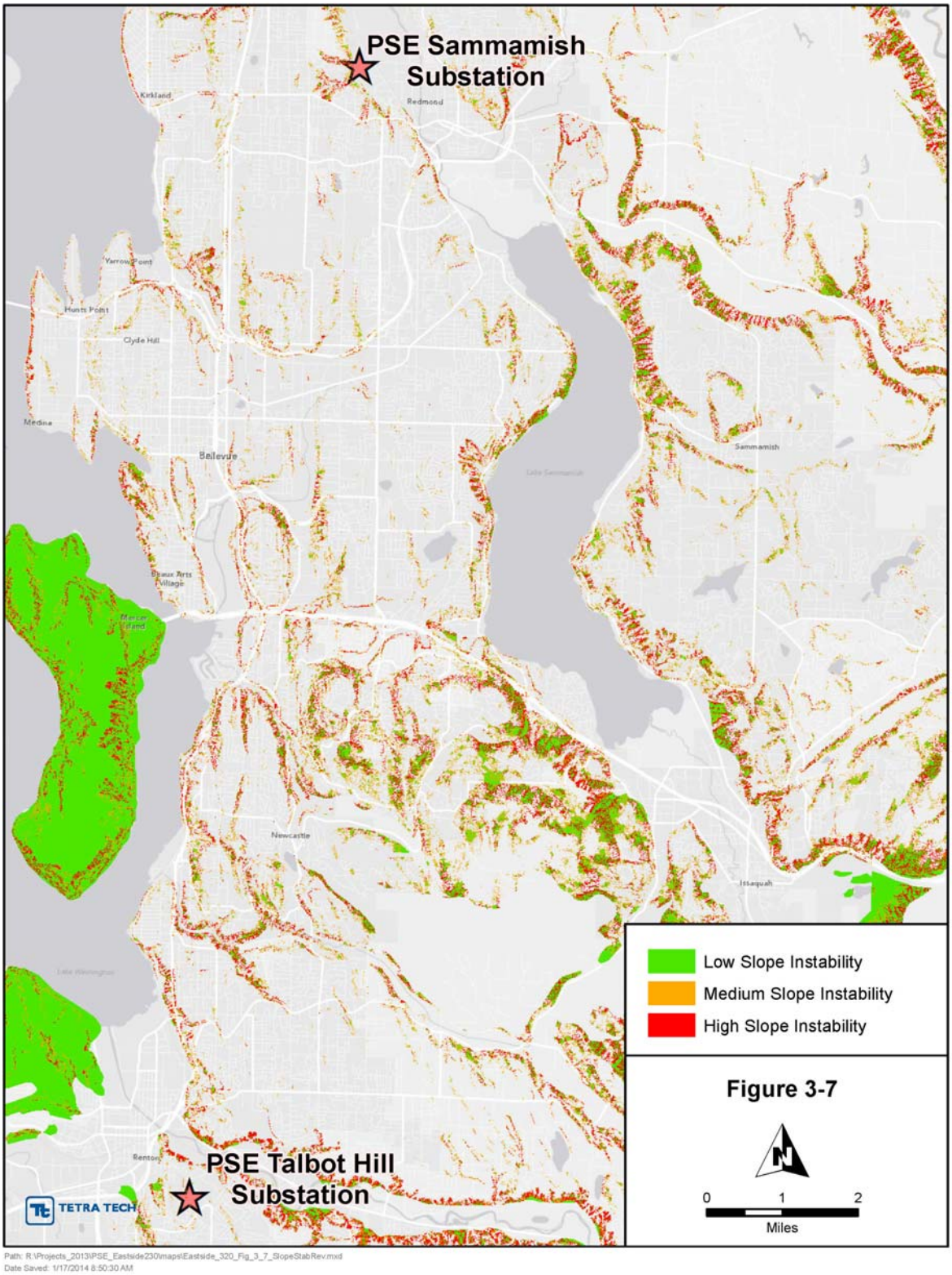

Figure 3-7. Slope Stability

3.4.4 Habitat

3.4.4.1 Waterfowl, Heron Rookeries and Bald Eagle Management Zones

Locations of priority habitat features were acquired from the WDFW GIS database. The identified priority habitat features in the study area are waterfowl areas, great blue heron rookeries, and bald eagle management zones. WDFW has identified priority waterfowl areas at the north and south ends of Lake Sammamish, Phantom Lake, Juanita Bay (part of Lake Washington), and several smaller lakes in the region that are classified as "Lakes With Waterfowl Use." The transmission line alternatives under consideration do not cross any of these GIS features.

Great blue heron rookeries are scarce within the study area. The nearest GIS mapped rookery to any alternative is 0.3 miles away in the Mercer Slough Nature Park.

Bald eagle management zones are designated by WDFW according to current conservation guidelines, and their locations were used unaltered in the analysis. Development of any transmission line within a bald eagle management zone will be subject to review and regulation by WDFW.

3.4.4.2 Fish and Wildlife Species

Streams in the Puget Sound region that provide Chinook salmon habitat are protected under the federal Endangered Species Act (ESA) and are considered a constraint to be avoided or spanned (Figure 3-8). Data for streams with known Chinook salmon use were acquired from the U.S. Fish and Wildlife Service (USFWS) GIS database. These mapped streams can be typically be avoided or spanned.

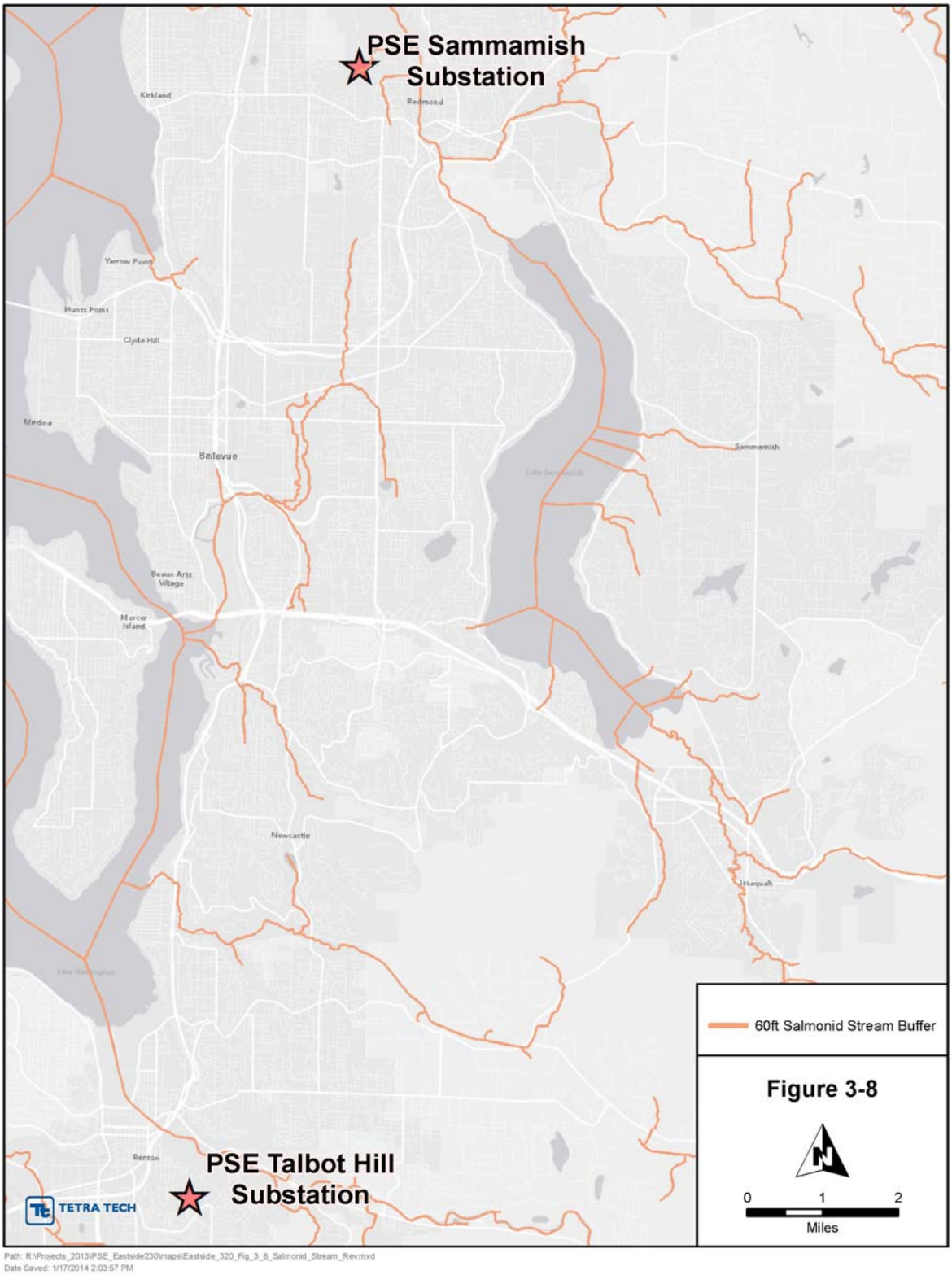

Figure 3-8. Salmonid Streams

3.4.5 Land Ownership

The optimum location of the transmission line is across land that allows for sufficient access, such as an easement owned by PSE, as this facilitates performance of maintenance and vegetation management in accordance with applicable clearance and safety requirements. As shown on Figure 3-9, private ownership is the predominant land owner type in the study area and would be a constraint if the transmission line had to traverse it. However, it is expected that most of the line can be constructed along existing road/utility corridors or overbuilt at existing overhead electrical line structure locations on PSE easement where the setting already includes both vertical and horizontal linear transmission facilities.

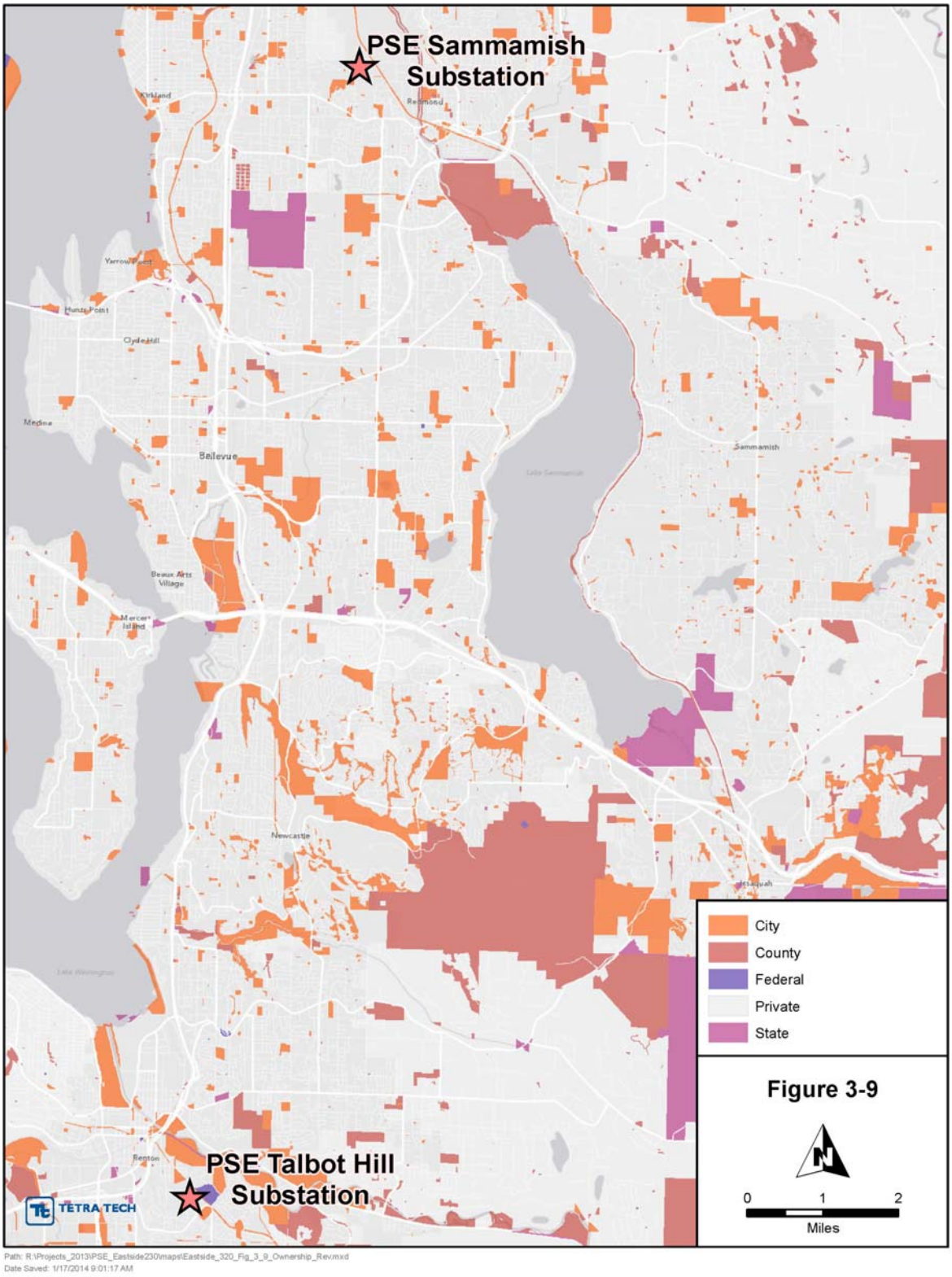

Figure 3-9. Land Ownership

3.4.6 Zoning/Land Use

Zoning and land use patterns were considered for purposes of this study based on two available GIS databases, a GIS database on current zoning (setting forth envisioned land use patterns such as agricultural, residential, commercial, etc.), and the tax assessors database based on current type of land use (commercial, residential, etc.). According to the zoning database, most of the land in the study area is zoned residential (Figure 3-10). More specific zoning and land use patterns and land use policy considerations will be evaluated in the next step of the process.

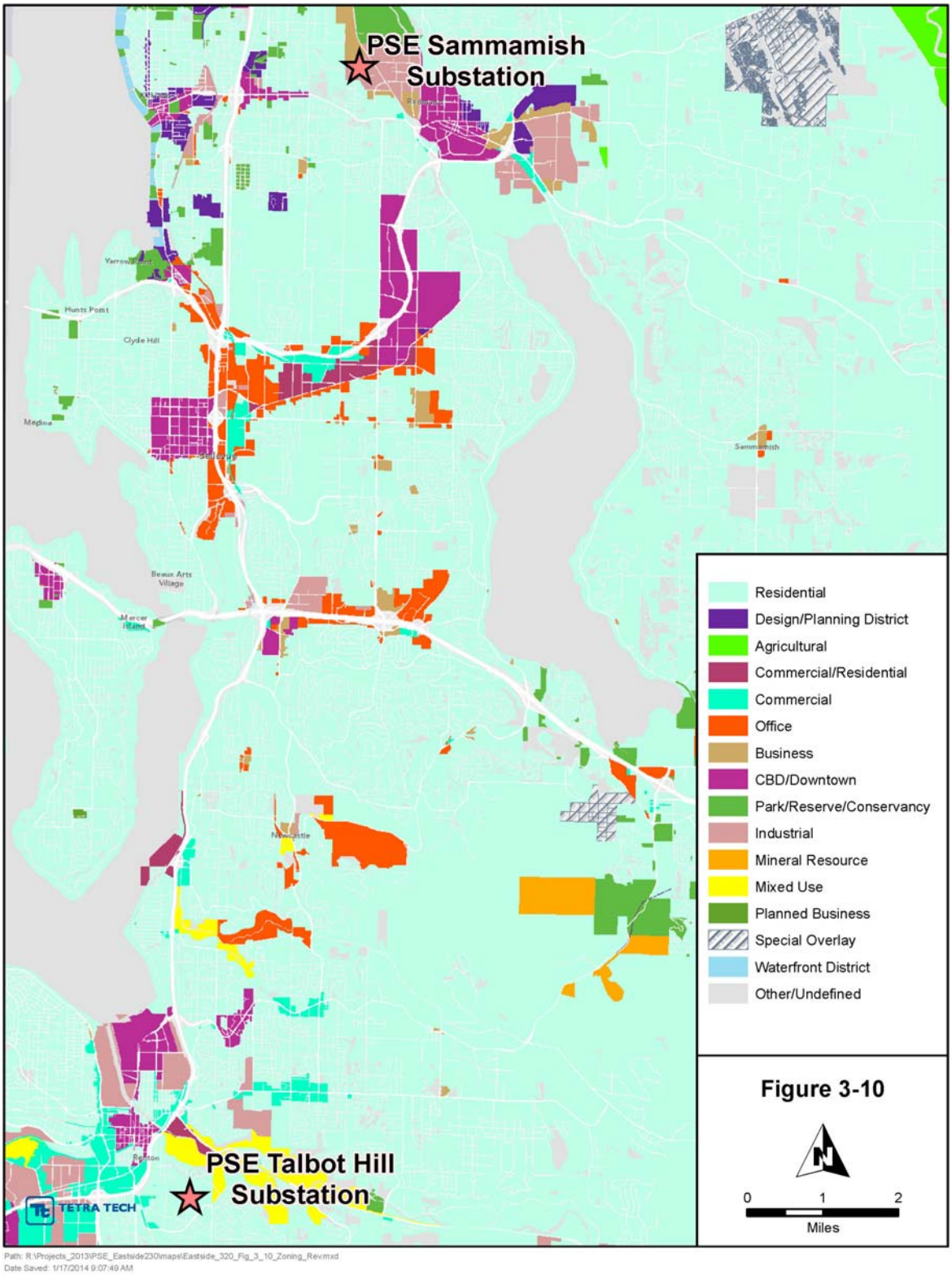

Figure 3-10. Zoning

3.4.7 Structures

Address point locations obtained from the tax assessor's GIS database were used as a proxy for occupied structure locations. In order to provide adequate avoidance, residential points were buffered by 100 feet, commercial locations were buffered by 160 feet, and trailers were buffered by 60 feet (Figure 3-11). Structure buffer density is high in the study area; therefore, buffers that overlapped onto roadways and existing corridors were removed as the structures would not be located in those areas (Figure 3-12). Additionally, without this modification, the address point layer density was too great to facilitate creation of viable routes.

Figure 3-11. Structure Buffer Process

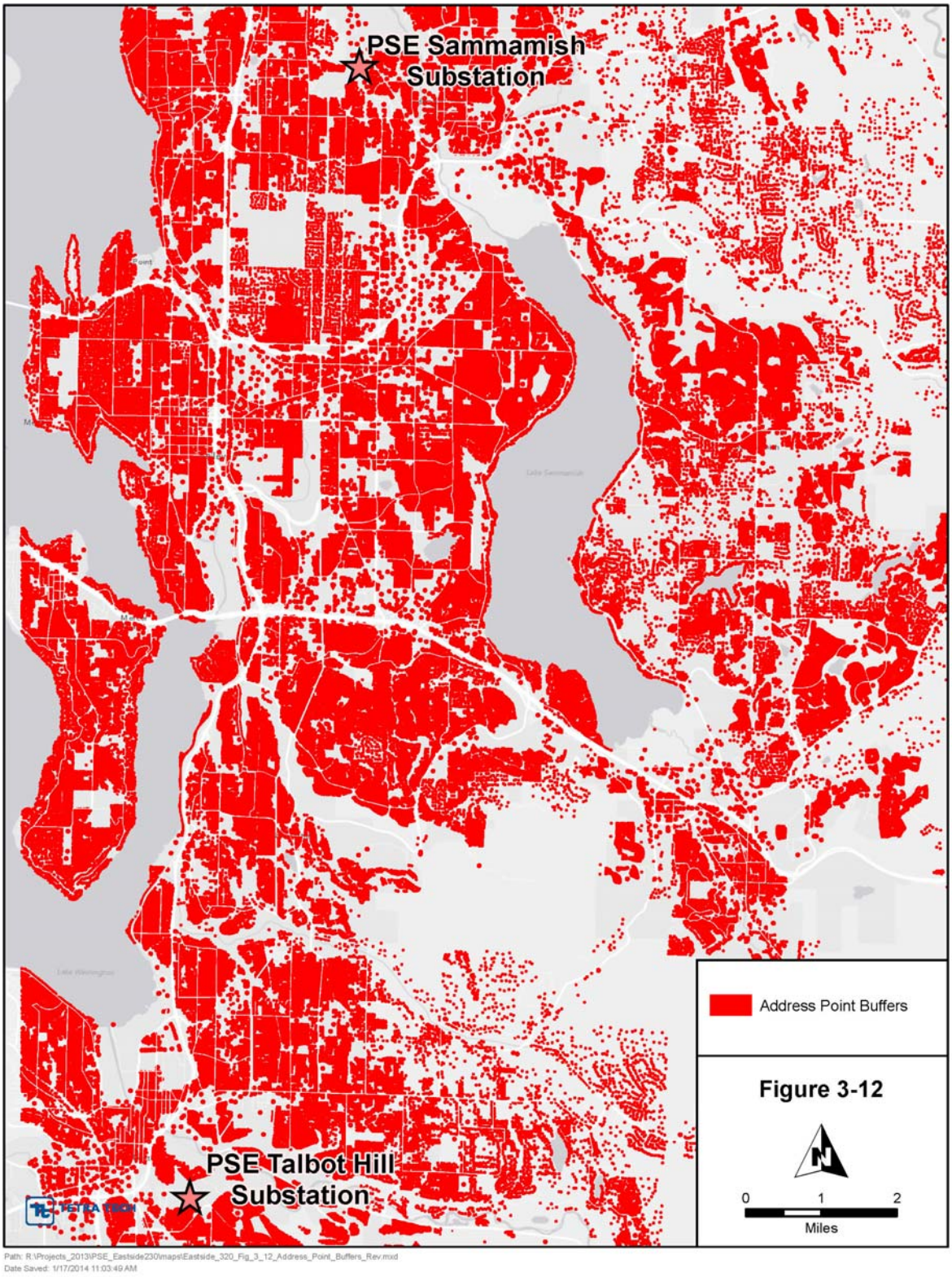

Figure 3-12. Buffered Address Locations

3.4.8 Parks and Recreation

The study area includes public lands designated as parks and recreational trails (Figure 3-13) using a GIS database from King County. While these lands can sometimes represent constraints for transmission line routing (with exception to the Eastside Rail Corridor, as described in section 3.5.2.2 above), they are relatively scarce and widely distributed, and therefore easily avoided.

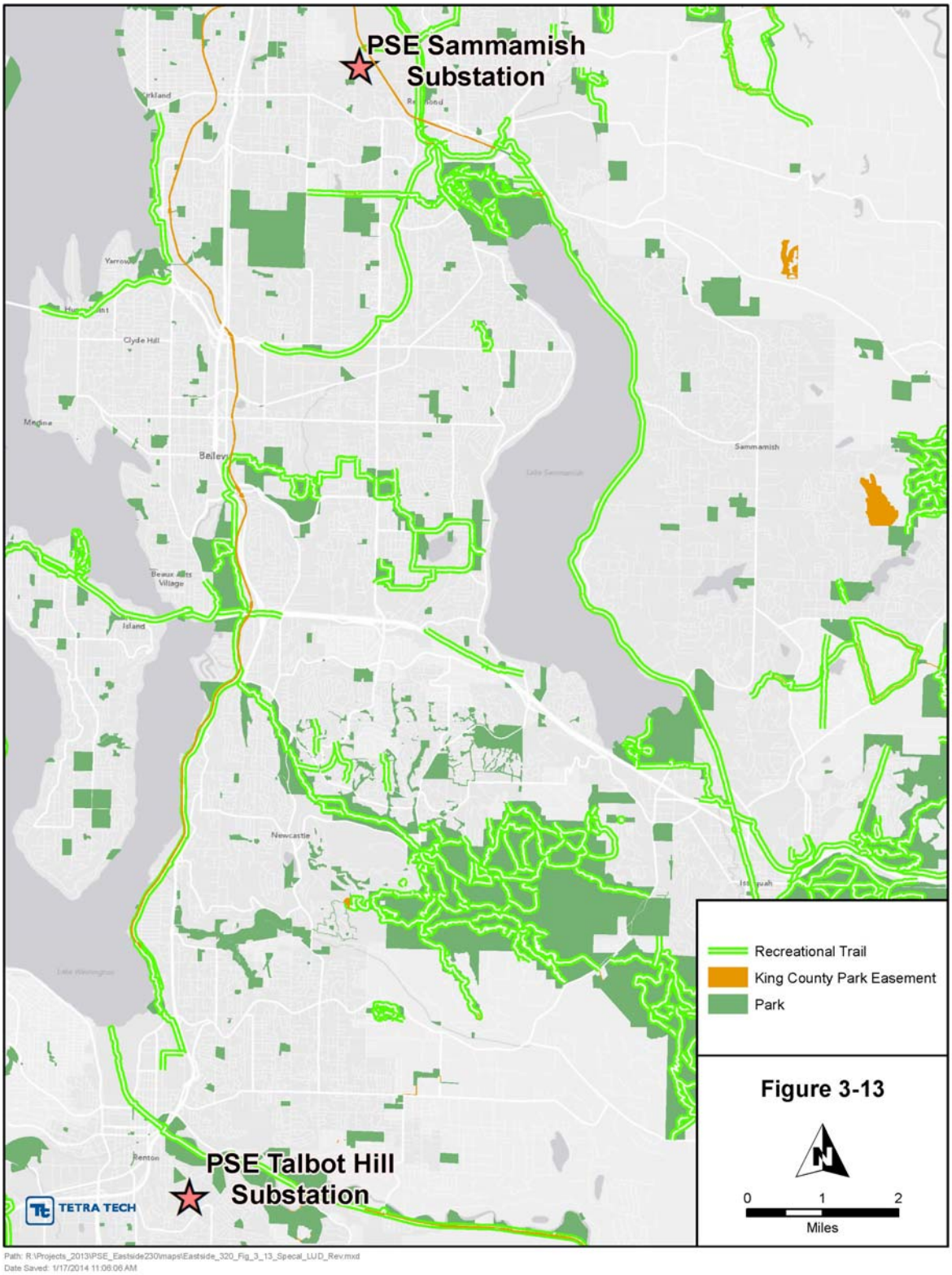

Figure 3-13. Special Land Use Designations

3.4.9 Historic Sites

Historic sites represent constraints, but also tend to be spaced well apart and can be easily avoided (Figure 3-14). For purposes of this analysis, data for Historic Parcels and Points were acquired from the King County GIS database. Cultural site data are classified as sensitive by the Department of Archaeology and Historic Preservation and therefore, were not included in the analysis. A review of cultural and historic sites will be undertaken during further route development, which is the next step of the process.

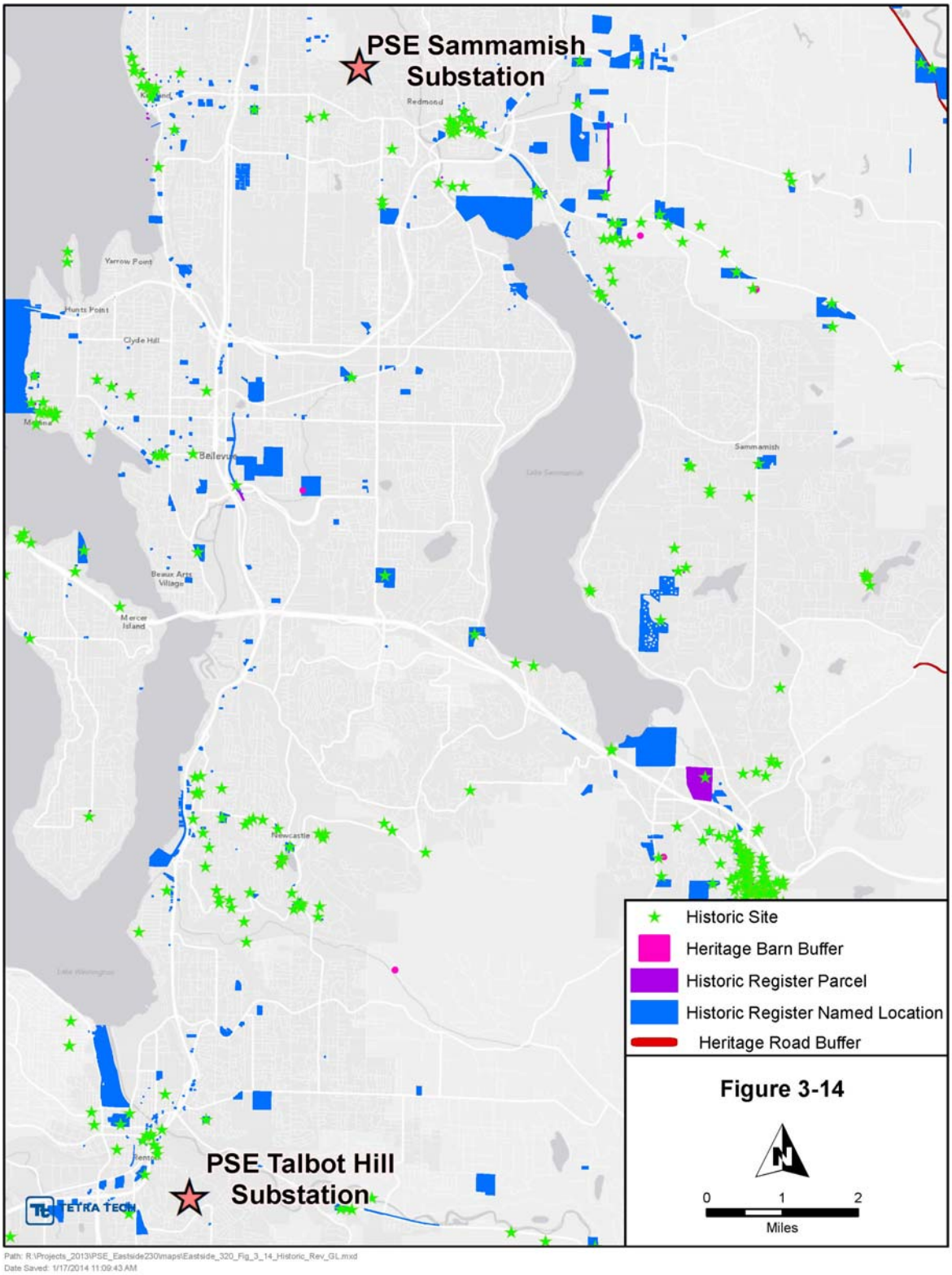

Figure 3-14. Historic Parcels and Points

3.4.10 Visual Resources

There is no GIS data available to effectively represent visual resource considerations in the routing analysis. Nonetheless, using existing corridors or ROW already occupied by existing lines can help minimize new visual impacts.

3.4.11 Waterbodies and Wetlands

There are a number of existing wetlands in the study area that could present constraints to routing a transmission line (Figure 3-15). Large wetlands can be routed around and therefore do not pose a serious problem. The wetlands in the project area occur mostly in river/stream floodways and floodplains, and around shallow lakes. Wetland locations were collected from the National Wetlands Inventory and King County.

Locations of water bodies, such as rivers, streams and lakes were collected from King County, as were the floodways and floodplains. These features can be spanned, except for Lake Sammamish, Lake Washington, Phantom Lake, Larson Lake, and Lake Boren, which can be routed around.

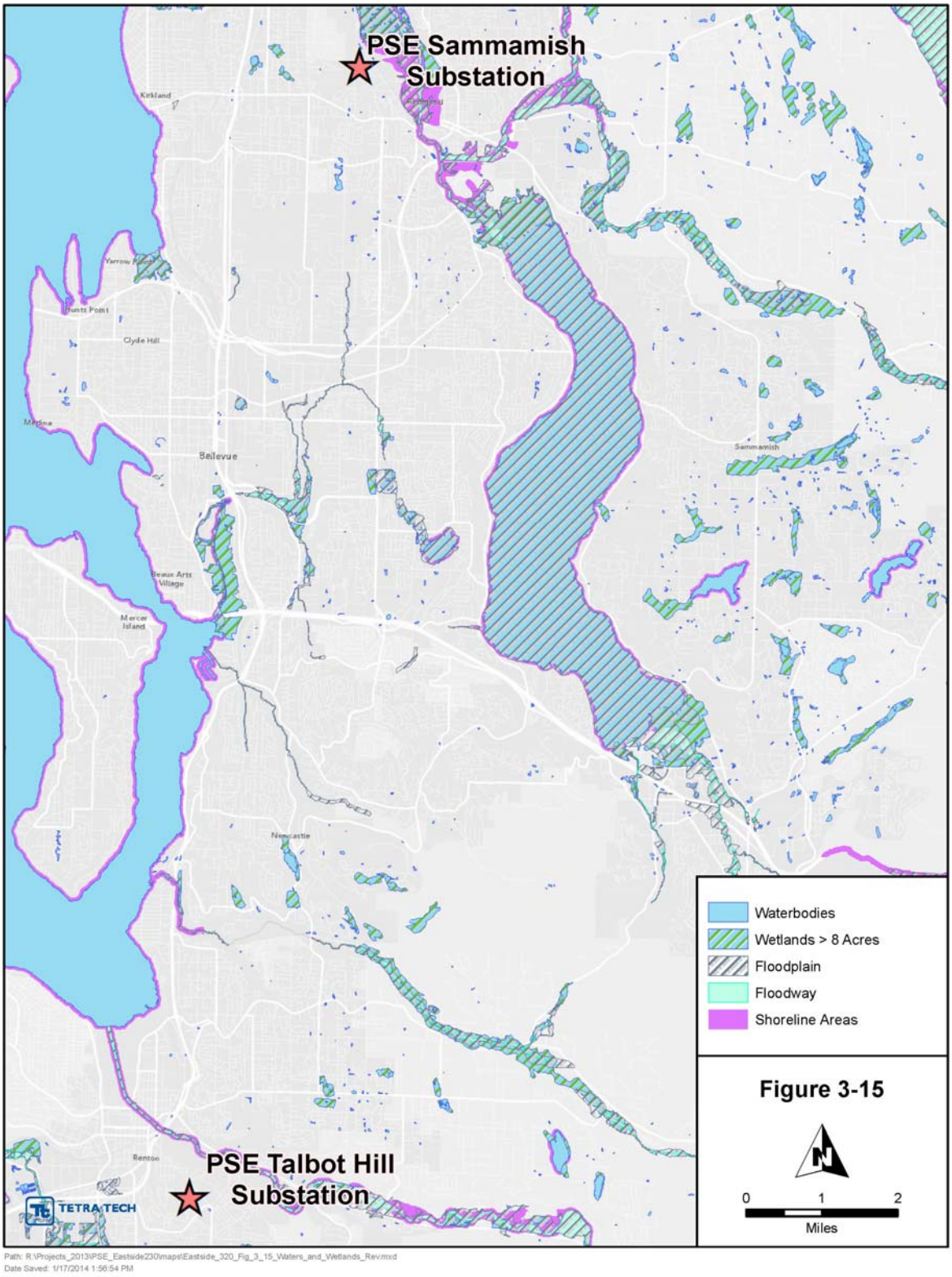

Figure 3-15. Water and Wetlands

3.4.12 Plants and Vegetation

The selected route must be compatible with PSE's vegetation management obligations, as well as applicable local, state, and federal species designated for enhanced protection. However, for the purposes of this study, only GIS mapped special habitat areas were considered. Washington Natural Heritage Program (WNHP) GIS data indicate that several rare, endangered or sensitive plant species occur in the study area. There is *Boschniakia hookeri* (S3) in Bridle Trails State Park, a *Pseudotsuga menziesii - Arbutus menziesii / Gaultheria Shalloon* Forest (S2) between Squak Mountain and Tiger Mountain, and a Forested Sphagnum Bog PTN (S1). S1 is the most sensitive of these categories, and the bog is over 4 miles east southeast of the Talbot Hill substation, and therefore does not influence the analysis. The S2 forest is over 8 miles east of the Talbot Hill substation, and not pertinent to the analysis. The S3 *Boschniakia hookeri* is 0.6 mile from a route segment; however, it is a small patch and easily avoided. In addition, King County and the local municipalities all have regulations regarding wildlife habitat conservation areas, as well as plant, significant tree, and vegetation disturbance in their jurisdictions that will be evaluated in the next step.

3.5 LRT ANALYSIS OF GIS MAPPED CONSTRAINTS AND OPPORTUNITIES

Following definition of the project study area, collection and processing of GIS data, and assessment constraints and opportunities, the LRT was used to identify transmission corridor options for further evaluation. Refinements to the corridors identified by the LRT were made after considering electric system feasibility and reviewing aerial photography, street maps, U.S. Geological Survey (USGS) topographic maps, and readily available knowledge of local conditions. Other criteria, such as engineering and construction feasibility, were also considered to a certain extent. Route distance minimization is built into the LRT as a standard parameter for route development. The respective steps in the transmission line route selection process are discussed below.

To select the best route options from the large number of possible routes, relevant attributes were evaluated simultaneously. Each of the environmental and engineering data sets identified in Table 3-1 were used to determine preliminary routes. Other criteria, such as total distance, engineering, and construction feasibility were also incorporated.

To enable this process, all of the datasets had to be normalized according to anticipated or potential constraints or opportunities associated with construction or operation of the proposed substation and transmission line(s). For that reason, the Project Team assigned values to each resource according to its relative contribution as an opportunity or constraint.

Tetra Tech staff collected existing available GIS files for land ownership, existing and future land use, public and private ROW, wildlife, vegetation, threatened and endangered (T&E) species, wetlands, topography, historical resources, and other factors that would influence the location of the proposed transmission line. The data collection process was designed to provide geospatial information on criteria that could represent either opportunities or constraints for the location of a transmission line.

Using the team's professional, multi-discipline expertise, the various data layers were individually weighted to reflect the varying degree of constraint or opportunity for each data set. The team's resource and LRT experts assigned values to the data layers (resources) using a progressive scale of values ranging from the most negative or adverse constraint, such as endangered species and residences, to the most positive or greatest opportunity, such as existing PSE ROW. Certain features were considered exclusion areas that could not be crossed under any circumstances because of regulatory, environmental, or engineering limitations. A matrix populated with these resources and their associated values was used as input to the LRT to identify potential transmission line routes. The GIS constraints and opportunities are listed in Appendix B.

The LRT combined these resource layer values and created an output file called the suitability grid, which represents a summation of all the constraints and opportunities for every point (grid cell) across the entire study area. Each grid cell was 10 feet by 10 feet in size, allowing for the model to look at the study area in relative detail. For each grid cell, the scores for each of the attribute layers were summed. The suitability grid can be likened to a landscape of opportunities and constraints that the corridor must traverse. The areas of greatest opportunity are the easiest to cross (valleys), while the areas of highest constraint (hills) are more difficult. The LRT generated multiple corridors across the suitability grid from PSE's Sammamish substation to PSE's Talbot Hill substation connecting via the potential transformation sites. An example of this output is shown in Figure 3-16. This figure depicts the optimal feasible route from the Sammamish to the Vernell substation, and from the Vernell to the Talbot Hill substation. Because all feasible routes include a transformation site between the Sammamish and Talbot Hill substations, all routes were modeled from the Sammamish substation to a potential intermediate transformation site, and then from that site to the Talbot Hill substation.

Multiple corridors, with varying degrees of opportunities and constraints were generated and used to develop alternative routes. To simplify analysis, each route was partitioned at the crossing points of routes to create unique segments. Each LRT segment was validated using professional judgment and ancillary resources such as aerial photographs, to help ensure they were realistic options. Once the segments were generated and validated, a composite score was calculated for each segment from the underlying suitability grid. The composite score for each segment was put into a deterministic model that considered over five hundred combinations of segments and substation sites. If parallel segments (i.e., typically less than a block apart) were identified during the model evaluation, LRT scores were compared to determine which segment would be used to develop routes.

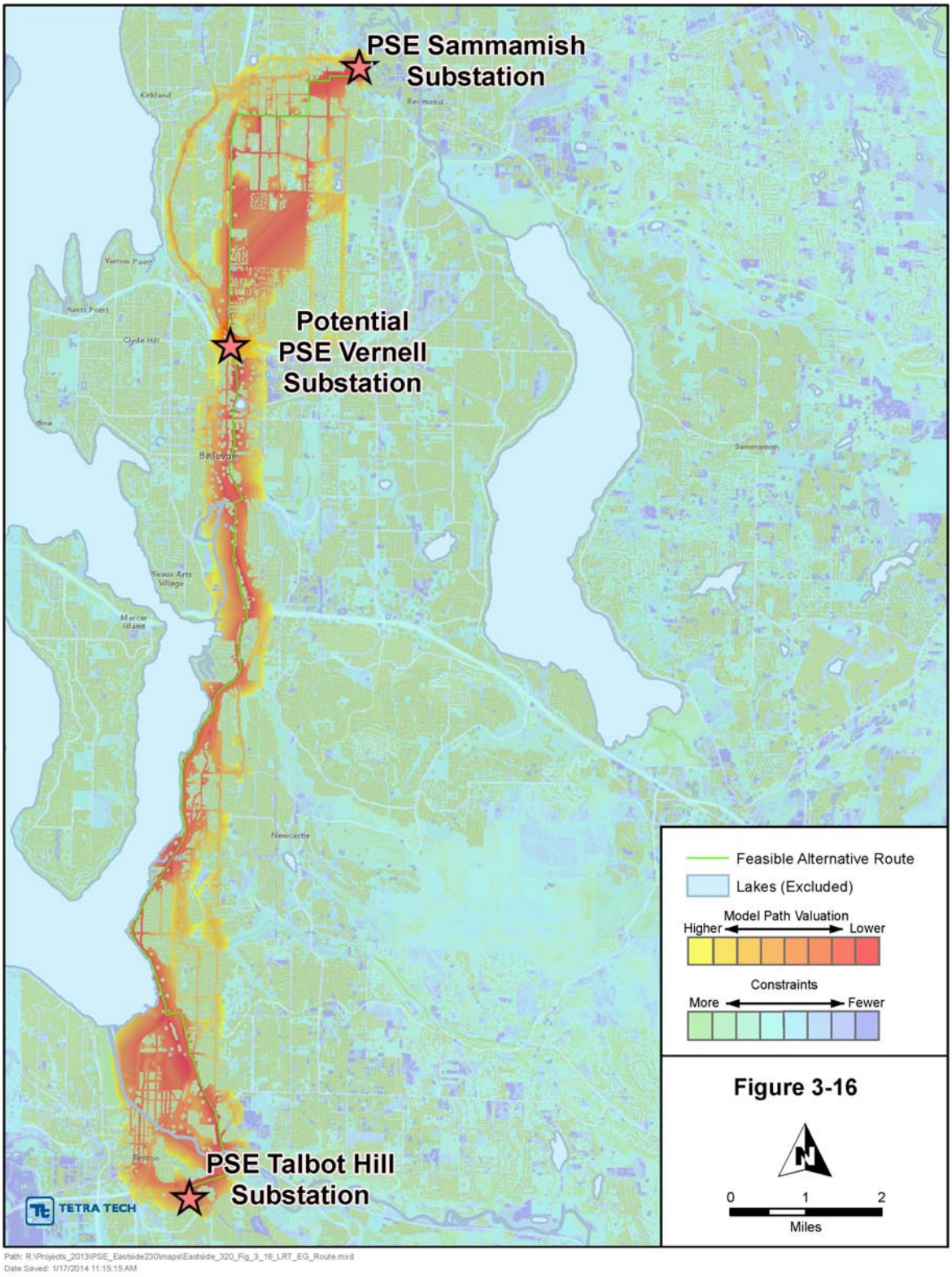

Figure 3-16. LRT Constraints and Opportunities, Corridor Grid and Route Alternatives

3.6 SELECTION OF ALTERNATIVES TO CARRY FORWARD

Because the Corridor Grid shows variations in the degree of opportunity and constraint, it is used to define route alternatives. Multiple corridors, with varying degrees of opportunities and constraints, were generated and used to develop alternative routes. To simplify analysis, each route was partitioned at the crossing points of routes to create unique segments. Each segment was then analyzed by the Project Team. This process has been used to help identify route options on many linear projects, further refining the professional judgment of the analysts over time. The analysis process also includes review of ancillary resources, such as aerial photographs, that add new and objectively verifiable information to the data sets that generated the corridor grid and route segments. By applying professional judgment to the data sets and ancillary resources, each LRT segment was validated to help ensure that they were feasible options. Once the segments had been identified, the constraint value score was calculated for each one. A constraint value model was developed that considered over 500 segment/route/substation site combinations. If parallel segments (i.e., typically less than a block apart) were identified during the model evaluation, LRT constraint values were used to compare and determine which segment would be used to develop routes.

A deterministic model was used to evaluate the LRT scores for each of the segment/route/site combinations. Negatively scored routes were eliminated from further consideration as they were not considered viable options. The top five percent of the positive routes were then mapped to assist further discussion and evaluation, with the segment combinations for these routes provided in Table 3-2, below. The mapping exercise revealed that there were four general subareas, which when combined, formed a "ladder" of route alternatives. The "leg" components of the ladder comprised the north-south running routes connecting the Sammamish, Talbot Hill, and one of the new transformation substations. Moving east to west between the "legs" could be accomplished by using one of the three cross-over segments or "rungs." The only exception to this being an additional north-south segment situated in the central part of the study area, south of I-90. To simplify future discussion, each of the fourteen legs and rungs were given a unique identifier (Figure 3-17).

Table 3-2. Route Segment Composition

Vernell 248	Vernell 249	Westminster 217	Lakeside 155	Lakeside 160	Lakeside 166
A	A	A	A	A	A
B	B	C	C	C	C
F	F	D	E	E	E
H	H	F	G2	G2	J
K1	L	H	G1	I	M
K2	N	L	H	K1	N
M		N	L	L	
N			N	N	

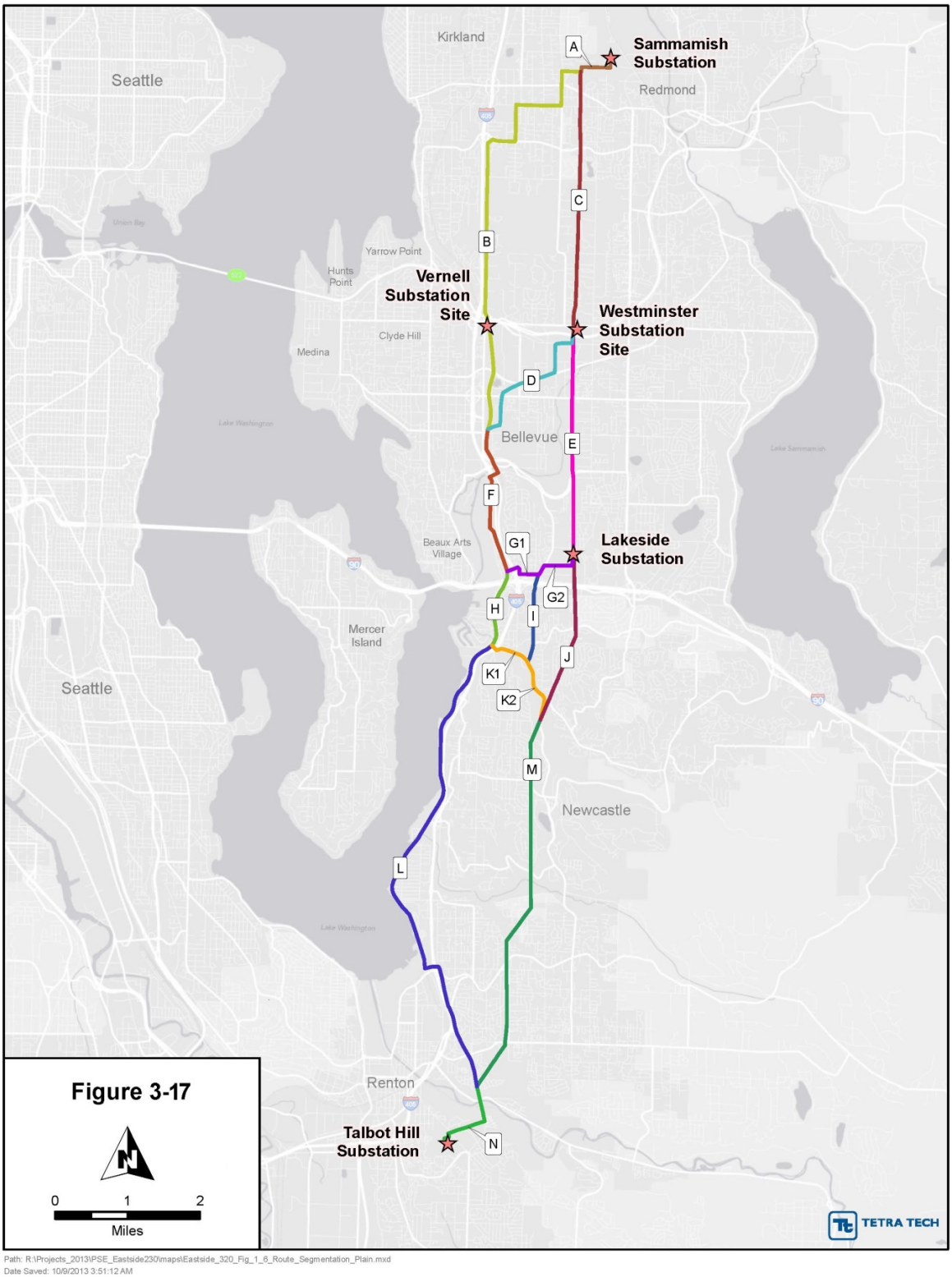

Figure 3-17. Route Alternatives with Unique Identifiers

4. Conclusion and Next Step: Viable Segments and Recommended Routes

Collection and synthesis of the GIS data sets identified throughout this report, analyzed by linear route selection professionals using the processes discussed above, supports the determination that all of the mapped segment combinations shown in Figure 3-17 can be used to develop a route capable of connecting the Sammamish Substation with the Talbot Hill Substation, while connecting to any one of the three new 230 kV intermediary substations.

Additional data collection and evaluation will be conducted in order to further refine the assessment of route segments, which will support a determination that the most viable route is one that is technically feasible and practicable for permitting, construction, and maintenance over time. Following a public review and input process, PSE will select the preferred route, which will then be subjected to project-specific land use and environmental review in support of permits to construct the new transmission facility.

5. Report Limitations

This assessment was developed in conjunction with Puget Sound Energy in an effort to assist in the selection of a feasible 230 kV transmission line route from the Sammamish Substation to the Talbot Hill Substation. The report was developed to describe the evaluation and selection processes. The need for future analysis may also be warranted if specific issues are identified that were outside the intended scope of this assessment.

As with any project that involves an evaluation of environmental and permitting factors, there is a certain degree of dependence upon available information that may not be readily verifiable without the implementation of thorough field programs. Data collected and used within this report were derived primarily from examination of records in the public domain and input from the project team's knowledge about the project area. The passage of time, manifestation of latent conditions, or occurrence of future events may require further study, as well as reevaluation of the findings, observations, and conclusions in the report.

APPENDIX A- Tetra Tech Routing Experience

Tetra Tech, founded in 1966, has provided siting and permitting services for AC and DC electric transmission lines for approximately 40 years in locations from California to Maine, including our current work on the longest contiguous electric transmission project in the nation, the Gateway West Transmission Project.

Listed below is a table of transmission siting projects in the West that Tetra Tech is currently supporting or has supported recently.

Client	Project	Location
Puget Sound Energy	Berrydale to Lake Holm (Krain Corner)	King County
Puget Sound Energy	Eastside 230 kV Project	King County
Idaho Power/ PacifiCorp	Gateway West 230 kV and 500 kV Lines	Wyoming and Idaho
Idaho Power	Boardman to Hemingway 500 kV Line	Oregon and Idaho
NV Energy	Falcon-Gender 345 kV Line	Nevada

APPENDIX B- GIS Constraints and Opportunities

Constrain/Opportunity	Value	Value Definition
Address point buffers (buildings); BPA substation; Large lakes	barrier	Exclusion areas that cannot be crossed under any circumstances due to regulatory, environmental or engineering requirements.
Highway polygons created using lane widths; WSDOT Utility Restrictions – restricted; WA Natural Heritage Project Critically Imperiled Species of Special Concern (S1); Water bodies, Airport; Transfer of development rights – receiving; Convenience Store with Gas; Service Station; Marina; Resort/Lodge/Retreat; 4-Plex; Air Terminal and Hangers; Apartment; Apartment (Co-op); Apartment(Mixed Use); Apartment (Subsidized); Campground; Condominium (Residential); Condominium (Mobile Home Park); Duplex; Fraternity/Sorority House; Retirement Facility; Townhouse Plat; Triplex; Gas Station; Mobile Home Park; Daycare Center; Golf Course; Historic Prop (Misc); Historic Prop (Office); Mobile Home; Reserve/Wilderness Area; Residence Hall/Dorm; Rooming House; School (Private); School (Public); Single Family (C/I Use); Single Family (C/I Zone); Single Family (Res Use/Zone)	-5	Very high impact (duration, regulation). Very difficult or impossible to mitigate (due to technology, sensitivity of resource or cost of mitigation).
Arterial Roads buffered by 20 feet; Landslide potential (class 3); Wetlands, large; Parks; Art Gallery/Museum/Social Service; Auditorium/Assembly Building; Church/Welfare/Religious Service; Club; Condominium Office); Park-Private (Amuse Center); Park- Public (Zoo/Arbor); Condominium (Mixed Use); Group Home; Health Club; Hospital; Hotel/Motel; Medical/Dental Office; Mini Lube; Movie Theater; Nursing Home; Office Building;	-4	High impact. Mitigation would be successful, but would be difficult to implement, very costly, and/or require a long time to complete.

Post Office/Post Service; Rehabilitation Center; Restaurant (Fast Food); Restaurant/Lounge; Skating Rink (Ice/Roller); Tavern/Lounge; Vet/Animal Control Service		
WSDOT Utility Restrictions – with exceptions; WA Historical Register; WA Historical Register Districts; Historic Property Inventory – named; WA Natural Heritage Project Imperiled Species of Special Concern (S2); Slope 20% or greater, unspanable; Slope 40% or greater, unspanable (combined with slope >20% results in a total of -6); Shorelines (200' Buffer); Waterfowl habitat; Heron rookeries; Bald eagle nest buffers; Native growth protection easement; River/Creek/Stream; Water Body- Fresh	-3	Moderate impact. Would not likely result in significant adverse impact. Mitigation, if necessary, would be fairly easy to implement.
WA Natural Heritage Project Rare or Uncommon Species of Special Concern (S3); Floodway; Floodplain; Coal mine hazards; Airport approach notification zone; Landslide potential (class 2); Utility, Private (Radio/T.V.); Retail Store; Shopping Center (Community); Shopping Center (Major Retail); Shopping Center (Neighborhood); Shopping Center (Regional); Shopping Center (Specialty); Retail(Discount); Retail(Line/Strip); Open Space Timber Land/Greenbelt; Open Space (Agriculture-RCW 84.34); Open Space (Current Use-RCW 84.34)	-2	Low impact. Mitigation, if necessary, would be easy to implement.
Scenic Byways buffered by 50 feet; Railroads (rail bank) buffered by 50 feet; BPA transmission corridor; Heritage Barns buffered by 100 feet; Landslide potential (class1); Salmonid streams buffered by 60 feet; Park easements, King County; Tideland, 1st Class; Auto Showroom and Lot, Bank; Bowling Alley; Car Wash; Convenience Store without Gas; Grocery Store; Service Building; Sport Facility	-1	Very low impact. No mitigation required.
Transfer of development rights – sending; Governmental Service;	0	No impact or impact not a concern.

Greenhouse/Nursery/Horticulture Service; High Tech/High Flex; Mining/Quarry/Ore Processing; Office Park; Retail(Big Box); Terminal (Auto/Bus/Other)		
High Pressure Gas Lines buffered by 75 feet; Farm; Mortuary/Cemetery/Crematory	1	Reduces impacts and mitigation requirements, and would facilitate permitting to a very minor extent.
Recreational Trails buffered by 10 feet; BPA transmission corridor buffered by 80 feet; Vacant (Commercial); Vacant (Multi-family); Vacant (Single-family)	2	Reduces impacts and mitigation requirements, and would facilitate permitting to a fairly minor extent.
Industrial Park; Industrial (Gen Purpose); Industrial (Heavy); Industrial (Light); Mini Warehouse; Terminal (Rail); Vacant (Industrial); Warehouse	3	Reduces impacts and mitigation requirements, and would facilitate permitting to a moderate extent.
Arterial Roads buffered by 45 feet; Railroads (abandoned) buffered by 50 feet; PSE 55kV corridor; Easement; Parking (Assoc); Parking (Commercial Lot); Parking (Garage); Right-of-Way/Utility-Road; Utility-Public	4	Reduces impacts and mitigation requirements, and would facilitate permitting to a large extent.
PSE transmission ROW buffered by 50 feet	5	Reduces impacts and mitigation requirements, and would facilitate permitting to a very large extent.

Exponent®

City of Bellevue
Electrical Reliability Study
Phase 2 Report

EXCERPTS

DSD 001845

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City of Bellevue
Electrical Reliability Study
Phase 2 Report

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February 2012

1101628.000 E0F0 0212 WRB3

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Executive Summary

Study Results

The City of Bellevue (the City) retained Exponent to perform an electric system reliability assessment to assist the City in meeting its goals to be an informed stakeholder and to work with Puget Sound Energy (PSE) to ensure a reliable electric power supply for the City. The study was performed to answer the following questions from the Electric Reliability Study Plan[1]:

1. *"How does PSE's existing system serving Bellevue perform relative to the Washington Utilities and Transportation Commission (WUTC) expectations, industry standards, and peers relative to reliability?"*

   There are over 90 circuits in Bellevue and while the performance on individual circuits can vary, the overall system in Bellevue is reliable.

   Electric system reliability is measured by the availability of the system to deliver electric power to a customer's meter in accordance with voltage and frequency requirements specified by the WUTC.[2] Reliability is therefore a measure of the probability that electric power is delivered in accordance with those requirements. Electric system reliability is typically measured based on the frequency (System Average Interruption Frequency Index [SAIFI]) and duration (System Average Interruption Duration Index [SAIDI]) of outages relative to the number of customers.

   WUTC has established reliability goals for its regulated utilities (service quality indices). Prior to 2010, the measures included SAIFI (frequency of outages per customer) and SAIDI (duration of outages per customer) goals for PSE of 1.3 and 136 minutes, respectively, excluding major storm events. While PSE has not always met the SAIDI goals system-wide, Bellevue's reliability has met the SAIFI and SAIDI goals over the past 5 years. In 2010, the reliability in Bellevue measured 0.44 and 66 minutes, respectively for SAIFI and SAIDI. In 2010, the measure for SAIDI was changed to include a 5-year average including major storm events and PSE met that goal system-wide. They will report this measure for Bellevue's circuits in 2011.

   PSE participates in an industry reliability survey through the Institute of Electrical and Electronics Engineers. PSE's overall system reliability performance is typically in the 1st or 2nd quartile on SAIFI (frequency of outages) and 2nd or 3rd quartile in SAIDI (duration of outages) (with the 1st quartile being best performance). PSE's 2010 performance for SAIFI and SAIDI was 0.86 and

[1] Reference 10.

[2] Washington Administrative Code (WAC)480-100.

129 minutes, respectively, and as shown above, Bellevue had significantly better reliability performance.

2. *"What changes relative to facilities, equipment, planning, and emergency operations will improve electric system reliability, communication, and outage response in Bellevue?"*

   While there has been improvement in the reliability of the Bellevue system over the past several years, the following enhancements are required to ensure continued improvement in reliability for the City:

   - Hardening of the Bellevue system to ensure appropriate redundancy to all substations and circuits.
   - Continued focus on underground cable replacement and remediation as well as replacement of older switches and transformers placed in underground vaults.
   - Review of specific circuits within the City that experience lower reliability to identify improvement actions.
   - Accelerate investments in distribution automation (including a Distribution Management System [e.g., Supervisory Control and Data Acquisition]) to improve reliability and to enable future technologies.
   - Develop strategies to provide greater opportunities for undergrounding lines experiencing lower reliability due to tree and storm impacts.
   - Improvements in the information technology infrastructure for outage management and customer interface to specifically improve communication and outreach to customers during outages on the system.

3. *"Will the City have adequate and reliable power supply to meet future City growth needs?"*

   Based on current plans, the City will have an adequate and reliable power supply to meet the medium-term (5–10 years) and long-term (10–20 years and beyond) growth requirements. The current plan includes:

   - Capacity additions, including upgrade of the 115 kV lines running north-south through Bellevue.
   - Addition of transformer banks to support growth in the Downtown, Bel-Red, and Eastgate/Somerset areas.
   - Upgrade of 115 kV lines to support additional transformer banks.
   - Support of PSE plans to significantly reduce the peak electric power demand through the use of more efficient electric lighting and equipment.

4. *"What opportunities are available to the City to work with PSE, regulators (WUTC,* Federal Energy Regulatory Commission*), and other stakeholders to ensure the needs and expectations of Bellevue's residents and businesses are met relative to the reliability of the power supply?"*

   Bellevue's role as an informed stakeholder requires that the City take an active role in becoming informed on matters affecting the reliability and planning for the electric system in Bellevue. This role includes direct communication with PSE as well as other stakeholders regarding electric service. Specific opportunities for the City to engage as an active stakeholder include:

   - WUTC: The City has a role in informing lawmakers and commissioners regarding matters that affect reliability. The City also has the opportunity to comment or participate in matters directly affecting PSE and its interaction with WUTC. It may be possible for Bellevue to support measures for investment brought forward by PSE that support its overall City goals for electric system reliability and service.

   - PSE: The City has many opportunities to proactively interact with PSE on issues related to system reliability, long-term planning, near-term major project planning, Smart Grid initiatives, and emergency planning.

5. *"How can the City measure and monitor whether improvement in reliability is being achieved?"*

   This reliability assessment includes recommendations for the City to consider moving forward. Proposed reliability improvement metrics have also been included to assist the City in measuring and monitoring the implementation and effectiveness of these recommendations.

This reliability study provides the analyses and recommendations to support the City in meeting its goals to be an informed and active stakeholder and to ensure that the City has an adequate and reliable electric system now and into the future.

Recommendations Summary

The outcome of this reliability assessment is a set of recommendations that will support the City's efforts to meet its stated goals. The recommendations are summarized below:

1. **Conduct Joint City/PSE Reliability Workshops—**The City should conduct an annual reliability workshop with PSE to perform a review of the following topics that relate to reliability in Bellevue:

   - Specific Circuit Reliability: The City should request reliability metrics (SAIDI and SAIFI) on a circuit basis. This will provide the City with information regarding the performance of circuits throughout the City and provide a basis for the City to work with PSE to identify appropriate means to improve performance.

- The City should trend circuit performance over time to identify the effectiveness of completed reliability projects (review number of outages and causes to trend improvement). This assessment provides the City with a means of reviewing the overall Downtown performance and performance for specific neighborhoods that have experienced frequent outages (such as neighborhoods with overhead circuits).

- Equipment Reliability Projects: The City should request a list of the current PSE projects identified for Bellevue (both funded projects in the capital plan and those waiting future funding) to understand the potential reliability improvement efforts for Bellevue.

- Maintenance and Inspection Program Results: PSE should identify to the City any new items likely to significantly affect the electric system reliability from its review of maintenance and inspection programs during the prior year.

- System Redundancy Projects: The City should review the design improvements that are being added to the Bellevue system.

- Automation Installation: The City should review with PSE the automation improvements that are being added in the Bellevue system. The City can monitor the overall upgrades to the system and the degree of system automation.

2. **Joint City/PSE Planning Workshops—**It is recommended that the City engage PSE in an annual planning workshop around future projects. The Comprehensive Plan includes an electric system plan that can serve as the basis for the annual workshop. The workshop should focus on the following items:

   - Current growth projections and electric power use in Bellevue

   - Review and update of current plan

   - Actions for capacity projects required to initiate siting and permitting activities within the next 2 years.

   An outcome of the workshop should be an updated plan for inclusion in the Comprehensive Plan (if required) and an action plan to move designated projects forward into siting analysis and/or planning.

3. **Integrated Resource Planning (IRP)—**The City should remain active in the IRP process and should begin to understand potential long-term impacts of this strategy.

4. **Vegetation Management—**The visual review of overhead circuits indicates that there are many substations and lines located in heavily wooded areas. The only way to significantly improve reliability is to perform more comprehensive tree

trimming. The City should review its vegetation policies, specifically in the areas of substations, to look at alternative vegetation approaches.

5. **Community Communications—**City personnel involved in emergency response should meet with PSE to understand the capabilities of the new outage management system (when completed) to assist in communications with the Bellevue community.

6. **Emergency Response Capability—**The City and PSE should consider the development of a more formal process (procedure) related to response and support activities during an outage. The outcome should be an agreement (or procedure) for communication and coordination during large-scale events affecting Bellevue.

7. **Energy Efficiency Improvements—**The City should lead the energy efficiency effort to assist PSE in reaching its long-term electric energy usage goals to help ensure adequate electric power supply during peak power periods for the City. Electric energy savings programs require active outreach to the customers and citizens to support various efficiency initiatives. The PSE long-term plan has a large reliance on reducing the electric energy demand by installing lower power consuming appliances and lighting systems. The City will have a major role to play in terms of City policy and regulations that support efforts that are alternatives to building additional power plants to supply peak power during high demand periods. The City will also have a major role in community outreach.

8. **Undergrounding of Distribution Lines—**The City should investigate opportunities for additional undergrounding of distribution lines through coordination of multiple utility projects and evaluation of local improvement districts. The City's Comprehensive Plan requires undergrounding of new distribution lines and strategies should be developed to increase opportunities to convert overhead lines to underground circuits.

9. **City Interface with WUTC—**Bellevue's involvement with WUTC should be one of informing lawmakers and commissioners regarding matters that affect reliability. This involvement should include:

    - Assigning a designated individual to electric system matters. This individual should remain informed of electric system activities related to WUTC.

    - Developing "white papers" for submittal to WUTC to inform the Commission of issues affecting electric reliability in the City. This provides a means to provide feedback to WUTC without direct response to hearings.

    - Commenting on or participating in matters directly affecting PSE and their interaction with the WUTC.

There are several additional recommendations that can be incorporated into the recommendations listed above. These include:

10. **Smart Grid Strategies—**PSE has identified a series of Smart Grid technology projects that are being considered over the next 2 years. These projects include a range of programs from the base infrastructure required to enable the Smart Grid to specific customer-related efforts. The City should review the overall PSE plan and determine its level of support for the various customer initiatives. The City needs to define a Smart Grid approach that it would like to see implemented in Bellevue, specifically addressing the level of support for customer interface applications, such as customer energy management, demand response, home automation, etc. The City should work with PSE to develop a Bellevue deployment plan consistent with PSE obligations. (Include with Recommendation #1)

11. **Long-Range Planning—**The City and PSE should synchronize their growth projections for the City by frequent information exchange on expected projects, expected timing of projects, and coordination of actions required by PSE and the City to address these projects. This exchange is meant to assist longer-term planning and should occur well in advance of any specific permitting or development activities. (Include with Recommendation #2)

12. **Multi-Utility Planning—**The City should engage with its utility partners to identify new projects (both large and small) to maximize efficiency for projects in the rights-of-way. The City can take advantage of projects that require trenching to place conduit for potential future use of undergrounding. The existence of conduit may allow for more economic alternatives for undergrounding in the future. (Include with Recommendation #1)

Detailed descriptions of these recommendations are included in this report.

Conclusions

This assessment of the electric system serving the City has shown that electric system reliability is improving and that the programs and projects shown in PSE's planning documents should continue to improve system reliability. However, successful execution of plans, programs, and projects is required to ensure that there is an adequate and reliable electric power system serving the City.

The recommendations offered for consideration by the City are intended to provide a basis for the City to become an informed and active stakeholder relative to decisions and actions required to support continued and improved electric system reliability.

2.2.8 Recommendations

Based on the outage assessment and the current status of PSE's programs to respond to these events, the following recommendations are made to improve the City's ability to be a more proactive participant in improving reliability:

- There are several programs underway to address prevention of outages and to reduce duration of outages. The City can and should proactively monitor the progress and extent of those programs focused on improving the reliability of the City's power distribution system. This will require the City to add staff with power system know-how.
- The City should investigate opportunities for additional undergrounding of distribution lines through coordination of multiple-utility projects and evaluation of funding for conversion of overhead lines to underground cable circuits by forming local improvement districts.
- PSE has ongoing reliability initiatives and performs system-wide and targeted projects to improve system reliability. The City should track the reliability impacts experienced in the various neighborhoods. Since, in the future, PSE will be reporting additional reliability information including storm outages, the City can utilize this information to determine the effectiveness of the various reliability programs and projects, and to work with PSE in identifying circuits requiring attention. A fast track implementation of system improvements is an option for the City to explore with PSE, although accelerated investments might have a negative impact on the power rates.
- The visual review of overhead circuits indicates that there are many substations and lines located in heavily wooded areas and the only way to significantly improve reliability is to perform more comprehensive tree trimming. The City should review its vegetation policies, specifically in the substation areas, to look at alternate vegetation approaches where the risks for large-scale disturbances related to vegetation issues is high.

The remainder of the section provides a discussion of the overall system design and work processes relative to the potential for reliability risk.

2.3 Review of PSE's System Design

2.3.1 Scope

System design has a major impact on electric reliability from the standpoint of limiting outages and reducing the restoration period in response to events. This section provides an assessment of the current PSE system relative to the overall design and layout of the Bellevue distribution system. The review of PSE's system design is intended to identify potential opportunities or vulnerabilities in the overall electric power system relative to reliability within Bellevue.

2.3.2 Approach

The assessment was performed solely through a review of publicly available WUTC documents, publically available PSE and other documents, and limited discussions with PSE's staff. In addition, a walk-through of PSE's substations and control centers was a part of the review in order to obtain an understanding of PSE's design practices. PSE proprietary and confidential documents were not made available for the review. The information reviewed for this assessment is listed below and was discussed with PSE personnel during meetings on these topics:

- Distribution System Design, Loadings, and Operations
- Transmission System Design, Loadings, and Operations
- Capital Project Planning and Prioritization
- Projects and Reliability Initiatives in Bellevue
- Substation and Line Maintenance and Problem Investigations
- PSE Electric Substation Work Practice Standards
- PSE Electric Relay Work Practice Standards.

The WUTC information included in Washington Administrative Code (WAC) 480-100 series was also reviewed as part of this assessment.

2.3.3 State of Washington Requirements

2.3.3.1 Relevant State Codes

WUTC provides oversight of electric utilities through regulations codified in WAC Chapter 480-100. As noted in WAC 480-100-001, the purpose of these regulations is "to administer and enforce chapter 80.28 of Revised Code of Washington (RCW) by establishing rules of general applicability and requirements for consumer protection, financial records and reporting, electric metering, and electric safety and standards". The principal statutes that define WUTC's authority and responsibility with respect to electric utilities are found in RCW Title 80. WUTC regulates electric non-public power utilities, such as PSE[44]. These laws provide the basis for the operations of the electric utilities and how they must conduct business. A more detailed discussion of the regulations and their impact on system reliability is provided in Section 4.2.1.

A brief summary relative to the regulatory impacts on reliability are:

- Requirements for maintaining fair rates subject to rate case hearings: These requirements have an impact on the utility's capital expenditures and projects selected each year.

[44] WUTC does not have jurisdiction over the Public Utility Districts (PUD) or Municipal Utilities.

- Requirements for power quality that define voltage range provided to the customers: This item requires both the utility and end-users (major industrial or power users) to manage their assets to minimize voltage fluctuations on the system.
- Requirements for submitting annual reliability reports: Regulated utilities are required to submit reports on electric system reliability and on actions taken to improve reliability. This requirement also has a major impact on the selection of capital projects and maintenance each year.
- Requirements for interacting with jurisdictions relative to access to rights-of-way in order to maintain a safe and reliable system.
- Guidance on renewable, energy efficiency, and environmental concerns: The State provides requirements and incentives to utilities to promote reductions in power use and the use of environmentally friendly power sources.

2.3.3.2 PSE's Regulatory Environment

Based on this review it was concluded that the state of Washington has codes and requirements similar to other states. However, the code requirements are less detailed than, for example, those of the state of California, which has issued detailed regulations in regard to design, operation, and maintenance of the electric power system.[45] California's key code sections are:

- General Order 95—Rules for Overhead Electric Line Construction
- General Order 128—Rules for Construction of Underground Electric Supply and Communication Systems
- General Order 165— Inspection Cycles for Electric Distribution Facilities.

That is, the state of California has issued detailed rules for design, construction, and maintenance of facilities. No similar rules have been found among WUTC's rules. Thus, it appears as if PSE can design and operate its power system with a higher degree of freedom. However, it still has to meet prevailing standards such as the National Electric Safety Code.[46]

According to information provided by PSE, expenditures and investment costs to be included in the rate base are not reviewed and approved in advance by WUTC but are reviewed after the expenditures and investments have been made. That is, PSE carries the entire risk for investment decisions that it makes until the investments have been made and are presented to WUTC for inclusion in the rate base. If WUTC does not find the investments or expenditures to be prudent it might not allow for these costs to be included in the rate base. In some other states, such investments may have to be preapproved by the regulators prior to initiating the project or starting construction.

[45] See http://docs.cpuc.ca.gov/gos/index.html for information about the California codes.

[46] IEEE Standard C2-2012 National Electric Safety code: ISBN: 9780738165882 (Latest Issue).

2.3.4 Review of PSE's Power Supply

Electric reliability depends on a stable power supply. Relative to the City, the power supply starts with generation and transmission assets feeding the distribution assets in Bellevue. Since the power flows to whatever loads are connected, it is not possible to evaluate the power generation portion specifically related to Bellevue. The Bellevue-specific aspect of the power supply relates to having transmission lines that are capable of supplying the generated power to the City. This section provides a brief synopsis of the current power supply situation for Bellevue.

2.3.4.1 Risk Analysis—Present Generation Capacity

Generation capacity has been sufficient to support the overall PSE electric demand at present, including Bellevue. However, issues have arisen about the ability of wind energy to be delivered through the transmission system in the Northwest from wind power plants in eastern Washington, Idaho, and Oregon.[47] This has not caused power supply problems for Bellevue but indicates that the location of PSE's power supply sources is important and that bottlenecks exists outside of PSE's service territory that can impact how much power PSE will be able to transfer over transmission lines that are not owned by PSE. The risk to Bellevue related to insufficient generation available to PSE cannot be quantified because data are lacking to enable such an analysis. A detailed discussion of generation issues is provided in Section 3 with the review of the Integrated Resource Plan (IRP).

2.3.5 Risk Analysis—Bulk Power Transmission System for Bellevue

2.3.5.1 Scope

PSE operation depends on power wheeling over relatively few transmission lines. This task entailed reviewing the contingencies under which PSE might lose all or a significant amount of the power it needs to keep its customers supplied with electric power in order to assess any potential risks to reliability.

2.3.5.2 Present Transmission System Design

The City receives its electric supply via a 115 kV looped subtransmission system that is connected to primary substations at Sammamish (to the north) and Talbot Hill (to the south). These two stations, in turn, are connected to the high-voltage transmission grid that serves the northwestern states, and receive energy from a mixture of fossil fuel and renewable sources, often located many miles away from Bellevue. The 115 kV lines roughly encircle the City and feed several distribution substations, which step the voltage down to 12.5 kV, a voltage which can more readily be routed through the neighborhoods of the City. It is important to note that most (although not yet all) of these distribution substations are fed from the 115 kV system using two different lines, a method which provides redundancy should one line experience a

[47] See http://www.nytimes.com/2011/11/05/business/energy-environment/as-wind-energy-use-grows-utilities-seek-to-stabilize-power-grid.html for a discussion of wind power issues in the Pacific Northwest.

fault or if maintenance on a line is required. On the 12.5 kV system, the service transformers, whether located on poles, underground, or as ground-level "pad-mounted" units, further reduce the voltage to the familiar ones we all use, such as 120, 240, or 480 VAC, and also provide 3-phase service to commercial and industrial customers.

Figure 30 provides a map of the existing 115 kV system for the City and the surrounding area. The map also shows an existing, double circuit (two 3-phase circuits on one pole) 230 kV line that is owned by Seattle City Light which is not available for power transmission into the City, although the line affects the power flows on other lines owned by other entities in the region. PSE has two 230 to 115 kV, 325 MVA transformers and three 115 kV lines feeding power north up to the City from its Talbot Hill substation. The two lines from Talbot Hill to Lakeside carry about 157 MW each under N-0 conditions (normal winter peak load with all circuits in operation).[48] The map also shows five 115 kV circuits feeding power from the north into the City. These terminate in the Sammamish substation, where there are also two 230/115 kV, 325 MVA transformers installed to feed power into the 115 kV lines.

The Talbot Hill and Sammamish substations receive power from 230 kV lines connected to the Bonneville Power Administration's (BPA) Maple Valley substation (which is shown in Figure 31) and from its Monroe substation to the northeast of Sammamish. The Maple Valley substation is located a short distance to the east of Talbot Hill. Figure 31 also shows the 230 kV line that comes from BPA's Monroe substation to PSE's Novelty Hill substation (not shown on the BPA map) and from there a transmission line extends west where it is terminated in PSE's Sammamish substation, which has a total of three 230 kV line terminations. One of these is leased from BPA by PSE. This line loops south from Sammamish via Klahanie to BPA's Maple Valley Substation. This lease expires in 2018 at which time the lease has to be renegotiated or the line reverts to BPA's control. The third line connects PSE to the Seattle City Light substation at Bothell.

[48] Reference 33 (Section 28, Reliability/Availability of Systems). N is the number of elements in the system and the minus zero designation means that no element is missing or out of service.

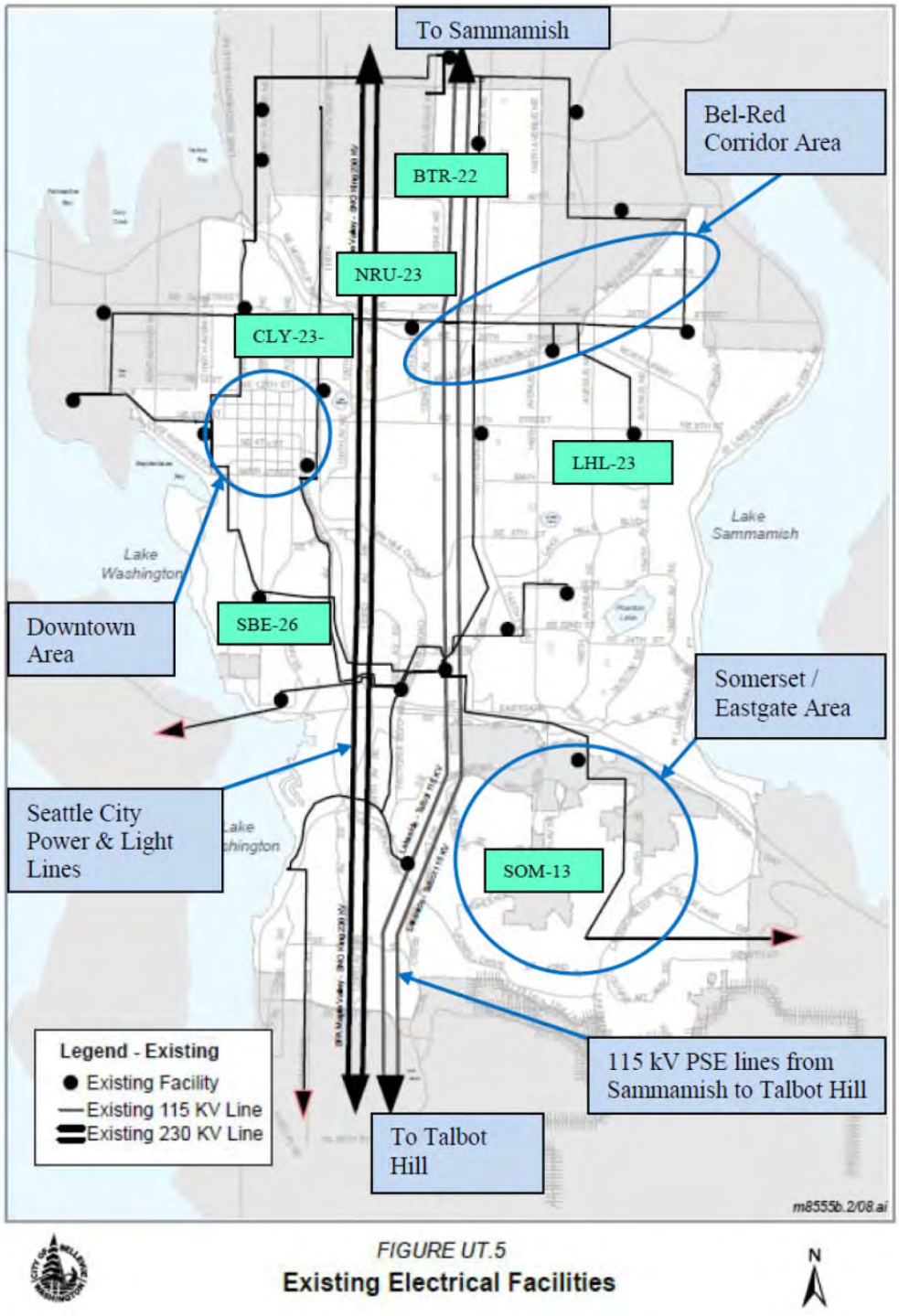

Figure 30. Existing Transmission Facilities around the City of Bellevue

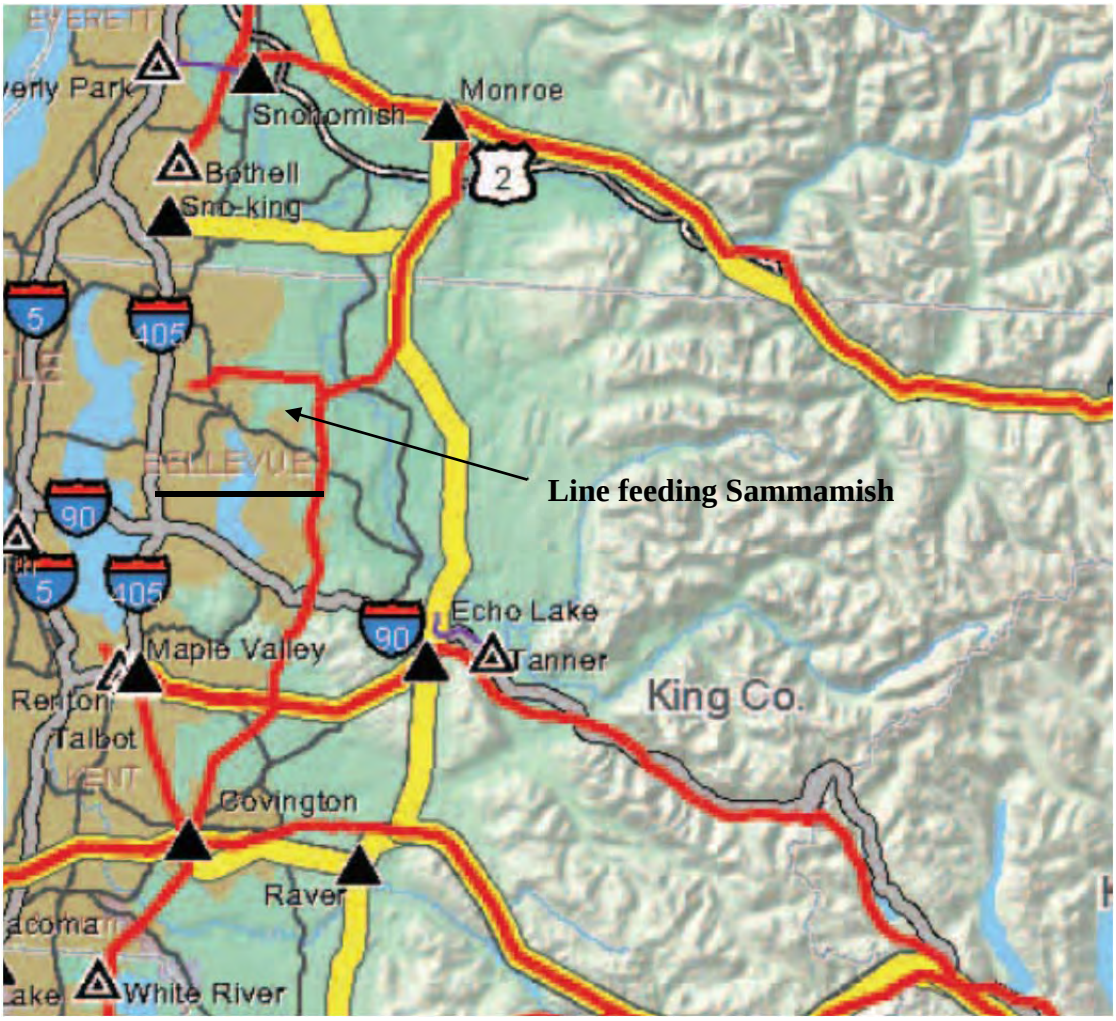

Figure 31. BPA's 500 kV (Yellow) and 230/345 kV (red) lines East and South of Bellevue

2.3.5.3 Bulk Power (230 kV) Transmission System Assessment

BPA's Maple Valley substation is a strong source supplied via 500 kV lines, whereas the Sammamish substation receives its power via longer 230 kV circuits from the Monroe, Bothell, or Maple Valley substations. (PSE also owns a 230 kV line going from Sammamish to the Bothell substation, which is owned by Seattle City Light.)

A loss of the 230 kV line to Monroe or the one to Maple Valley (N-1 contingency) is a serious stress to the City's power supply but should not cause any outages in the City.[49] There will be a future need for better voltage support to the Sammamish substation in order to support growth in the City and the surrounding areas.[50] Conversion of one of the 115 kV lines between Talbot

[49] Loss of the 230 kV lines from BPA was one of the reasons (but not the only one) for the widespread power outage in 2006. (Based on interview with PSE personnel; see also Reference 34)

[50] Interview with PSE planners.

Hill and Sammamish to 230 kV and installation of a 230/115 kV, 325 MVA transformer in the Lakeside substation will also be needed to support the region's expected future growth.

2.3.6 115 kV Transmission System Review

2.3.6.1 Scope

PSE's 115 kV system is considered a subtransmission system with transmission service being provided by BPA. This review consisted of assessing PSE's 115 kV transmission system, since disturbances on the 115 kV system would be most likely to cause power system disturbances in Bellevue.

2.3.6.2 System Load Scenarios and Planning Assumptions

PSE is a winter peaking utility. Therefore, transmission system outages have a larger impact in the winter than a similar outage during the summer period, since the summer peak load is only about 65% of winter peak.

PSE has not experienced any load growth since 2008. The planned growth has therefore been shifted foreword by a couple of years. The present planning criteria is for 0.5% annual growth for the immediate future and a growth rate of about 1% per year for the next 10 years.

PSE builds its transmission infrastructure to minimize outages and avoid overloads on the 115 kV transmission system on an N-1 basis (N-1 is the first contingency). This is defined as a Category B event by the North American Electric Reliability Corporation (NERC). NERC defines a Category C event as an N-2 contingency case (two simultaneous events). An example of this is a breaker failure (the first event) that would lead to clearing all circuits connected to a substation bus (the second event). For this contingency, according to the NERC rules, PSE is allowed to drop non-consequential load.

PSE also tries to minimize many so called N-1-1 events. That is, with one outage in the system, planned or unplanned, it tries to be in position to handle a second, unplanned outage. However, this is not possible for some portions of the 115 kV transmission system where a portion of the City is fed via a single 115 kV line. A loss of this line might cause power disruptions to a portion of the power users in the City. For example, as is shown in Figure 32, the loss of the single, radial line to Lake Hills would cause a loss of power to those connected to the substation, unless power can be provided via a looped 12.5 kV distribution circuit that can be fed from another 115 kV substation.

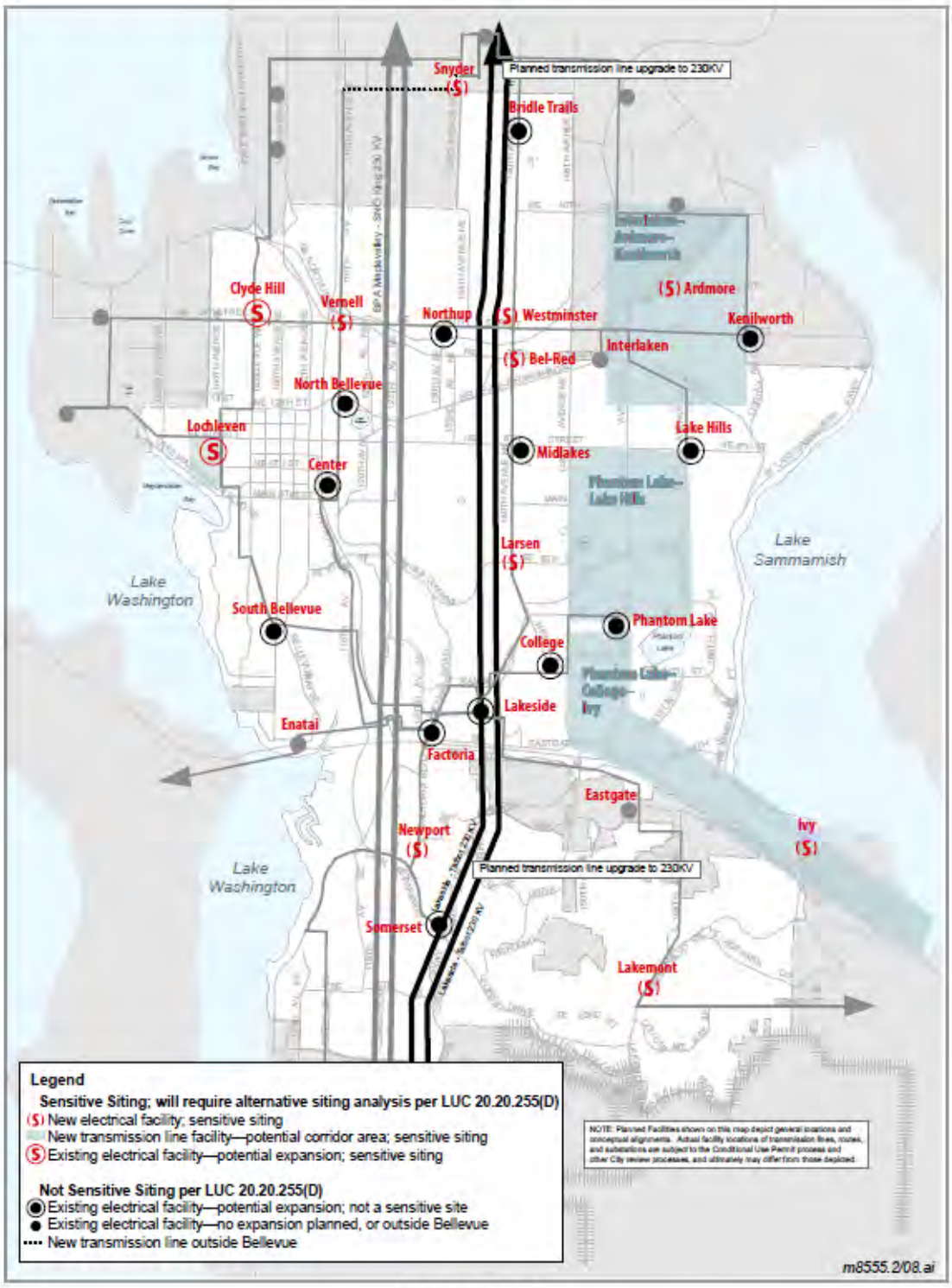

Figure 32. PSE's Expansion Plan for Bellevue

While in general, underground systems should have fewer faults per circuit mile than overhead transmission circuits, they are often subjected to flooding of the vaults and workmanship issues related to joints or splices that can affect the reliability of the circuits. That is, underground systems are not as robust and forgiving as overhead circuits are. These issues are reflected in the actual failure statistics as discussed in Section 2.2.3.3.

2.3.7.4 Comparison to Other Utilities

Some older utilities use a low voltage network that typically operates at voltages that can be directly used by the power users. This means voltage levels at 480 V or 120/208 V. The load flows in these types of systems are not easily monitored and faults frequently lead to underground vault explosions since faults in cables of such a system will often burn free. In younger, modern cities, the power distribution is typically handled as it is done in Bellevue using 15 kV or higher class distribution cable systems, often with redundant feeder cables to supply the loads. In modern high rise buildings, 5 to 15 kV class substations are sometimes placed on many of the floors up through the building. Since PSE began to install underground cables a long time ago for the Downtown area, it does not have the redundant feeder cables often used for critical loads in newer cities. PSE has therefore installed a number of unloaded reliability circuits, which can be switched to feed power to customers affected by a cable outage. Thus, PSE's system design compares well with other cities with which Exponent is familiar.

2.3.7.5 Recommendations

- The City needs to decide how to approach conversion of overhead distribution lines, used primarily in the residential areas, to underground systems, which requires special funding mechanisms.
- PSE needs to continue to reinforce the distribution system to meet the N-1 criteria for the entire City.

2.3.8 PSE's Substation Designs

2.3.8.1 Transmission Substations

PSE has built, owns, and operates transmission substations operating with voltages up to 230 kV for its bulk power supply. These incorporate large power transformers, which are used to reduce the voltage for distribution of power at 115 kV. Most of the substations used for power infeeds to load areas contain transformers rated 25 MW that are used to reduce the voltage from 115 kV to 12.5 kV for power distribution using cables and overhead distribution lines. The power is then stepped down to voltage levels that can be used by PSE's customers by means of underground vault transformers, pad mount transformers placed aboveground, or pole top transformers placed on the distribution power poles close to residences.

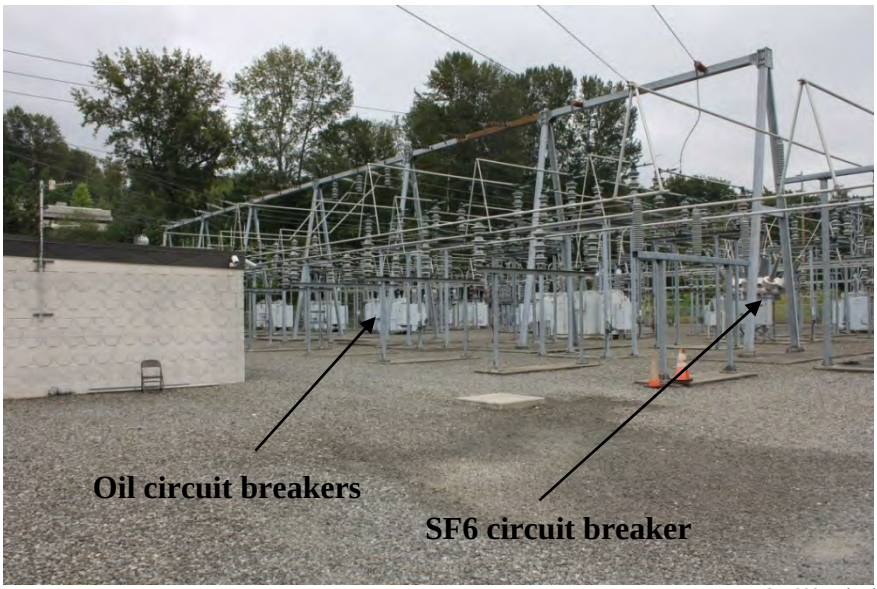

Figure 37. Lakeside 115 kV switchyard

Figure 38 shows a new 325 MVA transformer that was installed a short time ago to replace a transformer that failed. The installed transformer was a spare that had been procured by PSE in case of a failure of a transformer of this type. Since PSE has established 325 MVA as the rated power for bulk 230/115 kV transformers, PSE is able to have one spare high power transformer to be used in case of any bulk power transformer failure. This enabled PSE to restore the Sammamish substation to normal operation in a short time after removing the failed transformer. It could have taken from 10 to 18 months to obtain a replacement transformer, during which time the station would have had to operate at reduced capacity. PSE demonstrated in this case that it pursues a prudent strategy of spare parts inventory. Figure 39 shows that the new transformer is equipped with an on-line gas-in-oil monitoring device, which should enable early detection of many incipient transformer failures, which should reduce the cost of future transformer repairs.

The Sammamish substation appears to be relatively well designed to survive at least moderate earthquake forces. The transformers are welded to the foundation and if the breakers are also welded or secured to their foundations, they should remain in place during an earthquake. The station for the most part uses equipment placed directly on ground level foundations, which reduces the risk of amplification of earthquake forces. One potentially weak point might be the attachment of the flexible connections shown in Figure 40, since some experience from other earthquakes has demonstrated that flexible conductors attached to the overhead structure by means of suspension insulators have failed and fallen down to the ground. However, in case of a severe earthquake, the power supply is not likely to remain after the event. But such damage would be easy to repair and if the equipment is not seriously damaged, it should be relatively easy to restore the power and to put the system back in operation.[53] An assessment of the dynamic forces on the suspension insulators caused by earthquake forces would possibly reduce the risk of damage to the substation and would be a prudent use of resources.

[53] Experience has shown that the transformer breakers will be tripped because of sudden pressure or Buchholtz relay operations from the transformer protections. However, if the transformers are not damaged by the earthquake forces, restoring power is a simple operation.

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Table 6. Major Project Roadmap

Capacity Requirement	Action	Potential Need Date	Initiate Early Planning Time Frame
Downtown			
Growth to 125 MVA	Add transformer bank	2016	2012
Growth to 150 MVA	Add transformer bank	2020	2016
Growth to 175 MVA	Add transformer bank	2026	2022
Growth to 200 MVA	Add transformer bank	Post 2026	Unknown
Bel-Red			
Growth to 20 MVA	Add transformer bank	2018	2012
Growth to 40 MVA	Add transformer bank	2026	2022
Somerset/Eastgate			
Growth/Reliability	Add transformer bank	2018	2012
115 kV System			
50 MVA Need Downtown/Regional Growth	Upgrade 115 kV line	2018–2022	2012
Additional 50 MVA Downtown	Add third transmission feed from north	2020–2024	2015

3.4 Future System Assessment Recommendations

The future system status has been reviewed using the future plans for growth in Bellevue, PSE's long-range planning, and potential technology innovations. Based on this review, a set of findings and recommendations is provided to the City of Bellevue for their use as an informed stakeholder.

Recommendation Future 1: Energy Efficiency Programs

Finding: PSE's long-range plans indicate a significant reliance on energy efficiency for management of the peak electric power demand.

Reliability Actions: Support for Long-Term Power Supply

Recommendation Future 1: The City should lead the electric energy efficiency effort to assist PSE in reaching its peak electric power demand goals to avoid using or building new peak electric power plants. Electric energy efficiency programs require active outreach to the customers and citizens to support various energy efficiency initiatives. The PSE long-term plan has a large reliance on electric energy efficiency.

This is a longer-term issue that will be included in future PSE IRPs. The City should remain active in the IRP process and should begin to understand potential long-term impacts of this strategy.

Recommendation Future 2: Smart Grid Initiatives

Finding: PSE is initiating Smart Grid programs to comply with WUTC requirements.

Reliability Actions: Enabling of reliability impacts of Smart Grid technology.

Recommendation Future 2: PSE has identified a series of Smart Grid technology projects that are being considered over the next 2 years. These projects include a range of programs from base infrastructure required to enable the Smart Grid to specific customer-related efforts. Several projects that support development of the infrastructure are currently underway:

- Upgrade of information technology systems
- Upgrade SCADA in transmission substations
- Distribution SCADA on feeder breakers
- Extension of fiber optic cabling through T&D system.

These programs represent upgrades to the PSE infrastructure that are being undertaken on a system-wide basis. Additional programs to enable customer interface applications will be needed. These technologies have been discussed in other recommendations.

An issue with Smart Grid implementation is that PSE must review customer interface applications on a system-wide basis and Bellevue may have different needs and requirements than other parts of the PSE service territory. Security of these communications systems will become a major issue that needs to be resolved before major investments are made in the new technologies.

Therefore, the City should review the overall PSE plan and determine their level of support for the various customer initiatives that would be appropriate for the City to provide. The types of initiatives to be considered are those relating to customer energy management, demand response, and home automation. These technologies are enabled by significant communication system upgrades, but allow for consumers to have greater control over energy usage and expenditure.

Recommendation Future 3: Major Project Planning (see Recommendation Role 2 also)

Finding: PSE maintains a plan for expansion of the system in Bellevue to support growth of the City and the region. However, as the lead time to permit larger projects (required to add capacity or reinforce the City infrastructure) has grown, it requires that the City understand the projects from a more detailed perspective than just a conceptual framework.

Finding: There is the potential for several of the growth-related projects to occur within this decade. The specific projects for consideration are upgrade of the 115 kV lines, additional

capacity required for the Bel-Red and Somerset/Eastgate areas, and additional capacity requirements Downtown.

Reliability Actions: Conduct major project discussions well in advance of permit applications to ensure sufficient lead time to permit larger projects (required to add capacity or reinforce the City infrastructure).

Recommendation Future 3: It is recommended that the City engage PSE in an annual planning workshop around future projects with the intent of understanding the requirements from a City perspective. The Comprehensive Plan includes an electric system plan that can serve as the basis for the annual workshop. The workshop should focus on the following items:

- Current growth projections and electric power use in Bellevue
- Review of current plan applicability (Figure UT.5a from the City of Bellevue Comprehensive Plan)
- Update of the current plan
- Develop actions for capacity projects required to initiate siting and permitting activities within the next 2 years.

An outcome of the workshop should be an updated plan for inclusion in the Comprehensive Plan (if required) and an action plan to move designated projects forward into siting analysis and/or planning.

As a minimum, the following capacity additions have been identified as being needed within the next 5 to 10-year time frame. These capacity additions are based on the proposed growth within Bellevue and an assessment of current loadings on the Bellevue substations.

- Upgrade of existing 115 kV lines to 230 kV
- Addition of transformer banks to support expected growth in various areas of the City (Downtown, Bel-Red, and Somerset/Eastgate)
- Addition of new 115 kV lines to reinforce the overall electric system.

Based on recent Exponent staff experience with T&D capital projects, capacity additions of this magnitude typically require the following project execution times:

- Transformer bank additions require 18−24 months to complete from start of engineering to operation. This project time frame is based on the major material long-lead times (which have been increasing), and typical engineering and construction times. This time frame can be different based on difficulty in working at existing stations or permitting new stations. Also, additional time is required for planning and permitting.

- Line projects may require 4−5 years from the start of engineering to completion since permitting of lines typically requires significant engineering to be completed before the formal permitting process proceeds. The time frame for these projects is dependent on the length of the line segment, the number of jurisdictions involved, and the number of permits required (federal, state, and local). Line projects often require engineering to be completed in order to satisfy permit applications so that these projects have a longer time frame than substation projects.

Recommendation Future 4: Long-Range Planning

Finding: Both Bellevue and PSE work with various developers and companies to identify new potential facilities in Bellevue. There is an opportunity to share and communicate the results of these planning activities. This exercise relates to longer-term issues that are expected to be addressed in the future.

Reliability Actions: Coordination of growth planning and major project activities.

Recommendation Future 4: While information is shared for the IRP, and to the extent that information can be shared, it is recommended that a more formal meeting (annually) be held to ensure that all of Bellevue's needs are identified to PSE and that both organizations are coordinated regarding future load demand. This information sharing can also be included in the annual planning meeting.

The City and PSE should synchronize their growth projections for the City by exchanging information on expected projects, expected timing of projects, and coordination actions required by PSE and the City to address these projects. This exchange is meant to be longer-term planning and well in advance of any specific permitting or development activities.

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4 Role of the City of Bellevue

4.1 Study

4.1.1 Study Scope

The Role of the City assessment was performed to answer the following question: "what opportunities are available to the City to work with PSE, regulators [WUTC, FERC], and other stakeholders to ensure the needs and expectations of Bellevue's residents and businesses are met relative to the reliability of the power supply?"

4.1.2 Study Approach

The Role of the City assessment was performed in the following steps:

- Evaluation of potential interactions with WUTC and other government agencies as it relates to the City's ability to inform decision-makers or to advocate for policy change
- Evaluation of City's interaction with PSE around planning and permitting relative to influencing electric system reliability in Bellevue
- Review of transparency of operations relative to improvements in communication between PSE and its customers as it relates to reliability.

4.2 Enhance Role of City as an Informed Stakeholder

4.2.1 Regulatory Agencies

4.2.1.1 Study Approach

Prior to discussing the opportunities for Bellevue to interact with regulatory agencies, it is important to understand the regulatory framework under which PSE operates the electric power system and the regulatory framework as it affects the City. A brief summary of the regulatory requirements and their impact on reliability is provided below.

4.2.1.2 Washington Utilities and Transportation Commission

WUTC provides oversight to electric utilities through regulations codified in the WAC Chapter 480-100. As noted in WAC 480-100-001, the purpose of these regulations is "to administer and enforce chapter 80.28 RCW by establishing rules of general applicability and requirements for

consumer protection, financial records and reporting, electric metering, and electric safety and standards." The principal statutes that define WUTC's authority and responsibility with respect to electric utilities are found in RCW Title 80.

In determining the opportunity for the City to interact with WUTC, Exponent reviewed the responsibility of the agency to oversee the operation of electric utilities regulated by the agency. These requirements were then reviewed as they relate to PSE activities. Relative to electric system reliability, there are several requirements that are highlighted here:

PSE-Related Activities

- PSE is required to publish and communicate rates for electric power delivery through the filing of tariffs and rate schedules with WUTC (WAC 480-100-028 and WAC 480-100-103). Any changes to these tariffs or rate schedules must be presented at public hearings before WUTC and are subject to public hearings (RCW 80.28.020 and WAC 480-100-194). This requires PSE to present its basis for the proposed increases (for its investments and costs for providing services) to WUTC and to justify these expenditures as prudent since these expenditures are the basis for the increases and the means of PSE recovering their investment. The proposed changes are then reviewed by WUTC staff and a decision regarding the proposed changes is issued. While this process introduces risk to PSE's investment plans, the process is not expected to significantly alter PSE's investment program.

  This process of utility commission oversight is common to regulated utilities in the United States. In the case of PSE, they present their request for rate increases after investments are made so they are recovering expenses after they have been incurred. In other states, the rate case proceeding precedes the investments and the level of investment is approved prior to execution of projects. In the case of PSE, this requires that their investments (e.g., capital projects) be considered as prudent uses of capital across their entire system.

- PSE is required to have a rate structure that provides the same rates for similar services. This requirement is based on RCW 80.28.80. This requirement establishes a basis that a utility cannot provide preferred service and that service must be provided on a non-prejudicial basis except for a few special exemptions provided in the RCW. This requirement means that PSE must select projects to maintain their electric system assets from an overall system perspective.

- PSE is required to submit annual reliability reports that provide the service performance to its customers (WAC 480-100-398). This report highlights the current performance as well as actions that PSE will take to improve performance. This report addresses the entire service area. PSE indicates system circuits of concern (top 50) and identifies specific actions for these circuits. For 2010, there were no circuits identified in the Bellevue area (although Lake Hills-23 was on the list in 2009) (Reference 4).

- Through RCW19.285, the state of Washington has required that utilities meet a portion of their generation requirements through the use of renewable technologies. The state has required that at least 15% of generation come from renewable sources by 2020. The intent of this requirement is to encourage the use of renewable energy sources and energy efficiency in the state of Washington. This requirement affects reliability in the sense that PSE must develop a generation mix that satisfies its load demands and its renewable energy portfolio. In the future, as renewable energy sources and distributed energy sources become a bigger power source and a more local source, there will be a challenge to maintain the T&D system within acceptable voltage levels.

- WUTC (WAC 480-100-238) requires utilities to submit an IRP that is intended to present how a utility will meet its system demand and what the mix of generation sources will be. The IRP is required to examine alternatives that allow for meeting future demand at the "lowest reasonable cost." Utilities are also required to address conservation relative to energy reduction from energy efficiency and other means. The requirement is to submit the IRP on a biannual basis.

  PSE provides an IRP defining its strategy to respond to future load scenarios. The current IRP has been referred to previously in Section 3 in discussing future system status.

- Requirements for delivery of power are specified in WAC 480-100-368 and -373 for system frequency and voltage, respectively. The requirements state that the system must be operated at a frequency of 60 cycles per second under normal conditions and the voltage (depending on service class) must be maintained within ±5% of the standard voltage on the distribution feeder. There are additional requirements related to both utility and customer actions to control voltage fluctuation.

  This requirement directly relates to the issue of power quality. PSE is required to deliver voltage within the specified range. For customers who require a tighter band on voltage fluctuations, there are standard technologies employed by the end user at these sites to maintain the required voltage stability. Typically, information technology and manufacturing plants most often use site-specific technologies to control voltage that may interrupt their operations.

City-Related Activities

- Through RCW 35.96.040, the state of Washington specifies requirements that allow cities or towns to create local improvement districts and to levy and collect special assessments against the real property benefitting from the conversion of overhead facilities to underground facilities. This requirement directly relates to the funding mechanism required to convert existing

overhead facilities. Issues regarding the conversion of overhead lines to underground were presented in Section 2.2.6.4.

- Through RCW 36.70A, the state of Washington requires cities and counties to develop comprehensive land use plans to govern growth management in their jurisdictions, if they are required or choose to plan under RCW 36.07A.040.
- Through RCW 80.32, the state of Washington allows cities to establish franchise agreements with utilities relative to use of city rights-of-way (public roads, streets, and highways).

There are additional requirements in the state of Washington statutes and WUTC regulations that govern interconnections to the electric system, requirements for the renewable portfolio, and purchase of power from qualifying facilities.

4.2.1.3 Western Electricity Coordinating Council

The second organization with oversight responsibility is WECC, which is chartered with ensuring the reliability and security of the bulk electric system in the Western Interconnection. Since PSE has limited bulk transmission assets, their involvement with WECC deals with coordination of their transmission lines with the WECC area. PSE interacts with WECC for operations of its transmission lines at 100 kV and above. WECC provides requirements for operations and maintenance of the transmission system to ensure the reliability, stability, and security of the transmission system in the western United States and Canada. PSE involvement with WECC is mostly from an operations, maintenance, and protection standpoint to ensure that its system operates and coordinates planning with other regional entities. WECC develops standards for the western region based on review and application of NERC reliability standards which defines requirements to maintain reliability of the transmission system in the United States. WECC activities are focused only on transmission and do not reach into the distribution system within Bellevue or other parts of the PSE service territory. However, this interface is important from the transmission standpoint where events on the transmission system can result in significant wide-area outages.

4.2.1.4 Analysis

From a WUTC perspective relative to electric power, cities are considered as any other member of the public. This means that Bellevue has access to the published tariffs and rate schedules of PSE and has the ability to participate in public hearings and to offer comments and opinions relative to these hearings. Therefore, Bellevue's primary interaction with WUTC is one of being an active participant relative to changes in laws and tariffs that may affect electric system reliability in the State of Washington.

From an overall regulatory perspective, the City has the right to execute franchise agreements with companies that provide utility services to the City. These items are discussed in Section 4.2.2.2.

From the perspective of WECC, Bellevue has no real involvement with this group since it deals with issues on the transmission system (and large generation). WECC, however, does provide a source of information relative to electricity planning in the region and provides short- and long-term views of the electric transmission system. Their planning documents identify needs of the system moving forward and will provide Bellevue with an independent assessment of potential transmission needs in the area that may affect assets providing service to Bellevue or that are located in Bellevue.

4.2.1.5 Recommendations

There are potentially two areas of involvement by Bellevue relative to WUTC:

- Since WUTC operates and oversees all regulated utilities, any changes in fundamental requirements must be driven by state law and enforcement by WUTC must be consistent and fair among all regulated companies. Therefore, Bellevue's involvement in this aspect is one of informing lawmakers and commissioners regarding matters that affect reliability. However, matters affecting the electric system must be viewed in a global rather than a local context.
- Bellevue does have the opportunity to comment or participate in matters directly affecting PSE and their interaction with WUTC. The City may choose to support or oppose measures for investment brought forward by PSE that support its overall City goals for electric system reliability and service. Again, PSE has to propose its plans to WUTC on a system-wide basis, but Bellevue has the ability to support and advocate for initiatives that meet its goals and objectives.

From an overall regulatory perspective, interaction with the regulatory agencies provides Bellevue with a means of keeping current on plans for the electric system and advocating for projects that meet Bellevue's objectives.

4.2.2 Puget Sound Energy

4.2.2.1 Study Approach

Bellevue's primary involvement in electric system reliability is through its interaction and collaboration with PSE. There are several areas where Bellevue is actively involved with electric system activities by PSE. The interaction between the City and PSE relative to specific reliability initiatives and outage performance was discussed in Section 2. The major areas of interaction discussed here are planning, permitting, and emergency response.

4.2.2.2 City Policies

Bellevue establishes policies for utilities in the Utilities Element of the Comprehensive Plan[105]. The City provides its long-term vision and plans in its Comprehensive Plan, which provides goals, policies, and plans for all areas and aspects of City operations. The Utilities Element addresses many activities relating to electric reliability, including:

- A high level plan for utility capacity expansion to meet City and regional needs and to guide planning and decision-making
- Coordination of public and private trenching activities (related to the potential for undergrounding opportunities)
- Notification to the City prior to vegetation management in the City rights-of-way
- Required undergrounding of all new electrical distribution facilities
- Encouragement of consolidation of facilities
- Facilitation of conservation and environmentally sensitive energy sources
- Encourage communication with utilities, WUTC, and the City about cost distribution and undergrounding of electric distribution lines.

All of these policies have the potential to impact reliability. Additionally, through the Franchise Agreement between the City and PSE, the City provides requirements for work in the City rights-of-way that are intended to reflect the policies of the Comprehensive Plan. Based on a review of these documents, the City is influencing reliability through its planning and permitting process, its vegetation management policies, the ability to underground new facilities, and coordination of activities to take advantage of joint utility efforts. In the longer term, renewable and alternate energy sources and conservation will factor into the overall electric energy picture in Bellevue.

The recommendations provided in Sections 2 and 3 are consistent with the policies of the Comprehensive Plan. The recommendations are based on focusing the City's efforts on areas that will drive improvements in reliable service to existing and new members (business and residential) of the community, that satisfies the City's goals, and that understands the requirements of PSE as a regulated utility. The recommendations are provided to support City reliability through improved system design (redundancy), expanded use of automation and information technology, and improved communications between the City and PSE on matters affecting reliability and growth.

[105] Reference 26.

4.2.2.3 Planning

Both Bellevue and PSE engage in planning for the City. However, the planning needs for each organization are focused on different areas and concerns. Bellevue planning is required to address services and land use planning across all aspects of city operations, such as impact on land use, rights-of way, roadways, water and sewage, and coordination of projects by other utilities (electric, gas, and telecommunications). Therefore, planning by Bellevue involves the following:

- City growth projections including major facility and capital projects
- Forecast and plans for land use
- Forecast and plans for roadway additions and changes
- Forecast and plans for utility (water, electric, gas, telecommunications) additions and changes
- Forecast and plans for parks and public areas.

PSE focuses on planning for electric and gas system operations. PSE obtains its growth plans and projections from interactions with its various customers including cities, developers, companies, and facility owners. PSE and Bellevue share many of the same customers when it comes to planning for growth in Bellevue.

From the perspective of electric system planning, there are two main elements:

- Overall long-term growth planning to identify the potential for growth in Bellevue and to identify the need for additional electric system capacity.
- Medium-term tactical planning for specific projects that affect the electric distribution system in Bellevue as well as the PSE-owned transmission lines. The long-term plan is based on growth projections in the PSE service territory (Bellevue and surrounding areas) that impact the need for additional service to various areas of the City. The Comprehensive Plan Utilities Element Figures UT.5 and UT.5a present the current view of potential plans for electric expansion in Bellevue to meet future needs.

Discussions with staff in both Bellevue and PSE indicate that the overall growth plan is developed based on individual discussions with prospective developers and then later meetings are held between PSE and Bellevue to ensure that PSE has input from Bellevue relative to preparing their IRP. This level of planning is one of the means that PSE utilizes to project growth and to develop system plans to support growth. Since these are longer-term plans to identify future needs, the major need is to coordinate the results of the planning activities to ensure that PSE is informed by City input relative to growth for inclusion in its long-term planning process.

The medium-term tactical planning is directed at potential projects that may need to be performed in Bellevue on existing or new locations. Typical maintenance or replacement projects are handled through the normal permit process. PSE performs ongoing assessments and studies of its electric system to ensure that the system is capable of handling current and future demands. The PSE plans are based on their projections for future growth in Bellevue and other parts of their system. These medium-term tactical projects are also part of the IRP. The ability to turn the medium-term tactical plans into real projects varies by size and type of project. The projects subject to tactical planning are large expansion projects (substation expansions, new feeders, substation connections) that require significant lead-time to proceed to an actual project. Based on the discussion in Section 3, there will be a need for new facilities as the City grows and reaches its build-out limits.

Bellevue has entered into a Franchise Agreement with PSE[106] that outlines requirements for PSE operation, construction, and support of facilities in Bellevue. The Franchise Agreement outlines the requirements for the various types of projects performed by PSE. The Franchise Agreement and the City Comprehensive Plan Policies include requirements that call for siting reviews of the larger capacity projects. Based on discussions with staff at PSE and Bellevue, the review and update of the utility growth plans in the Comprehensive Plan requires review and update. Since these capacity expansions represent large and complex projects, and given the significant growth expectations of the City, a regular update of the plan is appropriate to ensure that the City and PSE understand the requirements for future growth.

4.2.2.4 Permitting

Once a project is ready to proceed, it then enters the permitting process. For major projects (including those on sensitive site locations per the Comprehensive Plan), the following steps are typically required:

- Pre-application meeting
- Siting analysis that must include three alternatives
- Tentative agreement on an alternative
- Submittal of the application
- City recommendation
- Hearings and appeals, if required
- City Council decision
- Permit issued.

The typical time frame for these types of projects (from initial request to permit) is approximately 3 years and can be longer. Typical smaller projects follow a similar permitting

[106] Reference 27.

process but start with submittal of the application, and the process proceeds in a quicker manner. If the project is on the public right-of-way and is covered by the Franchise Agreement, then issue of the permit is handled through the Franchise Agreement and does not require City Council approval.

4.2.2.5 Analysis

Based on discussions with Bellevue and PSE staff, observations relative to the planning and permitting process are:

- There is good agreement that both parties understand the permitting process and that working relations between the parties is good. However, there is sometimes a need to get new PSE contractors to more quickly understand the process.
- Complete information in the permitting process results in a more routine permit process. Incomplete information tends to slow the process.
- For larger projects, more complete siting analysis information on the alternatives (specifically impacts and mitigation plans) will improve the permitting process.
- There is more public interaction and comment for any large projects, especially for aboveground infrastructure.
- The PSE tariffs are clear and understood by the City relative to services provided under tariff. When multiple non-City utilities are involved in a project, all have Franchise Agreements, and there is some negotiation required to determine who pays for the services depending on the project initiator.
- Future projects are understood at a conceptual level, but the details are not fully appreciated until the permitting process is initiated.
- Coordination between the various utilities requesting right-of-way work could be improved from a planning perspective so that each utility can plan for these opportunities.

4.2.2.6 Recommendations for PSE Interaction

The assessment indicates that there are opportunities to improve the overall knowledge sharing and coordination in the planning and permitting process. While the interactions between the organizations are good due to proximity and history, much of the interaction is based on informal communications. The following recommendations are provided:

- It is recommended that the City engage PSE in an annual planning workshop around large future capital projects. This is the same recommendation that is defined in Section 3. The outcome of these workshops should be an action

plan to move projects forward. The intent of this recommendation is to have these major project discussions well in advance of permit applications. PSE has developed and maintains a long-term system planning strategy relative to the electric power system. This plan is generally represented in the IRP. However, as the lead time to permit larger projects (required to add capacity or reinforce the City infrastructure) has grown, it requires that the City understand the projects from a more detailed perspective than just a conceptual framework.

- Both Bellevue and PSE work with various developers and companies to identify new potential facilities in Bellevue. While information is shared for the IRP, and to the extent that information can be shared, it is recommended that a more formal meeting (annually) be held to ensure that all Bellevue needs are identified to PSE and that both organizations are coordinated regarding future load demand. This exercise relates to longer-term issues that are expected to be addressed in the future.

- There are opportunities for multiple utilities to take advantage of projects being performed by one of the utilities. This is a coordination function that is best captured by the City. It is recommended that the City engage their utility partners to identify new projects (both large and small) to attempt to maximize projects in the rights-of-way. This planning activity is intended to take place in advance of permit applications so that the utilities can plan these projects into their annual work. This action also represents a potential means to advance undergrounding of circuits if PSE can take advantage of trenching to add conduits for future use.

4.2.3 Transparency of Operations

The transparency of operations is focused on the communications between PSE and its customers during emergency and outage events. The City has a role to play as a representative of the community. However, PSE has also provided transparency in its operations through the information provided around its various business processes, projects, and plans.

4.2.3.1 Emergency Planning

The emergency response programs are well-defined for the both the City of Bellevue and PSE in their respective policies and procedures. The City of Bellevue maintains its emergency response program in its Emergency Operations Plan.[107] The plan supports and is compatible with King County and state of Washington emergency plans, the National Response Framework, and the Regional Disaster Plan for Public and Private Organizations in King County. Bellevue has adopted the National Incident Management System (NIMS) as the basis for incident management. The plan includes roles and responsibilities for the City departments and also discusses non-governmental agency support. In this case, PSE is identified as an

[107] Reference 28.

organization that will provide support during emergency events when appropriate. When requested, PSE will assign a liaison to the EOC, if available. However, PSE does assign a liaison to the King County Emergency Coordination Center (ECC) if a more regional emergency is called. Bellevue has also implemented programs for first responder "GETS" cards that provide priority access through the phone system. A HAM radio system is employed through the Amateur Radio Emergency Service to address situations where phone towers are down and normal (cell) phone communication cannot be used.

PSE maintains its emergency response program in its Corporate Emergency Response Plan.[108] This document outlines how PSE addresses emergency operations for both its electric and gas systems. Similar to Bellevue, PSE maintains an EOC and is in the process of adopting the NIMS protocol. Some key aspects of the PSE Emergency Response Plan include:

- An electric emergency is defined as:
  - 12 distribution circuits out in one region and escalating
  - 30 distribution circuits out system-wide and escalating
  - Poor weather conditions (wind, snow, ice) predicted
  - Earthquake or other hazardous conditions.
- PSE's overall response strategy is summarized as:
  - Restoration priorities are assigned for each region.
  - Focus on correcting problems that can be fixed quickly and restore the greatest number of customers.
  - Restore first and then repair (based on conditions of the damage). Damaged sections may be de-energized and service may be restored up to the point of damage.
  - Schedule and complete the repairs.
  - Facilities are generally restored in the following order: transmission, distribution substations, distribution feeders, and individual service. PSE maintains a more detailed list in its Corporate Emergency Response Plan document.
- PSE maintains a list of critical facilities and accepts municipality identification of critical facilities. PSE also maintains a list of locations that require priority for medical reasons (nursing homes, individuals).
- PSE maintains someone onsite at the King County ECC to coordinate on regional events.

[108] Reference 29.

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- PSE has defined contacts as liaisons with Bellevue even if they do not staff the Bellevue EOC.
- PSE has established agreements with other entities, including their subcontracting partners, to provide resources in an emergency. This includes a Western Region mutual assistance agreement for support from other utilities outside of the area to assist in restoration and repair in a major emergency (such as the 2006 storm event).
- PSE also employs a HAM radio operations system in the event that normal phone service is not available.

The Bellevue and PSE EOCs are similar, but they serve different functions. The PSE plan is related to their service territory and the PSE EOC may be activated without Bellevue needing to activate its own EOC. Similarly, the Bellevue EOC focuses on events in Bellevue, and depending on the emergency conditions, may open without PSE having to activate its center. However, in all cases, there are established interfaces within each organization to provide communication during an emergency. Additionally, both Bellevue and PSE participate in regional emergency planning exercises and have significant information on their websites regarding emergency response.

There are several coordination actions required in order to recover from an electric system emergency outage. Bellevue indicated that they have provided a priority list of critical facilities to PSE so that these are known in advance. Another issue centers on coordination of local city police and fire departments to support PSE crews in getting access to streets and areas to provide assessment, restoration, and repair services. There currently is no formal protocol for handling these interactions in an emergency and they are generally handled informally by requests from PSE to the Bellevue EOC as crews identify needs in the field.

4.2.3.2 Communications with Stakeholders

A major issue during the 2006 winter storm was the lack of communication on the status of the outage and restoration activities. The PSE OMS is currently a manual system as described previously in Section 2.4.6. The system does not currently provide web-based information on specific outage locations and statuses, and the manual process can get overwhelmed in a large outage or emergency.[109] PSE utilizes media outlets to try to communicate during these times; however, this has not been effective in the past at keeping customers at specific locations informed of outage status. Even in a major storm outage (non-emergency), the manual outage management process may be overburdened.

Many utilities are taking lessons learned from major storm events in all parts of the country and are engaging in installation or upgrades to their OMSs. Lessons learned[110] from major storms in

[109] Web-based systems assume that people have access to the Internet, which may not be available during a severe power system outage event.

[110] Reference 35.

the southeast United States indicate the need and the benefits of a fully-integrated computerized system to improve response in major storm events. These integrated systems allow for communication of real-time information to personnel located in multiple locations to facilitate decisions and to update progress. The ability to get visibility into the outage extent and to communicate rapidly with field personnel improves the overall response time. Several other utilities in the Northwest are in the process or have recently upgraded OMSs.

PSE has taken many actions to improve their response to a major event. Some key actions include:

- PSE is currently implementing a major upgrade to its OMS. This upgrade was defined in Section 2.4.6. A key feature of the OMS is that it can automatically locate circuit status visually on a display board that will allow personnel in multiple locations to have access to the data.
- Currently, in a major outage event, where PSE, Bellevue, and King County have activated ECCs and EOCs, communication channels will be strained based on the volume of people needing information. Per their emergency protocols, PSE will communicate from its EOC directly with the King County ECC. The King County ECC communicates with the other governmental entities. Additionally, PSE has liaisons for its various stakeholders and PSE will communicate directly to the City of Bellevue. When completed, the OMS installation should provide a means for faster and more accurate reporting of information.
- The PSE EOC will also issue regular status updates during an emergency. These updates will go to the various EOCs, municipalities, and the news media. The news media (radio) represents a significant distribution channel during major emergency events. PSE also updates its customer call center information to be consistent with releases to the news media. Unfortunately, in a major electric outage, normal communications channels may not be available, and individuals should be equipped with the ability to access the radio news media.

4.2.3.3 Recommendations

The assessment indicates that there are opportunities to improve the communication channel in outage and emergency events. The following recommendations are provided:

- PSE is deploying a new OMS system over the next year that should improve overall outage communications. After deployment, it may be appropriate for selected City personnel involved in emergency response to gain an understanding of the enhanced capabilities in order to better assist in communicating to the Bellevue community.
- There is an opportunity to improve the emergency response and recovery capability between PSE and Bellevue relative to coordination of PSE activities, and Bellevue emergency management, transportation, police, and

fire functions. This opportunity may also include Bellevue staff assisting PSE in identifying damaged areas. It is recommended that the City engage PSE in discussions to develop a formal process for these communications to facilitate response and recovery in the future.

- The improvements in the system over the past 5 years have had a positive impact on reducing outages and duration during normal operation. However, the overall system cannot be hardened sufficiently to prevent major outages for an event similar to the 2006 storm. A storm of this magnitude that impacts the regional transmission system requires significant time to restore power to all customers. It is expected that citizens within the City should be prepared to be without power for up to 3–7 days after this type of event. The City should consider an education campaign to make its citizens aware of the problems and help them to be better prepared to deal with future emergencies.

4.3 Role of the City Recommendations

Bellevue's role as an informed stakeholder requires that the City take an active role in becoming informed on matters affecting the reliability and planning for the electric system in Bellevue. This role includes direct communication with PSE as well as other stakeholders regarding electric service. Based on this review, a set of recommendations were described earlier in this section that focus on planning, permitting, emergency or outage management, and regulatory interface. A summary of the assessment is provided below.

Question:

- "What opportunities are available to the City to work with PSE, regulators (WUTC, FERC), and other stakeholders to ensure the needs and expectations of Bellevue's residents and businesses are met relative to the reliability of the power supply?"

Recommendation 1: WUTC Interaction

Finding: From a WUTC perspective relative to electric power, cities are considered as any other member of the public. Bellevue's primary interaction with WUTC is one of being an active participant relative to changes in laws and tariffs that may affect electric system reliability in the state of Washington.

Reliability Actions: Bellevue's ability to be a knowledgeable stakeholder will require assignment of an engineer knowledgeable in the electric power system to foster the City interaction with stakeholders.

Recommendation 1A: Bellevue's involvement with WUTC may be one of informing lawmakers and commissioners of matters that the City believes affect the City's electric reliability or general electric service. For issues affecting electric reliability that are of interest to the City:

- A designated individual can be assigned to electric system matters. The individual should remain informed of electric system activities related to WUTC.
- On matters of interest to the City, white papers can be developed for submittal to WUTC on issues affecting electric reliability. This provides a means to provide feedback to WUTC without direct response to hearings. Potential policy matters could be advanced using this approach.

Recommendation 1B: Bellevue has the opportunity to comment or participate in matters directly affecting PSE and their interaction with WUTC. Bellevue also has the ability to support and advocate for initiatives that meet its goals and objectives. The recommended actions are:

- The City can support or advocate for PSE positions of interest to Bellevue. As programs and rate discussions take place between WUTC and PSE, the City has the opportunity to advocate for positions that support City goals.
- The City should comment and participate in various programs submitted to WUTC by PSE, where PSE is seeking advisory input from stakeholders including the IRP, Smart Grid plan, and reliability programs.

Recommendation 2: Major Project Planning

Finding: The assessment indicates a need to review and update the utility growth plans in the Comprehensive Plan. The large capacity projects will require significant lead time for siting analysis and permitting.

Reliability Actions: Conduct major project discussions well in advance of permit applications to ensure sufficient lead time to permit larger projects (required to add capacity or reinforce the City infrastructure).

Recommendation 2: It is recommended that the City engage PSE in an annual planning workshop around future capacity and expansion projects. The Comprehensive Plan includes an electric system plan that can serve as the basis for the annual workshop. The workshop should focus on the following items:

- Current growth projections and electric power use in Bellevue (see Recommendation Role 3)
- Review of current plan applicability (Figure UT.5a)
- Update of the current plan
- Develop actions for capacity projects required to initiate siting and permitting activities within the next 2 years.

An outcome of the workshop should be an updated plan for inclusion in the Comprehensive Plan (if required), and an action plan to move designated projects forward into siting analysis and/or planning.

As a minimum, the following capacity additions have been identified as being needed within the next 5–10 year time frame:

- Upgrade of the existing 115 kV lines to 230 kV
- Addition of transformer banks to support expected growth in various areas of the City (Downtown, Bel-Red, and Somerset/Eastgate)
- Addition of new 115 kV lines to reinforce the overall electric system.

As previously stated, based on recent Exponent staff experience with T&D capital projects, typical time frames for projects of this size and complexity are as follows:

- Transformer additions require 18−24 months to complete from start of engineering to operation. Additional time is required for planning and permitting.
- Line projects may require 4−5 years from the start of engineering to completion since permitting of lines typically requires significant engineering to be completed before the formal permitting process proceeds.

Recommendation 3: Long-Range Planning

Finding: Both Bellevue and PSE work with various developers and companies to identify new potential facilities in Bellevue. There is an opportunity to share and communicate the results of these planning activities. This exercise relates to longer-term issues that are expected to be addressed in the future.

Reliability Actions: Coordination of Growth Planning and Major Project Activities

Recommendation 3: While information is shared for the IRP, and to the extent that information can be shared, it is recommended that a more formal meeting (annually) be held to ensure that all of Bellevue's needs are identified to PSE and that both organizations are coordinated regarding future load demand. This information sharing can also be included in the annual planning meeting.

The City and PSE should synchronize their growth projections for the City by frequent information exchange on expected projects, expected timing of projects, and coordination actions required by PSE and the City to address these projects. This exchange is meant to assist longer-term planning and should occur well in advance of any specific permitting or development activities.

Recommendation 4: Multi-Utility Planning

Finding: There are opportunities for multiple utilities to take advantage of projects being performed by one of the utilities.

Reliability Actions: This action also represents a potential means to advance undergrounding of circuits if PSE can take advantage of trenching to add conduits for future use.

Recommendation 4A: It is recommended that the City engage their utility partners to identify new projects (both large and small) to attempt to maximize projects in the rights-of-way. This planning activity is intended to take place in advance of permit applications so that the utilities can plan these projects into their annual work.

Recommendation 4B: The City can take advantage of projects that require trenching to place conduit for future use of potential undergrounding. The existence of conduit may allow for more economic alternatives for undergrounding in the future. This action requires City planning to identify future projects that require trenching and to discuss with PSE the placement of conduit. This will be an ongoing action as projects are defined, but can be coordinated through the City Planning Department. (This action is associated with Recommendation Current 3A).

Recommendation 5: Emergency Response Capability

Finding: There is an opportunity to improve the emergency response capability between PSE and Bellevue relative to coordination of PSE activities (e.g., Bellevue transportation, police, and fire functions). Currently, the coordination activities are more informal and on an as-needed basis. This opportunity may also include Bellevue staff assisting PSE in identifying damaged areas.

Reliability Actions: The ability to improve recovery time in Bellevue after an outage can be improved by better coordination between City first responders and PSE crews.

Recommendation 5: The City and PSE should consider the development of a more formal process (procedure) related to response and support activities during an outage. The ability to coordinate activities (especially during a major outage) may include the following activities:

- Locating damage
- Coordination of access to areas of damage
- Access to PSE outage information
- Coordination of recovery plans
- Emergency support to people in need.

The outcome should be an agreement (or procedure) for communication and coordination during large scale events affecting Bellevue.

PUGET SOUND ENERGY

QUANTA TECHNOLOGY

Eastside Needs Assessment Report
Transmission System
King County

Redacted Draft

October 2013

Puget Sound Energy

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Section 1 Executive Summary

The analysis discussed in this report verified that there is a transmission capacity deficiency in the Eastside area of Lake Washington which will develop by the winter of 2017-18. This transmission capacity deficiency is expected to increase beyond that date. Cities in the deficiency area include Redmond, Kirkland, Bellevue, Clyde Hill, Medina, Mercer Island, Newcastle and Renton along with towns of Yarrow Point, Hunts Point, and Beaux Arts.

Assessment Objective

The objective of this needs assessment is to assess the sufficiency of transmission supply within the next 10 years to Puget Sound Energy's customers and communities on the east side of Lake Washington.

As part of the mandatory North American Electric Reliability Corporation (NERC) Compliance Enforcement Program[1], PSE performs an annual comprehensive reliability assessment[2] to determine if any potential adverse impacts to the reliability of delivery of electricity exist on the PSE transmission system. During the 2009 comprehensive reliability assessment[3], PSE determined that there was a transmission reliability supply need developing due to the loss of one of the Talbot Hill Substation[4] transformers.

Since 2009, other issues have also been identified which impact this portion of the PSE system. These issues include concerns over the projected future loading on the Talbot Hill Substation, increasing use of Corrective Action Plans (CAPs) to manage outage risks to customers in this portion of the PSE system, and regional transmission reinforcement needs that were identified by ColumbiaGrid studies to support the movement of power from existing wind generation and hydroelectric generation across the Cascade Mountains to load centers around the Puget Sound.

The study described in this report focused specifically on the central King County portion of the larger PSE system in order to provide a more focused needs assessment. The timing of this study was intended to provide sufficient lead time to implement viable, long term solutions before the issues identified by the study develop. This report discusses the review of the current transmission infrastructure to support the current load and the future load growth in this area.

Method and Criteria

The studies documented by this report are collectively referred to as the "2013 Eastside Needs Assessment." To assess area supply needs, comprehensive reliability analyses were performed to determine the present and future transmission supply to PSE's Eastside area in King County and the Puget Sound area as a whole. In 2009, as part of

[1] NERC Reliability Standards for the Bulk Electric Systems of North America

[2] PSE Planning Studies and Assessment TPL-001 to TPL-004 Compliance Report

[3] 2009 PSE Planning Studies and Assessment TPL-001 to TPL-004 Compliance Report

[4] Talbot Hill Substation is located in Renton

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the TPL-001 through TPL-004 Compliance Report, PSE's analysis showed that there was a potential thermal violation with the loss of one of the two transformers at Talbot Hill Substation. For the 2013 Eastside Needs Assessment, PSE performed an updated analysis to evaluate if this potential thermal violation would still exist with updated load forecasts. The 2013 Eastside Needs Assessment was performed consistent with the mandatory NERC TPL annual comprehensive analysis. Supplemental performance studies were also performed to provide a clear understanding of the location and causation of these potential thermal violations.

For the 2013 Eastside Needs Assessment, PSE used the WECC 2012 series base cases to develop the 2013-14, 2017-18, and 2021-22 heavy winter cases. These cases were set up to account for normal weather with 100% of the forecasted level of conservation and were updated with the current PSE system configuration and load information. To better understand the extent of the need and risks faced by customers in this portion of the PSE system, sensitivity studies were conducted to evaluate performance under different levels of conservation. Sensitivities studies were also conducted to assess system performance under extreme weather conditions that are expected to occur once every twenty years.

This assessment also reviewed the near and long-term summer cases run for the 2012 NERC Transmission Planning (TPL) standard requirements. For the TPL report, cases had been developed for heavy summer of 2014 and 2018 using the 2012 WECC series base cases. These cases were set up to account for normal summer weather with 100% of the forecasted level of conservation and were updated with the current PSE system configuration and load information.

This analysis covered PSE facilities that are part of the Bulk Electric System (BES) and the interconnected system covered by the Western Electricity Coordinating Council (WECC). BES facilities must be studied in accordance with the latest approved versions of the mandatory NERC Reliability Standards and the WECC Reliability Standards[5]. These standards set forth the specific methods for studying the performance of the transmission system – 100 kV and above – and govern how that system is planned, operated and maintained.

In addition to the mandatory reliability standards, PSE has also issued Transmission Planning Guidelines[6] which describe how to plan and operate PSE's electric transmission system. These guidelines are in place to encourage the optimal use of the transmission system for service to loads and generators while complying with the mandatory standards. These guidelines also support transfers between utilities, when applicable, to support economic use of available resources.

Performance criteria are also established to determine if a need exists to improve the system. These performance criteria serve as a baseline to measure performance and to identify where reinforcements may be needed. The needs documented in this report were determined by whether or not the study area would perform such that it satisfied all approved applicable NERC, WECC and PSE transmission performance criteria[7].

Study Assumptions

The following key assumptions were adopted to more fully understand the potential reliability impacts:

- The study horizon selected was the ten year period from 2012 to 2022.
- System load levels used the PSE corporate forecast published in June 2012.

[5] TPL-001-WECC-CRT-2 – System Performance Criterion Under Normal Conditions, Following Loss of a Single BES Element, and Following Extreme BES Events

[6] PSE Transmission Planning Guidelines, November 2012

[7] PSE Transmission Planning Guidelines, pages 3-5 & 7, November 2012

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- Area forecasts were adjusted by substation to account for expected community developments as identified by PSE customer relations and distribution planning staff.
- Generation dispatch patterns reflected reasonably stressed conditions to account for generation outages as well as expected power transfers from PSE to its interconnected neighbors.
- Winter peak Northern Intertie transfers were 1,500 MW exported to Canada.
- Summer peak Northern Intertie transfers were 2,850 MW imported from Canada.

Specific Areas of Concern

The 2013 Eastside Needs Assessment was a fresh look at current and future system conditions which did not pre-judge the existence of any specific issues on the PSE system. Since 2009 a variety of concerns have been identified and these were investigated in the analysis. During the course of the analysis, some additional potential problems were identified that also were evaluated. The major issues include:

1. Overload of PSE Facilities in the Eastside Area: Several previous studies had identified potential overloading of transformers at Sammamish and Talbot Hill Substations[8]. These include the 2008 Initial King County Transformation Study, 2009 PSE TPL Planning Studies and Assessment, and the 2012 PSE TPL Planning Studies and Assessment[9]. Those studies indicated that potential thermal violations may occur on facilities from Talbot Hill Substation to Sammamish Substation. The 2013 Eastside Needs Assessment validated those concerns and identified transmission supply needs that focused on two 230-115 kV supply injections into central King County at Sammamish and Talbot Hill Substations. In the 2013 Eastside Needs Assessment the team found:

    - For the winter peak at approximately 5,200 MW (2017-18 in the model) there are two 115 kV elements with loadings above 98% for Category B (N-1) contingencies and five 115 kV elements above 100% for Category C (N-1-1 & N-2) contingencies.

    - For the summer peak at approximately 3500 MW (2018 in the model), there are two 230 kV elements above 100% and two 115 kV elements above 93% loadings for Category B (N-1) Contingencies. Also there are three elements above 100% loading and one above 99% loading for Category C (N-1-1) contingencies.

2. Small Margin of Error to Manage Risks from Inherent Load Forecast Uncertainties: The 2012 Corporate load forecast for winter under normal weather conditions and 100% conservation indicates load increases 138 MW from 2013-14 to 2021-22 (Figure 1-1), or about 17 MW of increased load per year. This annual increase is significantly lower than previous forecasts and is much lower than the 2011 forecast of approximately 22 MW per year[10],

    In extreme weather, system load can be much higher than this forecast. To illustrate, Figure 1-1 shows that the difference in forecast load between normal and extreme winter weather for the year 2014 is actually 497 MW – almost 10 percent of the total PSE load (assuming 100% of the forecast conservation for both). Normal weather represents the projected load at 23° F and extreme weather represents the projected load at 13° F. As the temperature gets close to 13° F, the forecasted load in any given year could easily surpass the entire 138 MW load increase projected for the 10 year study period. This effect has occurred recently on the

[8] Sammamish Substation is located in Redmond. Talbot Hill Substation is located in Renton.

[9] The 2010 and 2011 TPL Planning Studies also identified the Lakeside 230-115 kV transformer as needed and planned for 2016. It did not show up as a deficit in the long term due to being modeled as installed by the long term case year.

[10] 2011 PSE IRP Section H Page H-12 from 2010 to 2017

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PSE system. In winter 2009, the system hit an all-time peak of 5038 MW[11] at a temperature of 16° F, which was 194 MW higher than the 2009 forecast for normal weather peak load in 2009 . This 2009 actual peak load level is also higher than the 2012 forecast for normal system peak load in 2021.

The 2013 Eastside Needs Assessment shows a load level of need at approximately 5,200 MW winter peak. To illustrate the importance of conservation in our modeling, the team forecasted PSE load levels under a variety of conditions. If only 75% of forecasted conservation materializes, the 5,200 MW load level would be hit as early as 2015 under normal weather conditions. Even if 100% conservation is achieved, under extreme weather conditions PSE could exceed the 5,200 MW level during the winter 2013-14. These winter peak forecast sensitivities are illustrated in Figure 1-1:

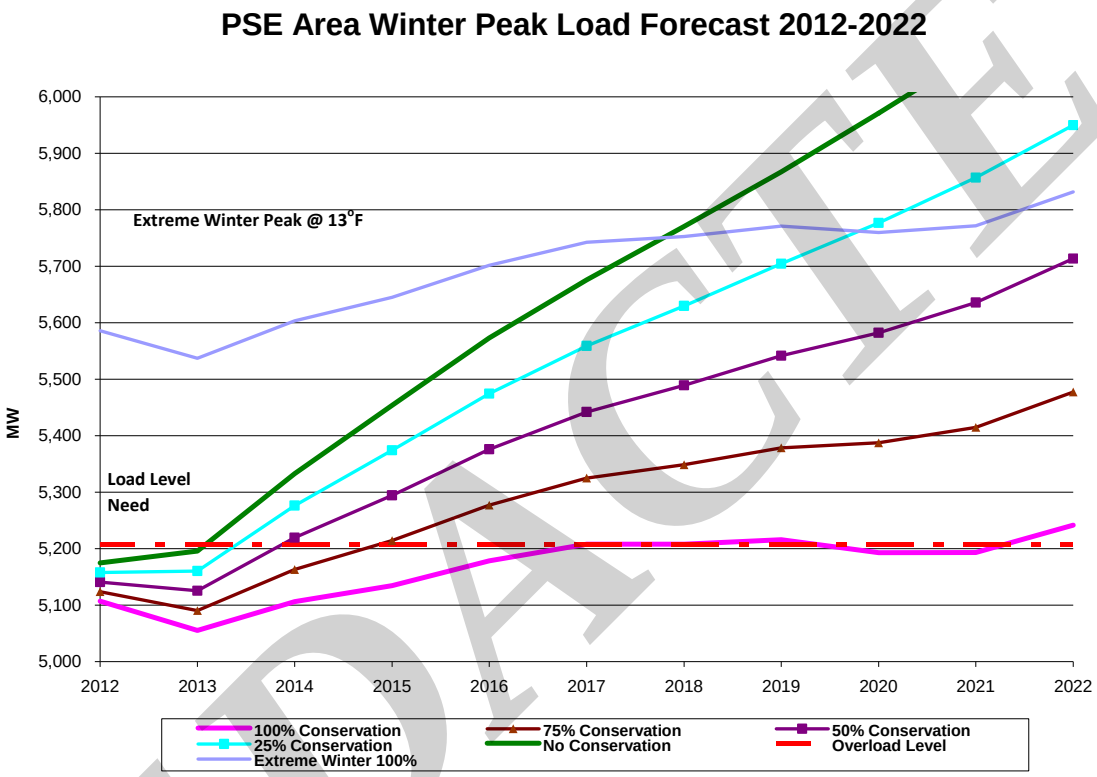

Figure 1-1: Corporate System Load Forecast for Winter 2012 to 2022

The 2013 Eastside Needs Assessment shows a summer load level of need is approximately 3340 MW (Figure 1-2). Summer peak load is calculated for an 86° F peak day. This load level could occur as early as 2014 and becomes more likely with time. While PSE has traditionally been a winter peaking utility, the increase in commercial load has driven summer load growth disproportionately higher than the winter growth in recent years. The projected summer peak growth is on average approximately 37 MW per year. The corporate load forecast does not indicate loading for an "extreme summer" peak, which would be expected to be higher than shown on these projections.

[11] This does not include approximately 270 MW of load on PSE's system served by other transmission providers.

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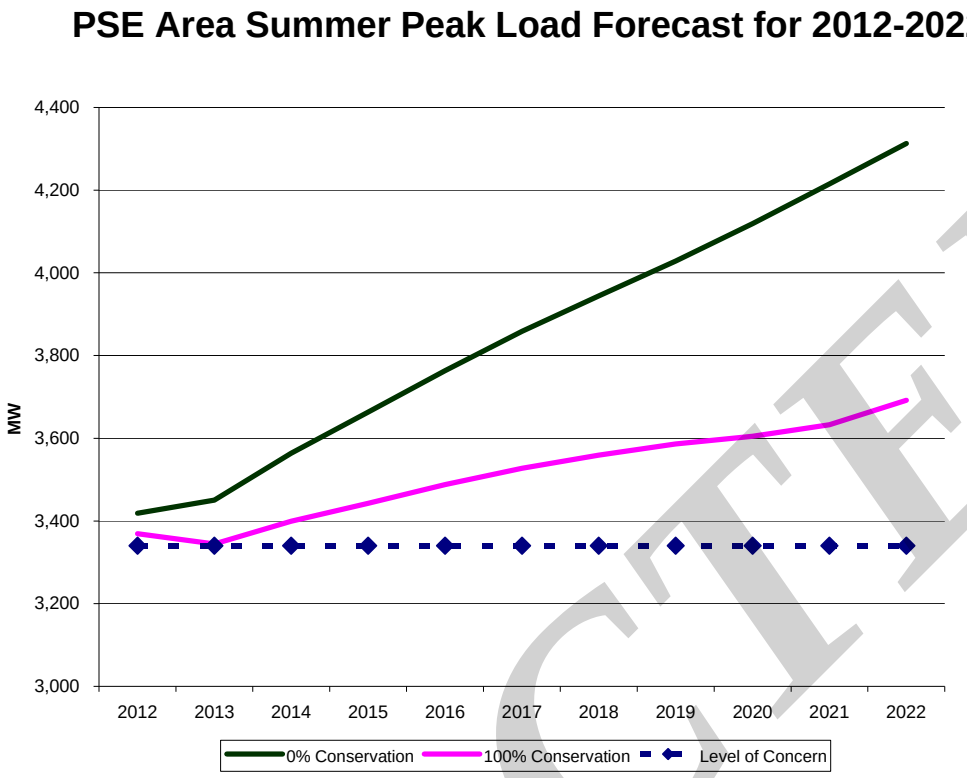

Figure 1-2: Corporate Load Forecast for Summer Peak from 2012 to 2022

3. Increasing Use and Expansion of Corrective Action Plans: An existing CAP in place to prevent overloads in the winter on either of the Talbot Hill transformer banks is increasing outage risk to customers. This CAP is to manually open [redacted], which removes [redacted]. Taking this step reduces the inherent reliability of the network since the transmission system cannot handle as many contingencies without overloads, voltage issues or loss of customers' power.

   As the PSE system load grows, the overload of either Talbot Hill transformer at winter peak may not be sufficiently reduced by this CAP. If loading on the overloading transformer is not reduced by use of the existing CAP, then [redacted] and [redacted] will also be opened. In addition to the reduction in reliability discussed above, opening these four 115 kV lines results in splitting northern King County from southern King County and puts approximately 32,400 customers at risk of outage, being served by just 1 transmission line without a backup line available (i.e., "radial supply"). This action also puts an additional 33,000 customers in Bellevue and Kirkland at risk of outage should there be an outage of [redacted] while the north and south systems are operating separately.

   There are two contingencies in the north end of King County that would trigger a CAP under summer conditions. These contingencies are (1) the loss of [redacted] along with the loss of the [redacted]; and (2) the loss of the [redacted] along with the loss of [redacted]. This CAP would open [redacted]. Taking this action places 33,000 customers at risk of outage should an additional

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transmission line outage occur. The 33,000 customers are served from two separate lines, so a single line outage would take out approximately half of the 33,000.

4. Emerging Regional Impacts Identified by ColumbiaGrid: ColumbiaGrid was formed in 2006 by regional utilities to improve the operational efficiency, reliability, and planned expansion of the Northwest transmission grid through an open and transparent process. The ColumbiaGrid produces a Biennial Transmission Expansion Plan that addresses system needs in the Pacific Northwest, including the PSE system. The latest report indicated a need to improve the dependability of the transfer capability through the Puget Sound Area. This need occurs during high load conditions and much of the rest of the year as facilities such as transmission lines are taken out of service to do required maintenance and improvements. ColumbiaGrid indicated that a reduced risk of curtailments is needed to reliably deliver power from regional and renewable generation such as PSE's wind generation in eastern Washington, to King County. Also, there are regional commitments to increase flows across the Northern Intertie to 2300 MW that will show up in the ten-year time frame.

   To significantly reduce regional curtailments, ColumbiaGrid identified six specific projects which include installing inductors on the 115 kV system in Seattle, adding a 500-230 kV transformer at BPA's Raver Substation in south King County, and increasing 230 kV south-north transmission capacity along the Eastside.

Statements of Need

The 2013 Eastside Needs Assessment confirmed that by winter of 2017-18, there is a transmission supply need on the Eastside of Lake Washington which impacts PSE customers and communities in and around Kirkland, Redmond, Bellevue, and Newcastle along with Clyde Hill, Medina, and Mercer Island. The supply need focuses on the two 230 kV supply injections into central King County at Sammamish Substation in the north and Talbot Hill Substation in the south. The transmission supply becomes a need at a PSE load level of approximately 5,200 MW, where overloads will result in operating conditions that will put thousands of Eastside customers at risk of outages. According to PSE projections, demand is expected to exceed this level in winter 2017-18.

The assessment also identified that higher overloads are expected to develop as load grows beyond the 5,208 MW (100% conservation) shown in 2017-18. For example as shown below, if only 75% of the conservation forecast is achieved - equivalent to 5,300 MW load in that same time period, the overloads will have grown. By the end of the 10 year study period, the study indicates that overloads will continue to grow even with all of the projected conservation in effect. These possible overloads will result in more hours operating under conditions that will put thousands of Eastside customers at risk of outages.

Under both load forecast conditions (full conservation and 75% conservation), the overloads occur for both Category B contingencies which are the loss of a single element (i.e., "N-1") and Category C contingencies which are the loss of more than one element, (i.e., "N-1-1" or "N-2"). Table 1-1 shows the overloads expected by 2017-18 for winter peak under normal weather conditions.

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Table 1-1: Potential Thermal Violations for 2017-18 Winter Peak with Normal Weather

	2017-18 Winter Peak	2017-18 Winter Peak
	5208 MW	5325 MW
Contingency	100% Conservation	75% Conservation
Cat B (N-1)	Talbot Hill - Lakeside #1 115 kV line – 98.6%	Talbot Hill - Lakeside #1 115 kV line – 99.9%
	Talbot Hill - Lakeside #2 115 kV line – 98.4%	Talbot Hill - Lakeside #2 115 kV line – 99.8%
	Talbot Hill 230-115 kV transformer #2 – 90.3%	Talbot Hill 230-115 kV transformer #1 – 90.9%
		Talbot Hill 230-115 kV transformer #2 – 92.4%
Cat C (N-1-1)	Talbot Hill-Lakeside #1 115 kV Line - 127.8%	Talbot Hill-Lakeside #1 115 kV Line - 129.9%
	Talbot Hill-Lakeside #2 115 kV Line - 127.6%	Talbot Hill-Lakeside #2 115 kV Line - 129.7%
	Talbot Hill 230-115 kV transformer #1 - 105.7%	Talbot Hill 230-115 kV transformer #1 - 108.1%
	Talbot Hill 230-115 kV transformer #2 - 105.7%	Talbot Hill 230-115 kV transformer #2 – 107.6%
	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 110.6%	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 112.5%
	Shuffleton – O'Brien 115 kV Line – 97.9%	Shuffleton – O'Brien 115 kV Line – 99.7%
	Shuffleton – Lakeside 115 kV Line – 97.3%	Shuffleton – Lakeside 115 kV Line – 98.9%
Cat C (N-2 or Common Mode)	Talbot Hill-Lakeside #1 115 kV Line - 101.5%	Talbot Hill-Lakeside #1 115 kV Line – 100.5%
	Talbot Hill-Lakeside #2 115 kV Line - 101.1%	Talbot Hill-Lakeside #2 115 kV Line – 103.0%
	Talbot Hill 230-115 kV transformer #1 – 91.8%	Talbot Hill 230-115 kV transformer #1 – 93.8%
	Talbot Hill 230-115 kV transformer #2 – 92.8%	Talbot Hill 230-115 kV transformer #2 – 94.4%

The analysis also identified that overload conditions will occur for Summer Peak conditions under normal weather. These overloads can occur as early as 2014 with a load level of approximately 3,300 MW. These overloads increase by the year 2018 when the load is expected to increase to 3,500 MW. Those issues are listed in Table 1-2.

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Table 1-2: Potential Thermal Violations for 2014 and 2018 Summer Peak with Normal Weather

	2014 Summer Peak	2018 Summer Peak
	3343 MW	3554 MW
Contingency	100% Conservation	100% Conservation
Cat B (N-1)	Monroe-Novelty Hill 230 kV line - 132.6%	Monroe-Novelty Hill 230 kV line - 133.0%
	Maple Valley - Sammamish 230 kV line - 111.4%	Maple Valley - Sammamish 230 kV line - 132.3%
		Talbot Hill - Lakeside #1 115 kV line - 93.9%
		Talbot Hill - Lakeside #2 115 kV line - 93.8%
Cat C (N-1-1)	Sammamish 230-115 kV transformer #1 - 95.5%	Sammamish 230-115 kV transformer #1 - 100.7%
	Sammamish 230-115 kV transformer #2 - 100.8%	Sammamish 230-115 kV transformer #2 - 106.4%
		Beverly Park - Cottage Brook 115 kV line - 100.5%
		Sammamish - Lakeside #2 115 kV line - 99.8%

When winter load reaches the point that overloads are possible, PSE or BPA would use CAPs to automatically or manually prevent overloads under the NERC reliability requirements. The CAPs required to prevent N-1-1 overloads would open lines between Sammamish and Talbot Hill. Some of the CAPs place customers at risk of outage due to transmission lines being switched to a radial supply, with no backup transmission line available. Load growth by the end of the 10 year study period will result in additional lines required to be opened, putting over 60,000 customers at risk of resulting outages. Some of the CAPs are set up today as BPA nomograms or PSE manual corrective action plans. If extreme winter weather were to occur today, loading would be high enough that CAPs would be employed to remain NERC compliant.

Future load growth will result in additional lines required to be opened, putting over 60,000 customers at risk of resulting outages. Additional power supply is needed in the central King County area to prevent overloads and outages, see .Figure 1-3.

The diagram below indicates areas at risk of outage if switching is performed to prevent overloads, and then subsequent outages occur on transmission lines that had been switched open. The subsequent outages could be due to radial lines experiencing faults due to car-pole accidents, lightning, or tree limbs. Outages could also occur if PSE dispatchers must drop load to prevent transformer overloads while transmission lines are switched open. In the diagram, green lines indicate a line or transformer whose loss during peak winter load could result in overloads of other system elements. The gold colored lines indicate those lines or transformers at risk of overloading when the green element trips out. The gray shaded areas indicate where customers would be at risk of outage from switching to mitigate the overloads.

This study finds that within the 10 year study period, additional transmission supply to the Eastside is needed to meet future demand growth of the area.

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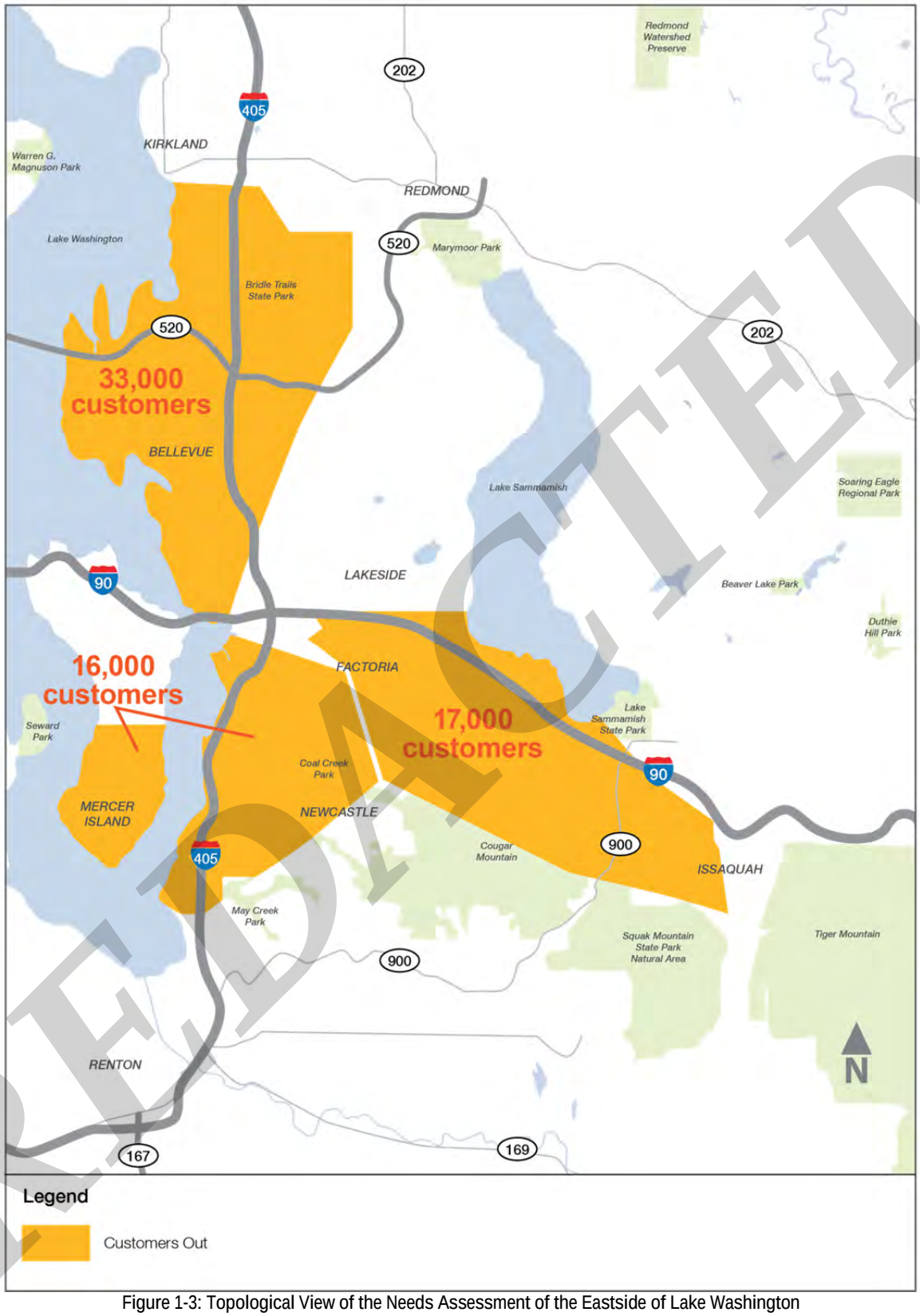

Figure 1-3: Topological View of the Needs Assessment of the Eastside of Lake Washington

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Section 2 Introduction and Background Information

2.1 Study Objective

The study objective was to assess the capability of existing transmission infrastructure to supply the communities on the east side of Lake Washington, called the "Eastside", within Puget Sound Energy's (PSE's) central King County area. These communities include Bellevue, Kirkland, Redmond, Mercer Island, and Newcastle as well as the smaller towns along the shore. A review was performed to determine the needs for future transmission supply to the Eastside. This study review was performed due to concerns identified in 2009 TPL studies that were related to the projected future loading on the Talbot Hill Substation, future requirements of the Columbia Grid, and operational issues of PSE's control area. These supply issues were exacerbated by impacts on the PSE system due to Puget Sound Area Northern Intertie (PSANI) related events during winter supply conditions and heavy south to north flows that had been identified in analysis conducted by Columbia Grid.

This present report reviews the entire infrastructure, and design of the transmission system with respect to present and future viability. The following tasks were completed as part of this study review and are discussed in this report: (i) updated the block load forecast of the King County area; (ii) merged this block load forecast into the 2012 PSE system load forecast (iii) conducted future performance simulations of the King County area for the years 2014, 2018 and 2022; (iv) reviewed the Columbia Grid 2013 Biennial Transmission Expansion Plan; and (v) reviewed operational issues with PSE's control area operators; and (vi) aligned the recommendations with the recommendations from the Columbia Grid analysis of PSANI events under heavy south to north flows.

Quanta Technology, LLC., assisted Puget Sound Energy in conducting this study, including research, analysis and documentation.

2.2 Background Information

One of the major drivers in the determination of need for additional transmission facilities is the existing load on the system and the projected load growth that is expected to occur. As early as 2008, PSE had indications that additional transmission supply was needed to support the central King County portion of PSE's service territory. In 2008, PSE conducted a King County Transformation Study that indicated increased loading had occurred at the Talbot Hill Substation, which has two 230-115 kV transformers. Concerns were noted that if load continued to grow in the area, then by 2017-18 one transformer would overload if the other transformer tripped off-line. This study used the F2008 Puget Sound Energy Electric Load Forecast.

The needs for additional transmission sources into central King County were confirmed while performing the mandatory NERC 2009 reliability compliance studies. In that analysis, PSE observed a potential thermal issue when there was a bus fault at Talbot Hill Substation. The bus fault caused the overload of a Talbot Hill transformer for the loss of the other transformer for the 2010-2011 winter peak[12]. Based upon the adjusted 2009 PSE load forecast, the peak load modeled in the 2010-2011 Winter peak case was 5,329 MW[13]. For the 2018-2019 Winter peak case a load of 5,765 MW was modeled.

To resolve this equipment overload, a temporary measure of manually switching out two 115-kV lines from Talbot Hill –Lakeside was identified as a Corrective Action Plan (CAP) that could be used to mitigate the overload[14]. The CAP would be used at a PSE load level of approximately 5,300 MW. At that time, PSE implemented the CAP and has been using it in its operations for managing the reliability of service in that area.

[12] Page 13, 2009 PSE Planning Studies and Assessment TPL-001 to TPL-004 Compliance Report

[13] Page 7, 2009 PSE Planning Studies and Assessment TPL-001 to TPL-004 Compliance Report

[14] Page 22, 2009 PSE Planning Studies and Assessment TPL-001 to TPL-004 Compliance Report

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In early 2009, PSE's corporate load forecast group responded to the national economic crisis to re-evaluate the projected load forecast. The resulting revision reduced the forecast 2010-11 winter peak by 3% from the previous year's forecast.

In 2009, PSE set their all-time record loads for both the winter and summer seasons. The 2009 winter peak load was 5,038 MW and the 2009 summer peak was 3,509 MW. This compares with a 2009 forecast of 4,973 MW for winter and 3,086 MW for summer. Neither the forecast number nor the peak load includes the 270 MW of transmission level customers used in the area load. It should be noted that the 2009 winter peak forecast assumed a normal winter temperature of 23° F, while the peak load occurred with a temperature of 16°F. For a discussion of the forecast methodology and the limitations on its use, see Section 4.1.5.

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2.3 King County Area Description

King County is a major load center of the Puget Sound Region. The Eastside area is in central King County and includes the cities of Redmond, Kirkland, Bellevue, Mercer Island, Newcastle and Renton, as well as the smaller towns of Yarrow Point, Hunts Point, Medina, Clyde Hill and Beaux Arts. The greater Eastside area also includes towns and cities to the north and east of the core area which are not a focus of this study: Bothell, Woodinville, Duvall, Carnation, Sammamish, Issaquah, Preston, Fall City, Snoqualmie, and North Bend.

Figure 2-1 Street Map of Eastside Area

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The load density of north King County is shown below in Figure 2-2. The map shows that the most densely populated areas, shown in red, of King County are Kenmore, Kirkland, Redmond, Bellevue, and Renton.

The easterly border of King County is along the Cascade Mountain Range, which creates a natural obstacle between the densely populated western Washington communities clustered around Seattle and Tacoma, and the sparsely populated arid region of eastern Washington.

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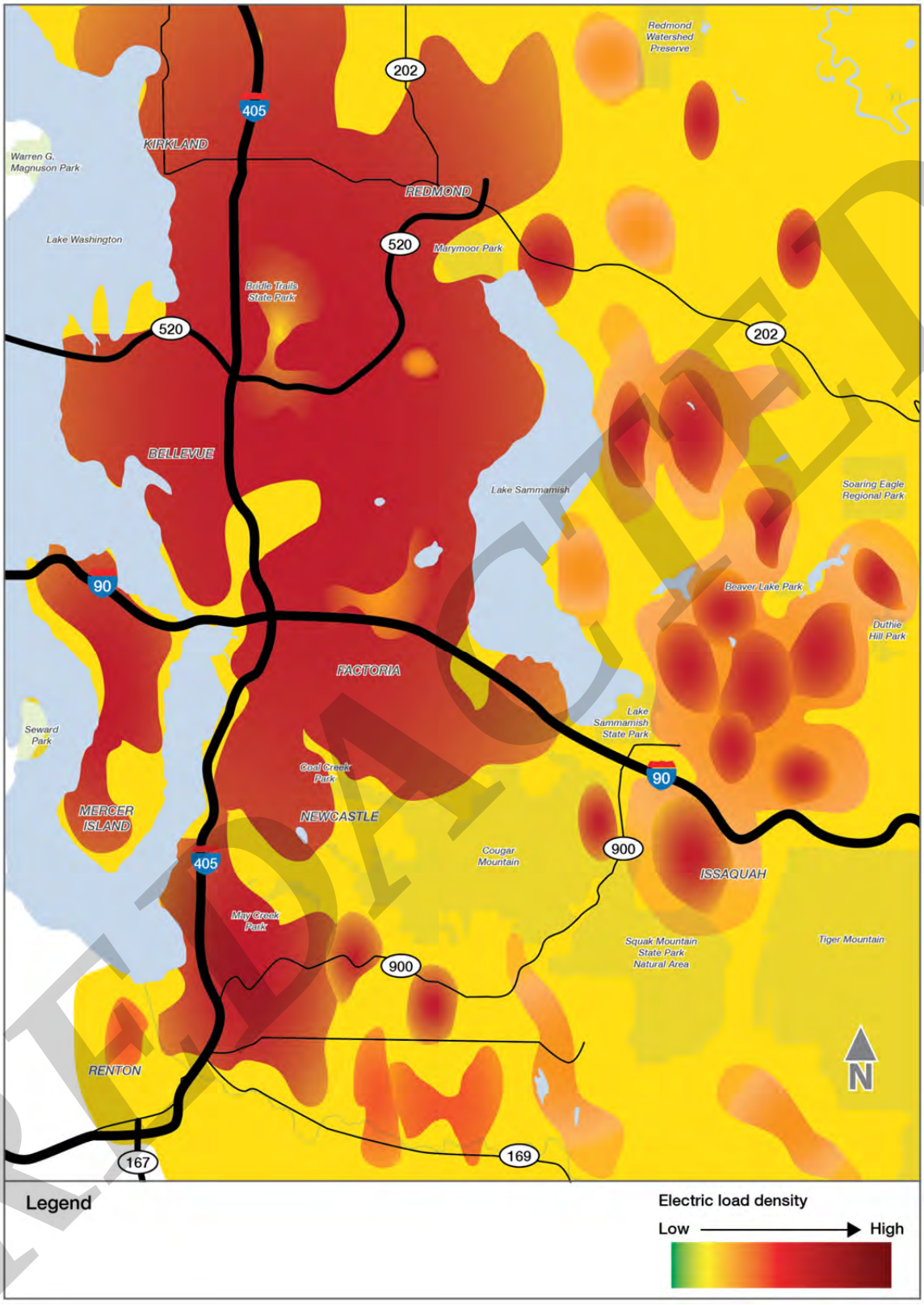

Figure 2-2: King County Load Density Map

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The King County load is supplied from Bonneville Power Administration's (BPA) 500 kV sources at Monroe (Monroe), SnoKing (Mill Creek) Maple Valley (Renton), and Covington (Covington) Substations, as well as 500 kV switching stations at Echo Lake (south of Snoqualmie) and Raver (Ravensdale). There is very little generation in King County; a small amount of hydro generation in eastern King County provides less than 5% of the county's peak load requirements. Therefore PSE depends on its transmission system and on transmission interconnections with neighboring utilities to bring power to its load center in King County.

King County also has 230 kV supply from the following substations: Sammamish (Redmond), Novelty Hill (Redmond Ridge), Talbot Hill (Renton), O'Brien (Kent), and Berrydale (Covington). To serve the loads in King County, there are eight 230 kV/115 kV transformers; two at Sammamish, two at Talbot Hill, and one at Novelty Hill, two at O'Brien, and one at Berrydale. North King County load is generally served by Sammamish and Novelty 230 kV sources but due to the interconnecting nature of the system, Talbot Hill transformers serve part of the North King and South King systems. Sammamish and Novelty Hill are both connected to the Monroe-Maple Valley 230 kV line, which is leased from BPA. See Figure 2-3 and Figure 2-4 on the following pages.

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Figure 2-3: Puget Sound Area System Overview One-Line Diagram

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Figure 2-4: Major Electrical Infrastructure Supporting the Eastside Area

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The 11 - 115 kV lines out of Lakeside Substation serve 15 substations in Bellevue and 14 substations in Newcastle, Issaquah, Mercer Island, Medina, Kirkland and Redmond, as shown in Figure 2-5. Lakeside Substation is supplied by 230-115 kV transformers at Sammamish and Talbot Hill. Lakeside connects to switching stations at Shuffleton (Renton), Lake Tradition (Issaquah) and Ardmore (Bellevue). In the Eastside area, when regional power flows are from south to north the power serving the Eastside will generally flow from south to north. In this case, power for the Eastside starts at Talbot Hill and flows north to Lakeside and continues to Sammamish Substation. When regional flows are north to south, Talbot Hill will still feed north past Lakeside but power will also flow south out of Sammamish Substation which feeds approximately sixty percent of the load between Sammamish and Lakeside Substations during north-south regional flows. Talbot Hill is a strong source of supply between Lakeside and Sammamish Substations.

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Figure 2-5 One-Line Diagram of Eastside Study Area

All of the 115 kV transmission lines in the Eastside area have been uprated to their maximum capacity ratings, except the two lines to Mercer Island, which operate normally open. PSE has two 115 kV transmission lines on separate structures on a transmission right of way (ROW) between Sammamish and Talbot Hill Substations, which interconnect at Lakeside Substation. There are three 115 kV lines in parallel with this corridor in the north, two lines in parallel in the south, all supplying load to distribution substations.

The Bellevue area is a higher-density load center without a 230 kV bulk transmission source nearby. With 230 kV supplies in the north at Sammamish Substation and the south at Talbot Hill Substation, lower-capacity 115 kV transmission lines bring power to Bellevue from the 230 kV transmission substations in Redmond and Renton.

2.4 Study Horizon

PSE has studied the Eastside area for the near-term (years 1-5) and long-term (years 6-10) horizons. Since PSE peaks during the winter season, the reliability analysis focused on the winter peak for years 2013-14, 2017-18, and 2021-22. Summer peak was also analyzed for years 2014 and 2018 for the annual 2012 NERC TPL analysis; the 2012 NERC TPL summer results were included in this study.

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Section 3 Analysis Description

A number of comprehensive reliability analyses were performed to determine the present and future transmission supply to the central King County area. The following detailed studies were performed to assess any adverse conditions to the reliability and operating characteristics of the PSE system or surrounding systems in the context of applicable standards:

2013 Eastside Needs Assessment: Power flow simulations were performed for the near and far-term horizon to determine if there are any thermal or voltage violations to King County's Eastside area. Past studies have shown supply issues to this area. While the recent economic downturn has impacted the future load growth projections of PSE overall, the load within the Eastside continues to grow. This study uses the latest corporate load forecast and adjusts the lumpiness of the load based on PSE's knowledge of future block loads.

2008 Initial King County Transformation Study: Power system simulation studies were performed on the King County system which indicated increased loading at Talbot Hill Substation, pointing to future overloads of either transformer for the loss of the other transformer at Talbot Hill. A bus section fault or loss of one of the lines from BPA Maple Valley Substation could also result in Talbot Hill transformer overloads.

2009 PSE Planning Studies and Assessment-TPL-001 to TPL-004 Compliance Report: As required per the 2009 NERC Compliance Enforcement Program, PSE performed an assessment of the system based on criteria described in NERC Standards TPL-001 through TPL-004. There were a number of potential overloads and voltage violations identified with these studies. The proposed solutions are generally system projects that will mitigate the issues via a topology change, line uprate, or additional transformation. The solutions may also take the form of a Remedial Action Scheme (RAS), as well. PSE demonstrated through a valid assessment that its portion of the interconnected transmission system is planned such that the Network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand levels over the range of forecast system demands, under the contingency conditions.

2012 PSE Planning Studies and Assessment-TPL-001 to TPL-004 Compliance Report:
PSE performed an assessment of the system based on criteria described in NERC Standards TPL-001 through TPL-004. There were a number of potential overloads and voltage violations identified with these studies. The proposed solutions are generally system projects that will mitigate the issues via a topology change, line uprate, or additional transformation. The solutions may also take the form of a Remedial Action Scheme (RAS), as well.

BPA Transformation Study: A study was conducted by PSE in 2010 to review the impact of BPA 500-230 kV transformation at Monroe, Maple Valley or Covington which had been identified by BPA as alternative sites for the new transformer. A Covington transformer plus Lakeside 230-115 kV transformation provides better improvements to stressed contingencies than Covington plus Lake Tradition, Berrydale and Christopher 230-115 kV transformers combined. A Maple Valley transformer would stress PSE's system in the Talbot Hill vicinity more than a Covington transformer.

ColumbiaGrid 2013 Biennial Transmission Expansion Plan: ColumbiaGrid 2013 Biennial Transmission Expansion Plan looks out over a ten-year planning horizon (2013 - 2023) and identifies the transmission additions necessary to ensure that the parties to the ColumbiaGrid Planning and Expansion Functional Agreement can meet their commitments to serve load and meet firm transmission service commitments. The Expansion plan still includes the addition of a Lakeside 230-115 kV transformer in the Ten-Year Plan, and the additional 230-115 kV transformation at Lake Tradition in the long term. The new issues in the 2013 Expansion plan include Northern Intertie transfer issues.

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A limitation in the 500/230 kV transformation in the Puget Sound area was noted in previous System Assessments. To resolve this issue, The Puget Sound Area Transmission Expansion Plan and the ColumbiaGrid Ten-Year Plan include a new 500-230 kV transformer at Raver which is scheduled to be installed in 2016.

Study Criteria: The following is a list of the criteria, standards and guides which apply to this needs statement:

1. TPL-001- System Performance Under Normal (No Contingency) Conditions (Category A)
2. TPL-001-WECC-CRT-2 – System Performance Criterion Under Normal Conditions, Following Loss of a Single BES Element, and Following Extreme BES Events:
3. TPL-002 - System Performance Following Loss of a Single Bulk Electric System Element (Category B)
4. TPL-003 - System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
5. TPL-004 - System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)
6. PSE's Transmission Planning Guidelines
7. Northwest Power Pool Coordinated Plan
8. PSE Procedures to Establish and Communicate Operating Limits

Section 4 Study Assumptions

4.1 Steady State Model Assumptions

4.1.1 Study Assumptions

The 230 kV Eastside Area steady state models were developed to be representative of the long term projection of the winter peak system demand level to assess reliability performance under heavy load conditions. The model assumptions included consideration of Puget Sound area generation units' unavailability conditions as well as variations in surrounding area transfer level conditions.

The following assumptions are used in the 2013 Eastside Needs Assessment. The primary focus was on the winter peaks for years 2013-14, 2017-18, and 2021-22 utilizing the latest corporate load forecast modified to reflect the lumpiness of the load by substation. The Eastside load is defined as the sum of the MW flows out of the bus on the Talbot Hill end of the Talbot Hill - Lakeside #1 & #2 115 kV lines, Shuffleton end of the Shuffleton - Lakeside 115 kV line, Lake Tradition end of the Lake Tradition - Goodes Corner - Lakeside 115 kV line, and Sammamish end of the Sammamish - Lakeside #1 & #2, Sammamish - North Bellevue - Lakeside, Sammamish - Lochleven - Lakeside, and Sammamish - Ardmore - Lakeside 115 kV lines.

The difference in winter peak load forecasts with 100% conservation from 2013-14 to 2021-22 is 138 MW, which on average, is only approximately 15 MW per year (see Figure 4-1). Sensitivities on the amount of conservation and weather were run to reflect the inherent risks associated with an essentially flat load growth. Figure 4-1 shows the load levels in the study with various levels of conservation.

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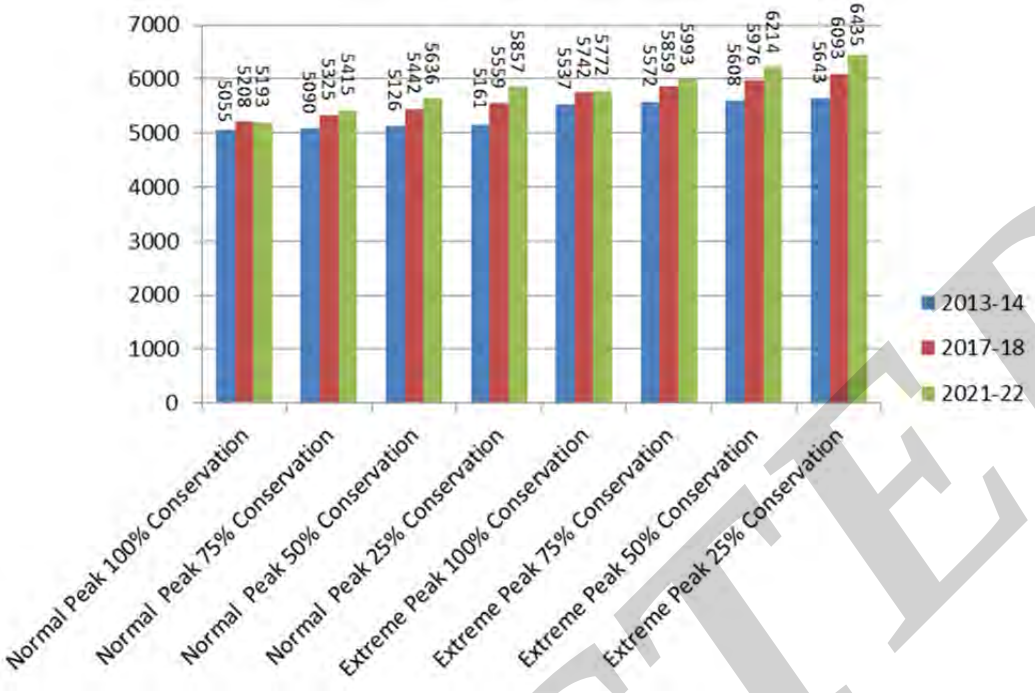

Figure 4-1: Winter Peak Load Growth with Varying Levels of Conservation

The Northern Intertie for the winter peak was modeled with a south to north flow of 1,500 MW into Canada.

The generation dispatches for the winter peak were modeled to reflect the standard way PSE studies the King County area which is to reduce generation in the north of the PSE area to create a greater south to north power flow during contractual flows from the Northwest to Canada. A winter low generation sensitivity case with adjusted Puget Sound area generation was run to identify risks associated with running a no Puget Sound Area generation case.

4.1.2 Source of Power Flow Models

The power flow models used in the study were based on WECC base cases created in 2012 for the winters 2012 -13, 2016 -17 and 2021-22 and for summers 2012 and 2017. These base cases are updated annually by all WECC members to reflect expected load forecasts, planned projects, generation changes and system adjustments. The 2012-13 winter case was modified to model the expected 2013-14 winter, the 2016-17 winter case to 2017-18 winter, the 2012 summer case to 2014 summer, and the 2017 summer case to 2018 summer. The cases were updated to reflect the PSE Corporate load forecast as discussed in Section 4.1.5.

The winter cases were then adjusted to reflect the case where the region sees high south to north power flows with no Puget Sound area generation. In previous studies, this scenario was the one that indicated the greatest problems on the Eastside in the winter. For TPL studies, four other scenarios are also studied:

- High South to North flows on the Northern Intertie with high Puget Sound area generation
- High South to North flows on the Northern Intertie and high south to north flows on the Paul - Raver 500 kV line with no Puget Sound area generation
- High North to South power flows on the Northern Intertie with no Puget Sound area generation
- High North to South power flows on the Northern Intertie with high Puget Sound area generation

The summer cases were run through four generation and Northern Intertie scenarios for PSE's 2012 TPL report; the TPL report summer results were used for this study.

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The adjusted cases were then tailored for system improvements. Most improvements had been included already in the WECC cases. Additionally, the Seattle City Light (SCL) inductors and the Raver transformer were modeled. The PSE Lakeside 230 kV project was removed from the 2018 summer and 2021-22 winter cases since this project was proposed for perceived Eastside transmission supply need.

The cases were also adjusted for forecasted load in future years. First a block load adjustment was made where expected load is known for substations in King County. Then the system load for each of the study years was scaled to the level forecasted by PSE's Load Forecast Group in 2012.

4.1.3 Transmission Topology Changes

Projects added to the Eastside Needs Assessment base case are listed in Section 9 - Appendix B Table B-1 and Table B-2.

4.1.4 Generation Additions and Retirements

In addition to the generation increases included in the WECC base case by other utilities, PSE added generation capacity at the Snoqualmie and Lower Baker hydro units in 2013. These increases were modeled in the summer cases. The winter cases used no Puget Sound area generation for low generation scenarios, so the additional hydro generation was not relevant.

4.1.5 Forecasted Load (including assumptions concerning energy efficiency, interruptible loads, etc.)

The 2012 PSE Corporate system load forecast was used as a basis for the demand levels modeled in the study. PSE Corporate Load Forecast Group uses econometric regression models (*not end use models*) to forecast use per customer and customer counts for its electric and gas service area. The regression models are developed by customer class, such as residential, commercial, industrial, and so on.

The use-per-customer and customer equations are driven by a number of regional economic, demographic, weather, binary and other independent variables. The forecasts of the underlying economic and demographic variables are developed using information from Moody's Analytics and other regional sources of economic data.

The use per customer equation is driven primarily by historical data and variables such as unemployment rate, total employment, manufacturing employment, real personal income, retail rates and weather variables like heating and cooling degree days. The base forecast created by the regression model is modified appropriately to account for impacts of conservation programs and any known changes to large customers managed by the major accounts group. The conservation estimates prepared by the Integrated Resource Planning team distribute the implementation of conservation measures based on cost effectiveness analyses. The forecast of conservation savings is a major determinant of the final shape of the load forecast.

Customer count growth is driven by historical data and changes in population, household growth, housing permits, total employment and manufacturing employment in PSE's service area.

A major influence on PSE in the early 1990s was Washington's Growth Management Act (GMA). Elements of the GMA provide direction as to where growth and load will locate. PSE's planning process continues to provide input and updates on future planned transmission and distribution facilities for local jurisdiction Comprehensive Plan revisions to support their growth forecasts. Overall, the GMA and the local Comprehensive Plans coupled with PSE Annual Corporate Customer and Sales Forecasts provide a measure of predictability as to where and when construction of planned facilities will be needed.

PSE Annual Corporate Customer and Sales Forecasts include summer and winter peak load forecasts for a 20 year period. These forecasts include both normal and extreme winter load levels, with and without Demand Side Resources (DSR). Forecasts for Network Loads and other T & D service categories are obtained from customers

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annually for a 10-year period. Transmission Planning uses the most recent normal peak loads as a starting point and checks sensitivities to forecasted load as set forth in the NERC transmission planning requirements[15].

Table 4-1 shows PSE's 20 year load forecasts for the calendar years of 2010 to 2012 for normal (23° F) and extreme weather (13° F) with 100% conservation. PSE Load Forecast is provided for PSE system load, and does not include the 270 MW of Transmission Customer industrial loads. Transmission Customer loads are included in the area load for the TPL and 2013 Eastside Need Assessment. The load forecasts have decreased from the earlier years. The 2013 Eastside Need Assessment used the latest forecast.

From Table 4-1, the total load growth between 2013 and 2021 for normal weather is 138 MW. The difference in load between normal weather and extreme weather for 2013 is 482 MW. If the temperature on the peak day drops from 23° F to 13° F, the load increase would be approximately 3.5 times the total normal load growth over the study period.

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[15] TPL-001-2 R2.1.4: http://www.nerc.com/docs/standards/sar/atfnsdt_recirc_ballot_tpl_001_2_clean_20110711.pdf

Table 4-1: PSE Load Forecasts from 2010 to 2012 for Normal and Extreme Weather

	Forecasted 2010		Forecasted 2011		Forecasted 2012	
Year	Max of Normal Peak w/ DSR	Max of Extreme Peak w/ DSR	Max of Normal Peak w/ DSR	Max of Extreme Peak w/ DSR	Max of Normal Peak w/ DSR	Max of Extreme Peak w/ DSR
2010	4,842	5,260	4,781	5,253		
2011	4,868	5,291	4,878	5,363		
2012	4,913	5,344	4,893	5,388	4,837	5,316
2013	4,947	5,387	4,925	5,433	4,785	5,267
2014	4,961	5,407	4,965	5,487	4,836	5,333
2015	4,947	5,400	4,979	5,513	4,865	5,375
2016	4,954	5,414	5,003	5,548	4,909	5,432
2017	4,967	5,434	5,023	5,579	4,938	5,472
2018	4,989	5,462	5,027	5,593	4,938	5,483
2019	5,017	5,498	5,044	5,622	4,946	5,501
2020	5,063	5,551	5,025	5,615	4,923	5,490
2021	5,141	5,639	5,028	5,630	4,923	5,502
2022	5,222	5,731	5,078	5,693	4,972	5,562
2023	5,302	5,821	5,149	5,775	5,039	5,641
2024	5,383	5,913	5,225	5,865	5,117	5,732
2025	5,466	6,007	5,303	5,955	5,193	5,820
2026	5,547	6,099	5,382	6,047	5,266	5,905
2027	5,629	6,192	5,464	6,142	5,341	5,993
2028	5,711	6,285	5,552	6,244	5,426	6,090
2029	5,795	6,380	5,645	6,351	5,515	6,192
2030			5,490	6,091	5,605	6,296
2031					5,694	6,399
2032					5,785	6,504
2033					5,878	6,610

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The conservation in MW, by county, utilized in the 2012 forecast is shown below in Table 4-2.

Table 4-2: Conservation in MW, by County

Conservation Effects by County Normal Peaks (23ºF) 100% Target Conservation (MW)										
Year of Study	King	Thurston	Pierce	Whatcom	Skagit	Island	Kitsap	Kittitas	Jefferson	Total
2012	33.0	7.8	6.9	5.2	3.4	2.1	7.4	0.8	1.3	67.9
2013	69.6	16.5	14.6	10.8	7.2	4.4	15.5	1.7	2.7	142.9
2014	112.3	26.7	23.6	17.5	11.5	7.0	24.8	2.7	4.3	230.5
2015	158.5	37.8	33.2	24.6	16.2	9.9	34.8	3.9	6.1	324.9
2016	196.1	46.8	41.0	30.3	20.0	12.1	42.7	4.8	7.5	401.5
2017	233.0	55.6	48.6	35.9	23.7	14.3	50.3	5.8	8.9	476.2
2018	280.4	66.9	58.3	43.1	28.4	17.2	60.1	7.1	10.7	572.1
2019	325.4	77.6	67.4	49.8	32.9	19.8	69.2	8.3	12.4	662.9
2020	389.5	92.8	80.4	59.5	39.2	23.5	82.2	10.2	14.9	792.1
2021	443.5	105.6	91.2	67.5	44.6	26.6	92.8	11.7	16.9	900.4
2022	474.0	112.9	97.3	72.0	47.6	28.2	98.4	12.7	18.0	961.1
2023	495.6	118.0	101.4	75.1	49.6	29.3	102.1	13.4	18.8	1003.4
2024	514.9	122.6	105.1	77.9	51.5	30.3	105.3	14.1	19.5	1041.2
2025	535.1	127.3	109.0	80.7	53.3	31.3	108.5	14.7	20.3	1080.3

Figure 4-2 shows the twenty year window of PSE's Winter Normal Peak with 0%, 25%, 50%, 75% and 100% conservation. As Figure 4-2 shows, with 100% conservation, the load levels of PSE are relatively flat for the years of study. The difference between 2013 and 2021 is 138 MW.

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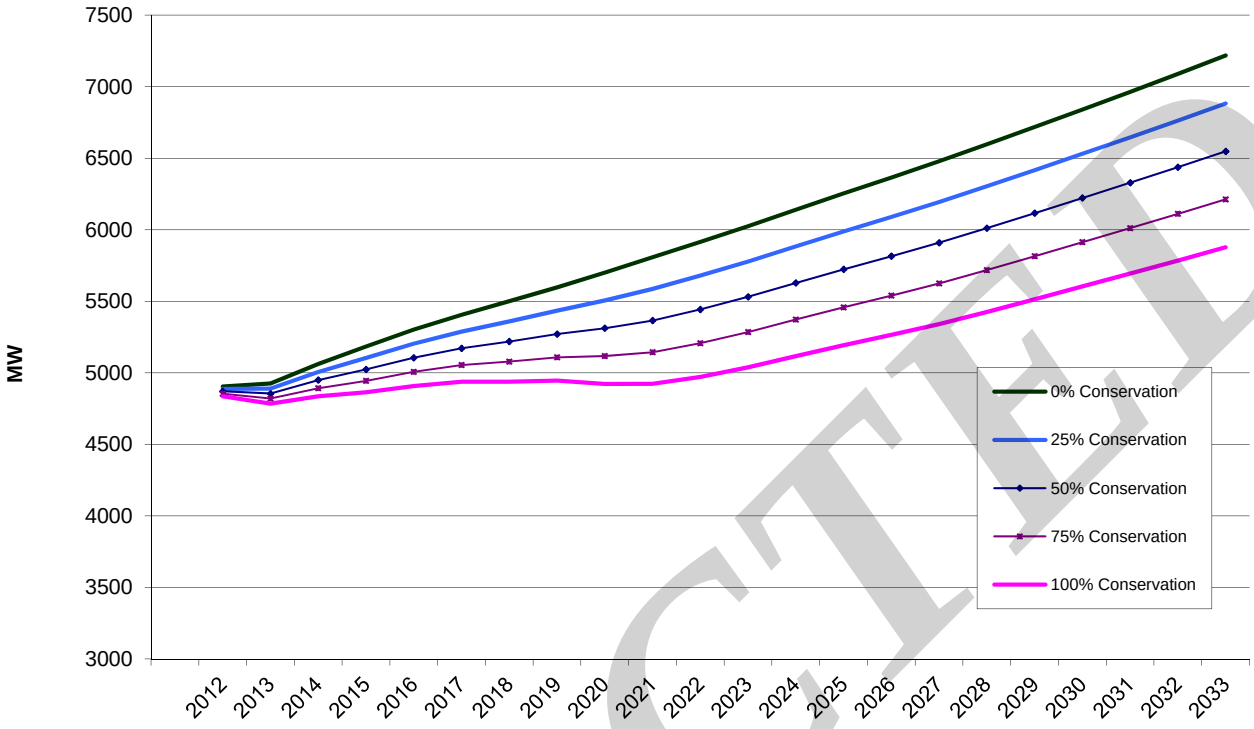

Figure 4-2: Twenty Year Graph of PSE's Forecast Winter Normal Peak with 0%, 25%, 50%, 75% and 100% Conservation

4.1.6 Load Levels Studied

For the power flow studies associated with the 230 kV Eastside Needs Assessment, the heavy winter 2013-14, 2017-18 and 2021-22 cases were used. Substation loading for the PowerWorld cases was developed using the substation loading at the time of the January 18, 2012 system peak as a proxy to the distribution of the load. There were a few substations without Supervisory Control and Data Acquisition (SCADA) load readings. Those substations were assigned values based on manual onsite substation load readings during the same load cycle. Both megawatts (MW) and megavars (MVAR) were determined in this manner.

Small Area Load Forecast: PSE distribution planners keep current on developments planned for their respective planning areas. These anticipated new loads are generally known within a 2-5 year time frame; specific projects are not often known with confidence beyond 5 years in advance. PSE planners reviewed such new loads expected in the King County area within the study period and added those expected loads to the historical load for each substation. These small area load adjustments were included in the substation load spread before the company-wide load was scaled to the corporate load forecast.

Transmission Customer Load: The corporate load forecast together with the interconnected Transmission Customer load, or non PSE load, was used to determine future loads for the power flow studies. The Transmission Customer load typically runs between 250 MW and 300 MW. For purposes of this study, 270 MW was used for a typical value. For example, in the year 2013-2014 the winter peak load forecast for the PSE area is 5055 MW which comprises the projected forecast of 4785 MW plus 270 MW of Transmission Customer loads. Loads were developed similarly for years 2017-18 and 2021-22. For completeness, this non-PSE load was included in the 2013 Eastside Needs Assessment and is shown in Table 4-3.

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Table 4-3: Winter Peak Load levels studied in the Eastside Needs Assessment

Area Load Used for Eastside 230 Study												
Year Studied	Report	Season	Normal Peak 100% Conservation	Normal Peak 75% Conservation	Normal Peak 50% Conservation	Normal Peak 25% Conservation	Normal Peak 0% Conservation	Extreme Peak 100% Conservation	Extreme Peak 75% Conservation	Extreme Peak 50% Conservation	Extreme Peak 25% Conservation	Extreme Peak 0% Conservation
2013-14	2012 E230	Winter	5055	5090	5126	5161	5196	5537	5572	5608	5643	5678
2017-18	2012 E230	Winter	5208	5325	5442	5559	5676	5742	5859	5976	6093	6210
2021-22	2012 E230	Winter	5193	5415	5636	5857	6078	5772	5993	6214	6435	6656

Note: PSE Load Forecast is provided for PSE system load, not including the 270 MW of Transmission Customer industrial load. Transmission Customer load is included in the area load for the TPL and Eastside Needs Assessment studies.

Conservation Sensitivities: The winter forecast was adjusted for sensitivities regarding the amount of expected conservation at peak load. PSE's corporate load forecast assumes 100% of the targeted conservation levels are achieved. To understand the reliability risk due to higher than expected load, PSE ran load sensitivity studies which adjusted conservation levels as a proxy for the higher loads. For the load sensitivity studies, conservation was adjusted to 75%, 50%, and 25% of expected values.

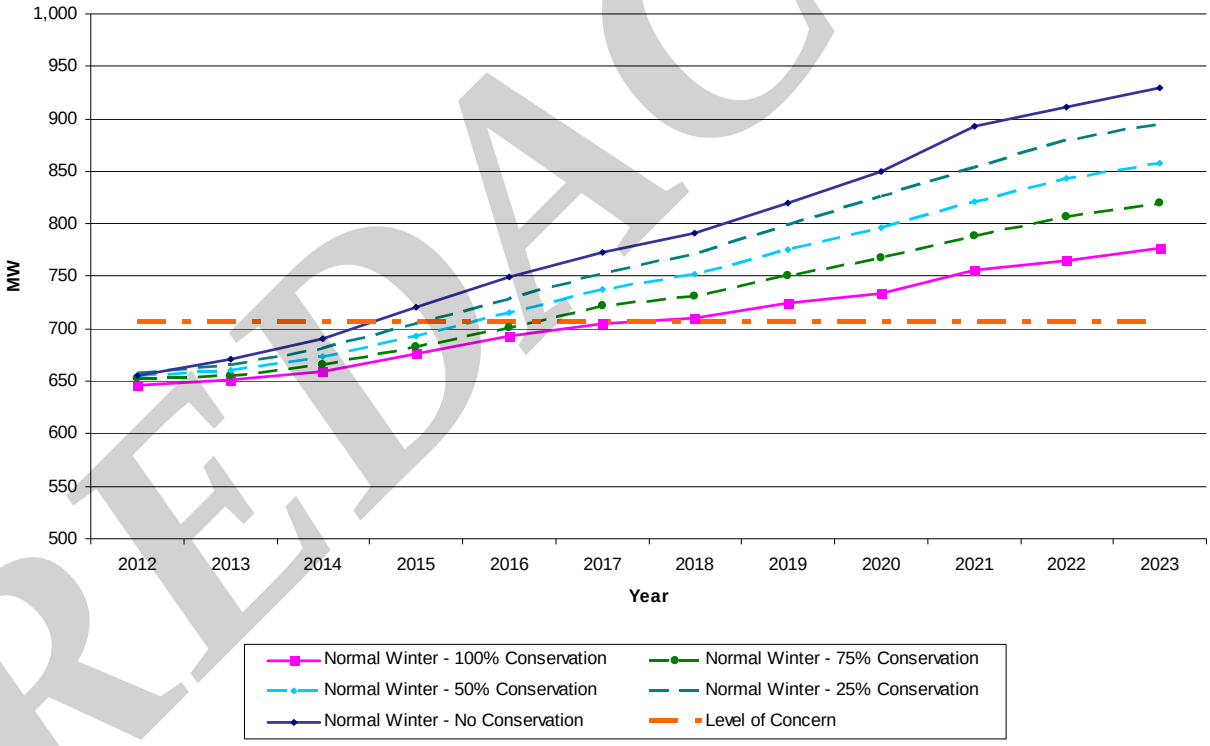

Figure 4-3: Eastside Load Forecast for Normal Winter Load Forecast 2012-2023

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4.1.7 Load Power Factor Assumptions

The power factor at each substation was based on the MW and MVAR loadings at the time of the January 18, 2012 system peak. As the load levels changed based on the load forecast, the power factor at each substation did not change.

4.1.8 Transfer Levels

The NI (Northern Intertie) flows were assumed based on season and historic flows; Winter Peak NI-1500 MW S-N and Summer Peak NI-2850 MW N-S.

4.1.9 Generation Dispatch Scenarios

For the winter peak load cases, no PSE and SCL generation west of the Cascades were run. Tacoma Power generation was left on, due certain internal system constraints. The generators off-line in the Eastside Needs Assessment are listed in Table 4-4.

A low-generation case was simulated as a sensitivity. The Puget Sound area generation run during that case is indicated in Table 4-4.

Table 4-4: List of Puget Sound Area Generators Adjusted in the 2013 Eastside Needs Assessment

Generation Plant	Winter MW Rating	Expected MW Output during Winter Peak for Low-Generation Sensitivity Case	Type	Owner	Transmission Delivery Area
Enserch	184.8	125	Natural Gas, Combined Cycle	PSE	Whatcom County
Sumas	139.8	0	Natural Gas, Combined Cycle	PSE	Whatcom County
Ferndale	282.1	0	Natural Gas, Combined Cycle	PSE	Whatcom County
Whitehorn	162.2	0	Natural Gas, Simple Cycle	PSE	Whatcom County
Fredonia	341	0	Natural Gas, Simple Cycle	PSE	Skagit County
Sawmill	31	22	Biomass	Private Owner	Skagit County
Upper Baker	106	80	Hydro Dam	PSE	Skagit County
Lower Baker	78	54	Hydro Dam	PSE	Skagit County
Komo Kulshan	14	0	Hydro Run-of-River	Private Owner	Skagit County
March Point	151.6	134	Natural Gas, Combined Cycle	Shell	Skagit County
Ross	450	295	Hydro Dam	SCL	Snohomish County
Gorge	190.7	157	Hydro Dam	SCL	Snohomish County
Diablo	166	160	Hydro Dam	SCL	Snohomish County
South Tolt River	16.8	0	Hydro Run-of-River	SCL	Northeast King County
Snoqualmie	37.8	0	Hydro Run-of-River	PSE	East King County
Twin Falls	24.6	0	Hydro Run-of-River	Private Owner	East King County
Cedar Falls	30	0	Hydro Run-of-River	SCL	East King County
Freddy 1	270	0	Natural Gas, Combined Cycle	Atlantic Power/PSE	Pierce County
Electron	20	4	Hydro Run-of-River	PSE	Pierce County
Frederickson	162.2	0	Natural Gas, Simple Cycle	PSE	Pierce County
Expected MW output during Winter peak is based off of actual 2011-2012 Winter peak output except for SCL hydro, which is based off of modeled generation levels in WECC winter peak case.					

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4.1.10 Reactive Resource and Dispatch Assumptions

All existing and planned area reactive resources were assumed available and dispatched if conditions called for their dispatch. The reactive output of units was constrained to defined limits and shunt reactive resources were dispatched as conditions required.

4.1.11 Conservation Assumptions

PSE employs conservation as a strategic measure to manage energy requirements and provide customer benefits. Conservation programs have been funded for over 20 years and are projected to continue to receive strong funding in the next 20 years. PSE's Energy Efficiency Group has demonstrated the efficacy of its funded programs on a continuing basis. As a result, conservation is included in PSE's Integrated Resource Plan (IRP) as a cost-effective source of new energy.

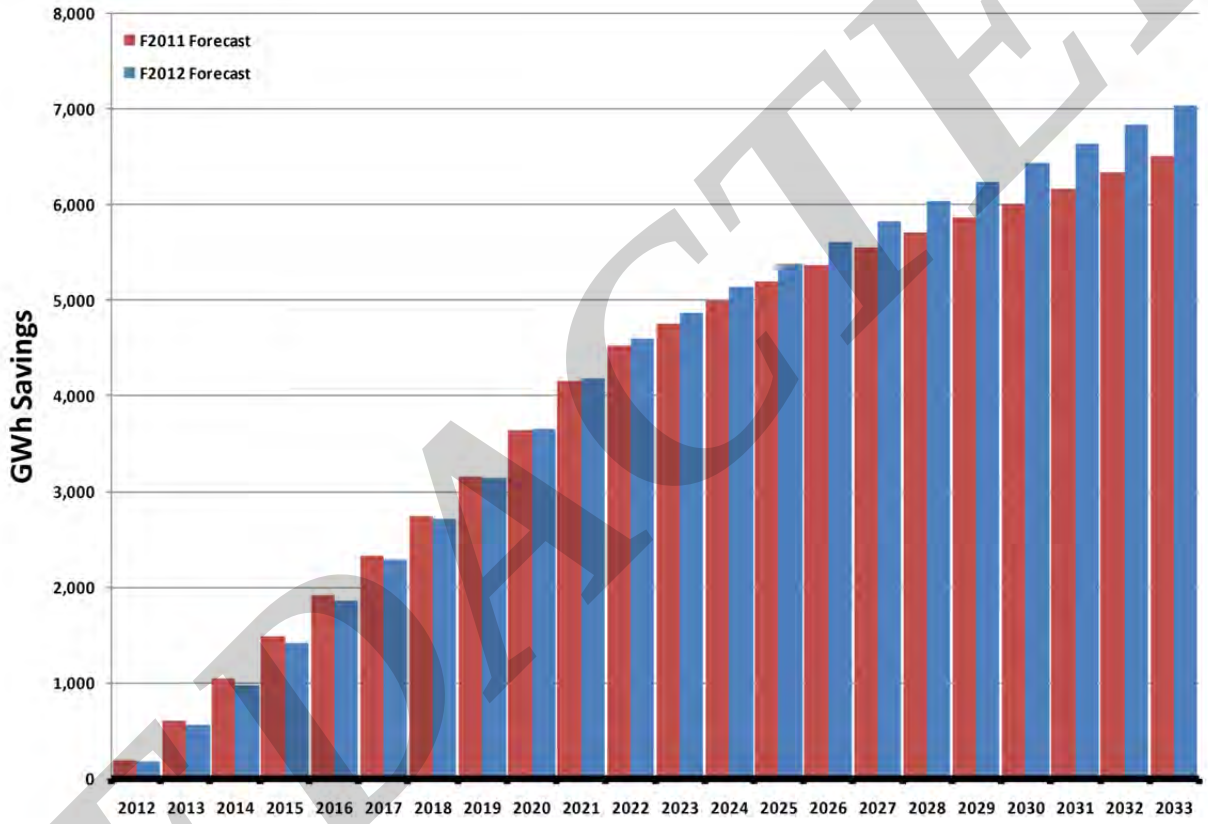

Figure 4-4: PSE Conservation Forecast in 20 year Horizon Measured in Gigawatt-Hours; Comparison of 2012 Forecast to 2011 Forecast

4.1.12 Explanation of Operating Procedures and Other Modeling Assumptions

PSE's Transmission Planning group has prepared a CAP that instructs PSE Transmission Operators to take certain actions in the event of either Talbot Hill 230-115 kV transformers overloading. While the CAP was initiated to address the potential for either transformer to exceed its emergency rating, the CAP can also be used to address the event of either transformer exceeding its operating limit as well.

The CAP instructs the PSE Transmission Operators to open the Talbot Hill – Lakeside #1 & #2 115 kV lines if either Talbot Hill 230-115 kV transformer overloads. The contingency that would cause the transformers to overload would be a double-contingency (N-1-1) loss of a Talbot Hill transformer and the Berrydale transformer during high winter loading.

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With future load growth, the CAP may be expanded to state that if the transformer overload is not sufficiently reduced or the Shuffleton – Lakeside 115 kV line overloads as a result of [redacted], then the Transmission operation should open [redacted]

While none of these planned actions would drop load in a system normal configuration, the opening of [redacted] exposes three substations supplying 16,000 customers [redacted] and three substations supplying 17,000 customers on [redacted] to an outage on the lines, as shown in Figure 4-5. Furthermore, if [redacted] are opened, North and Central King County is at risk of manual load shedding for an N-1-1 loss of [redacted]. See Figure 4-5 below that shows areas in jeopardy of outage when transmission lines are opened under the CAP's to prevent overloads of the Talbot Hill and Sammamish transformers.

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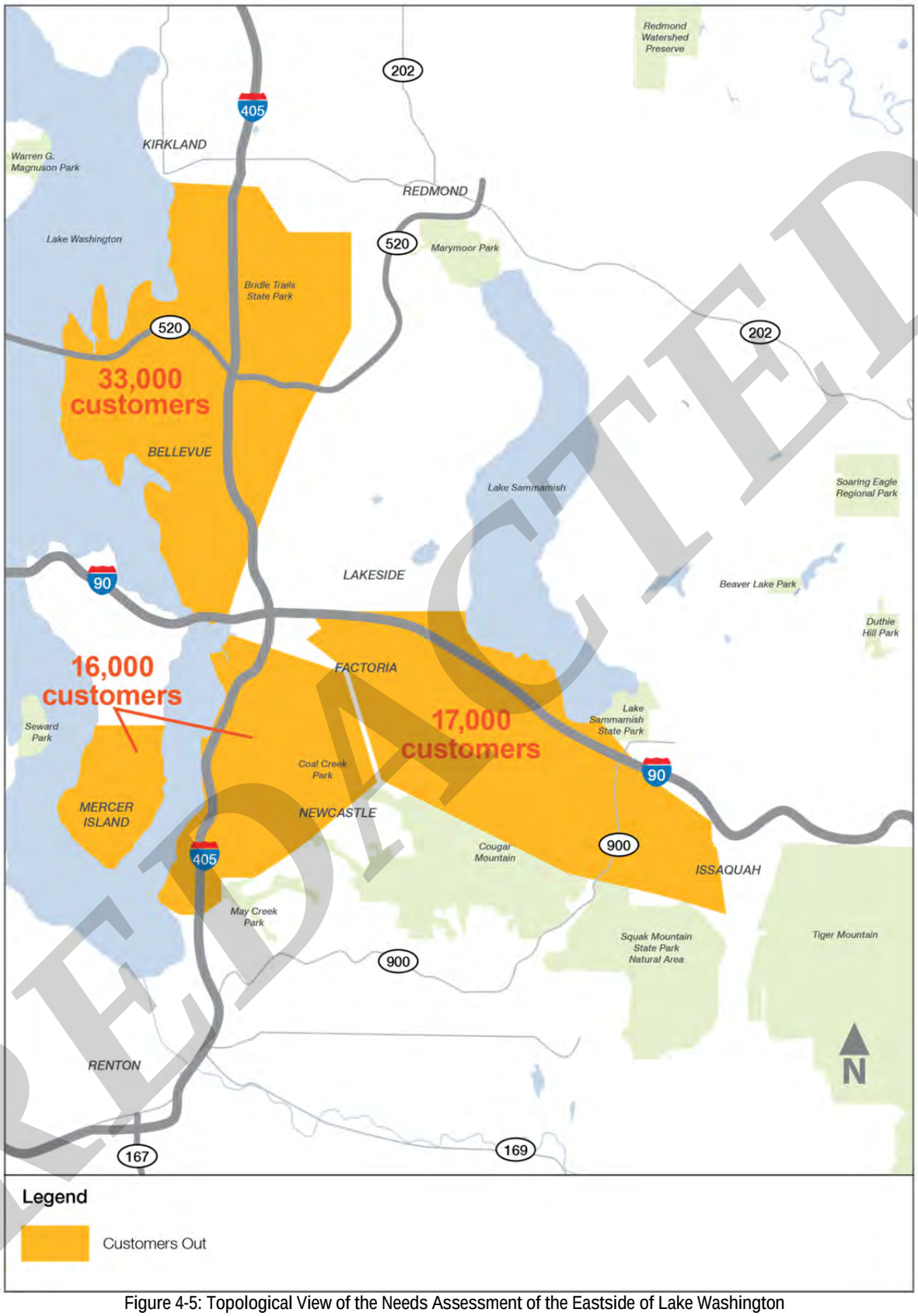

Figure 4-5: Topological View of the Needs Assessment of the Eastside of Lake Washington

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If, with future load growth, the Talbot Hill 230-115 kV transformers are at risk of overloading for an N-1 loss of one transformer during Winter peak conditions, then the CAP described above would be implemented as a pre-emptive, pre-contingent measure to ensure that overloads don't materialize. In this case [redacted] would be opened during winter peak conditions, regardless of the loading on the Talbot Hill transformers.

There is also a CAP intended for use during the summer peak in the event of the loss of [redacted]. The CAP instructs the PSE Transmission Operators to open [redacted].

While none of these planned actions would drop load in a system normal configuration, the opening of the transmission lines exposes seven substations supplying 23,000 customers on [redacted] and [redacted] to a subsequent outage on the lines. The total customer impact of 33,000 is shown in Figure 4-5.

With future load growth, the CAP may be expanded to state that if the associated overloads are not sufficiently reduced, then the Transmission Operator should also open [redacted].

While none of these additional actions would drop load in a system normal configuration, the opening of [redacted] exposes one substation supplying 6,000 customers on [redacted] and seven substations supplying 23,000 customers on [redacted] to a subsequent outage on the lines.

In the King County area, PSE has eight transmission transformers, any one of which, when tripped, could trigger a CAP. The customers at risk of outages due to the CAPs described above are supplied by four of the eight transmission transformers, located at Talbot Hill and Sammamish. When a transformer trips, it takes substantial time to test and replace: 18-24 hours typically for testing, and 3-5 weeks to replace the damaged transformer with a spare transformer. This is a long duration of exposure if CAPs must be employed during the transformer outage.

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4.2 Changes in Study Assumptions

The Bothell - SnoKing 230 kV #1 & #2 lines, owned by SCL, overloaded for various outages in all cases. These overloads were excluded from the results page, as SCL is planning to upgrade these lines whether or not the Eastside 230 kV project is built. Furthermore, the Eastside 230 kV project scope is not expected to significantly alleviate these line overloads.

SCL's Maple Valley - SnoKing 230 kV #1 & #2 lines overloaded for various outages in all cases; these overloads were observed in the base case and were expected to also occur in the more extreme cases. However, these overloads were caused in large part by the loss of [redacted]. BPA has winter operating procedures in place that will protect against these overloads through use of nomograms.

The [redacted] contingencies did not solve for the majority of the cases, due to the high South to North flows on the Northern Intertie. Therefore, the overloads in more extreme cases were not listed, as the contingency did not solve. The potential issues caused by the high South to North flows are managed through the use of nomograms by BPA.

Certain local 115 kV PSE system overloads within King County were excluded from the listed results, as they were clearly a local system problem that did not contribute to the need for the Eastside 230 kV project. The following systems or lines were excluded: Moorlands three line system, Asbury three line system, Krain Corner 115-55 kV system, and Novelty Hill - Stillwater - Cottage Brook 115 kV lines. These are known system issues with planned projects that are independent in nature from the Eastside 230 kV project.

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Section 5 Performance Requirements

5.1 Planning Standards and Criteria

This study examined thermal overloads for Category A (N-0), Category B (N-1) and Category C (N-2 and N-1-1) outages as required by NERC, WECC and PSE Transmission Planning Guidelines. PSE plans for winter and summer peak, such that no thermal or voltage violations result. While the peaks occur for just a few hours per year, there are many more hours each year where operating flexibility is impacted by system capacity. PSE plans for normal summer and winter temperatures, which are 23ºF in winter and 86ºF in summer. PSE also studies extreme winter peak temperature (13ºF) as an indicator of future deficiencies.

NERC TPL-001- System Performance Under Normal (No Contingency) Conditions (Category A): PSE shall demonstrate through a valid assessment that its portion of the interconnected transmission system is planned such that, with all transmission facilities in service and with normal (pre-contingency) operating procedures in effect, the Network can be operated to supply projected customer demands and projected Firm (non- recallable reserved) Transmission Services at all Demand levels over the range of forecast system demands, under the conditions defined in Category A of Table 1[16].

NERC TPL-002 – System Performance Following Loss of a Single Bulk Electric System Element (Category B): PSE shall demonstrate through a valid assessment that its portion of the interconnected transmission system is planned such that the Network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand levels over the range of forecast system demands, under the contingency conditions as defined in Category B of Table 1[17].

Category B outages can occur at any time when a single element trips off line. The NERC TPL Standards Table 1 Category B states that there should be no loss of load or curtailed firm transfers with the exception outlined in footnote b of Table 1[18]. Utilities may only shed directly-connected ("consequential") load to stay compliant. Non-consequential load loss is not allowed for Category B events for BES level less than 300 kV. The system shall remain stable. Cascading or uncontrolled islanding shall not occur. Therefore any overloads showing up for a Category B event are very serious.

NERC TPL-003 – System Performance Following Loss of Two or More Bulk Electric System Elements (Category C): PSE shall each demonstrate through a valid assessment that its portion of the interconnected transmission systems is planned such that the network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand

[16] Table 1 TPL-001 - System Performance Under Normal (No Contingency) Conditions (Category A)

[17] Table 1 TPL-002 - System Performance Following Loss of a Single Bulk Electric System Element (Category B)

[18] Footnote b Table 1 - An objective of the planning process is to minimize the likelihood and magnitude of interruption of firm transfers or Firm Demand following Contingency events. Curtailment of firm transfers is allowed when achieved through the appropriate-dispatch of resources obligated to re-dispatch, where it can be demonstrated that Facilities, internal and external to the Transmission Planner's planning region, remain within applicable Facility Ratings and the re-dispatch does not result in the shedding of any Firm Demand. For purposes of this footnote, the following are not counted as Firm Demand: (1) Demand directly served by the Elements removed from service as a result of the Contingency, and (2) Interruptible Demand or Demand-Side Management Load. In limited circumstances, Firm Demand may be interrupted throughout the planning horizon to ensure that BES performance requirements are met. However, when interruption of Firm Demand is utilized within the Near-Term Transmission Planning Horizon to address BES performance requirements, such interruption is limited to circumstances where the use of Firm Demand interruption meets the conditions shown in Attachment 1. In no case can the planned Firm Demand interruption under footnote 'b' exceed 75 MW for US registered entities. The amount of planned Non-Consequential Load Loss for a non-US Registered Entity should be implemented in a manner that is consistent with, or under the direction of, the applicable governmental authority or its agency in the non-US jurisdiction.

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Levels over the range of forecast system demands, under the contingency conditions as defined in Category C of Table 1[19] .

Category C outages have subcategories of N-2 and N-1-1. An N-2 outage is when a single event trips multiple facilities, such as a transmission bus fault tripping all breakers on the bus or a double-circuit transmission line outage. Breaker failure is also included as a Category C outage. For these outages, there is no time allowed for operator response, but the utility is allowed to have automatic processes to shed non-consequential load to stay compliant.

An N-1-1 Category C outage is a Category B outage followed by a period of time to manually adjust the system to a secure state, followed by a second Category B outage. PSE utilizes 30 minutes to make manual system adjustments after the first outage occurs, to prevent overloads upon the second outage event.

TPL-001-WECC-CRT-2: System Performance Criterion Under Normal Conditions, Following Loss of a Single BES Element, and Following Extreme BES Events. System simulations and associated assessments are needed periodically to ensure that reliable systems are developed that meet specified performance requirements with sufficient lead time, and that systems continue to be modified or upgraded as necessary to meet present and future system needs.

PSE Transmission Planning Guidelines, November 2012: The Transmission Planning Guidelines explain the criteria and standards used to assess the ability of Puget Sound Energy's existing and future electric transmission system, and how they are applied to provide safe and reliable service at reasonable cost. The guidelines address both specific and general issues the transmission planner needs to consider. There may be issues specific to site, project, region, or customer that will require plans to be developed on a case-by case basis. However, the Transmission Planning Guidelines are structured in a way that will help achieve consistency across the PSE transmission system.

5.2 Performance Criteria

5.2.1 Steady State Thermal and Voltage Limits

PSE has two thermal operating limits; normal and emergency. The normal operating limit is a specific level of electrical loading that a system, facility, or element can support or withstand through the daily demand cycles without loss of equipment life. The emergency limit is a specific level of electrical loading that a system, facility, or element can support or withstand for a finite period. The emergency rating assumes acceptable loss of equipment life or other physical or safety limitations for the equipment involved. If there is a violation of the emergency limit, a transmission line may not meet applicable clearance, tension and sag criteria. PSE's operating practice is to shift or shed load or dispatch generation to avoid reaching an emergency limit.

System steady state voltages and post contingency voltage deviation shall be within acceptable limits. For PSE system the acceptable limits are: the steady state voltage levels are not above 105% or below 90% for any bus, the voltage deviation for Category B events does not exceed 5%, and the voltage deviation for multiple contingency Category C events does not exceed 10%.[20]

[19] Table 1 TPL-003 - System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)

[20] PSE Transmission Planning Guidelines, November 2012, page 7

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5.2.2 Steady State Solution Parameters

Devices with automatic settings were allowed to adjust automatically for base case runs, reflecting manual operation by Transmission Operators where appropriate: LTC's, phase-shifters, and shunt reactive devices. During contingency runs, LTC and phase-shifter operations were disabled. Shunt reactive devices with known fast-acting schemes were allowed to switch. Inter-area AGC was enabled for the analysis since generation or load loss simulations for the Eastside Needs Assessment were all modeled within the Northwest area and AGC response would be expected for those conditions.

Table 5-1: Study Solution Parameters

Case	Area Interchange	Transformer LTCs	Phase Angle Regulators	SVDs & Switched Shunts
Base	Tie Lines Regulating	Stepping	Regulating or Statically Set	Regulating
Contingency	Tie Lines Regulating	Disabled	Disabled	Regulating

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5.3 System Testing

5.3.1 System Design Conditions and Sensitivities Tested

Four base scenarios were developed for the additional winter studies run for the 2013 Eastside Needs Assessment. The study plan is shown in Figure 5-1.

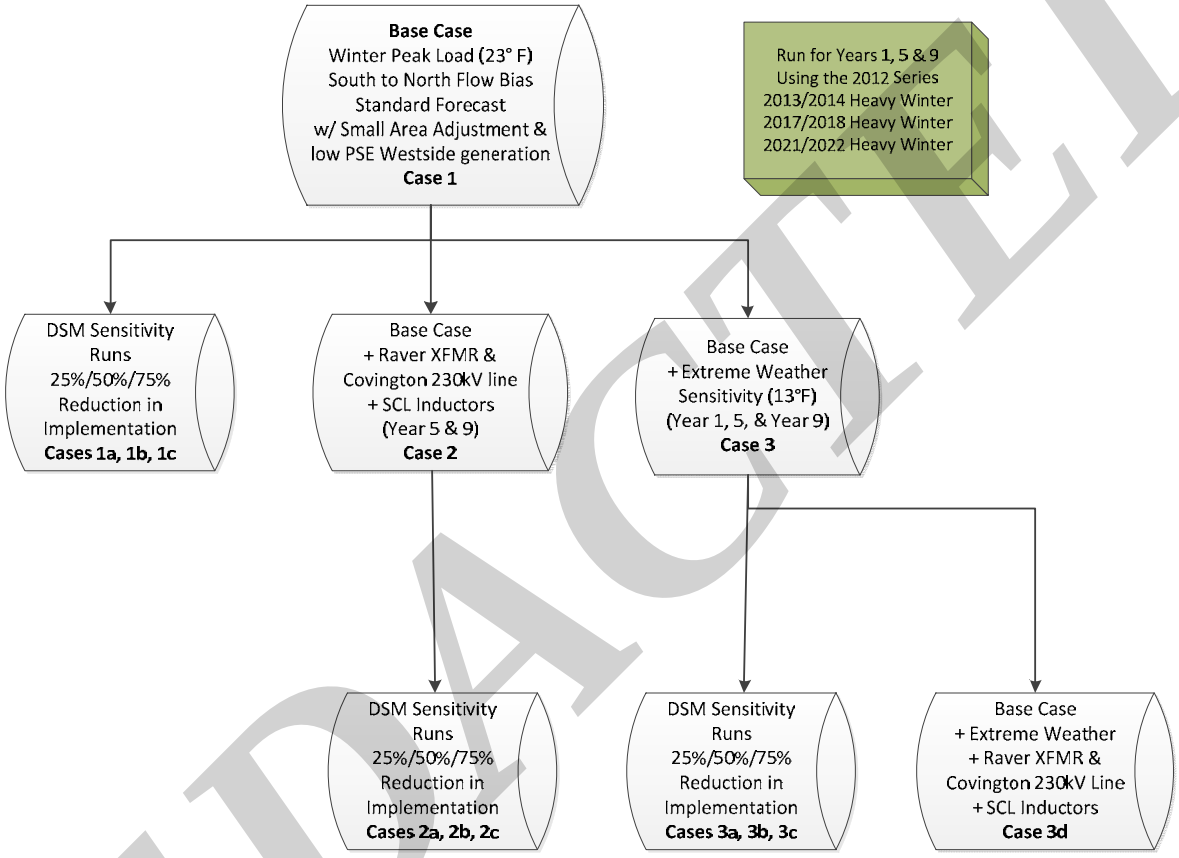

Figure 5-1: Eastside Project Need Validation Study Plan

Case 1 represents base years 2013-14, 2017-18, and 2021-22 winter peaks, normal weather adjusted by substation to reflect the lumpiness of the load. Case 1 includes a south to north bias of 1500 MW with low PSE generation in the Puget Sound area.

Case 2 represents 2017-18 and 2021-22 with additions of a 500 kV/230 kV transformer at Raver, a Raver to Covington 230 kV line, and 115 kV series inductors to the Broad Street - Massachusetts and Broad Street - East Pine 115 kV underground cables in Seattle City Light.

Case 3 represents extreme weather for Case 1.

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Case 3d represents extreme weather for Case 2.

The winter cases were run with no generation in the Puget Sound area, a case which PSE normally runs for the annual TPL assessment. However, since it is an extreme case, a low-generation case was run for the 2013 Eastside Needs Assessment as a sensitivity to determine whether some of the violations seen during the power flows could be offset by running generation. The generation levels for the low-generation sensitivity case are shown in Table 4-4, in the column labeled "Expected MW Output during Winter Peak for Low-Generation Sensitivity Case."

Sensitivities on the amount of conservation realized were performed for each of the cases above, to indicate the possible additional violations that could occur should conservation be achieved at a level below the projection or if economic growth should be higher than forecast. This was done because the 10 year load forecast with full projected conservation had such a flat growth profile. The load levels were adjusted to reflect 75%, 50%, and 25% conservation as a proxy for higher loads. The case assumptions are summarized in Table 5-2.

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Table 5-2: Winter and Summer Case Study Assumptions

Winter and Summer Case Study Assumptions						
Case Name	Amount of Conservation	System Load	Eastside Load	Northern Intertie	PSE/SCL Westside Gen	Other Adjustments Modeled
1 100% Conservation 2013-14 Winter	100%	5055 MW	652 MW	1500 MW Export	0 MW	Saint Clair 230-115 kV transformer; Talbot Hill - Berrydale #1 line uprate; Starwood autotransformer removal with Tacoma Power voltage increase
1 75% Conservation 2013-14 Winter	75%	5090 MW	656 MW	1500 MW Export	0 MW	Saint Clair 230-115 kV transformer; Talbot Hill - Berrydale #1 line uprate; Starwood autotransformer removal with Tacoma Power voltage increase
2 100% Conservation 2017-18 Winter	100%	5208 MW	706 MW	1500 MW Export	0 MW	Block load allocated per King Co Dist. Planers; Planned improvements include 2013 adjustments + Alderton 230-115 kV transformer; Beverly Park 230-115 kV transformer; Raver 500-230 kV transformer; SCL series inductors
2 75% Conservation 2017-18 Winter	75%	5325 MW	722 MW	1500 MW Export	0 MW	Block load allocated per King Co Dist. Planers; Planned improvements include 2013 adjustments + Alderton 230-115 kV transformer; Beverly Park 230-115 kV transformer; Raver 500-230 kV transformer; SCL series inductors
2 100% Conservation 2021-22 Winter	100%	5126 MW	756 MW	1500 MW Export	0 MW	Block load allocated per King Co Dist. Planers; Planned improvements include 2017-18 adjustments
2 75% Conservation 2021-22 Winter	75%	5415 MW	789 MW	1500 MW Export	0 MW	Block load allocated per King Co Dist. Planers; Planned improvements include 2017-18 adjustments
3 100% Conservation 2013-14 Extreme Winter	100%	5537 MW	718 MW	1500 MW Export	0 MW	Saint Clair 230-115 kV transformer; Talbot Hill - Berrydale #1 line uprate; Starwood autotransformer removal with Tacoma Power voltage increase
3d 100% Conservation 2017-18 Extreme Winter	100%	5742 MW	782 MW	1500 MW Export	0 MW	Block load allocated per King Co Dist. Planers; Planned improvements include 2013 adjustments + Alderton 230-115 kV transformer; Beverly Park 230-115 kV transformer; Raver 500-230 kV transformer; SCL series inductors
3d 100% Conservation 2021-22 Extreme Winter	100%	5772 MW	845 MW	1500 MW Export	0 MW	Block load allocated per King Co Dist. Planers; Planned improvements include 2013 adjustments + Alderton 230-115 kV transformer; Beverly Park 230-115 kV transformer; Raver 500-230 kV transformer; SCL series inductors
2014 Heavy Summer	100%	3343 MW	516 MW	2850 Import	2171 MW	Saint Clair 230-115 kV transformer; Talbot Hill - Berrydale #1 line uprate; Starwood autotransformer removal with Tacoma Power voltage increase
2018 Heavy Summer	100%	3554 MW	552 MW	2850 Import	2276 MW	Planned improvements include 2013 adjustments + Alderton 230-115 kV transformer; Beverly Park 230-115 kV transformer; White River - Electron Heights 115 kV line re-route into Alderton; White River 2nd bus section breaker; Lake Hills - Phantom Lake 115 kV line; Sammamish-Juanita 115 kV line

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5.3.2 Steady State Contingencies / Faults Tested

The above cases were tested based on Category A, B, and C contingencies described in the NERC TPL, and WECC standards and PSE's Transmission Planning Guidelines. Descriptions of the type of contingencies tested are listed in Table 5-3.

Table 5-3: Summary of NERC, WECC and/or PSE Category Contingencies Tested

NERC WECC PSE Categories	Description of Outaged Element(s)	Contingencies Modeled
A	All lines in-service	N/A
B A-2; 6.1 a. PP4; 3.1 a.	Loss of a generator, transmission circuit, transformer or single pole DC line	Category B contingencies included all PSE and interconnected transmission lines and transmission transformers,
C A-2; 6.1 a. PP4; 3.1 a.	Normally loss of a bus or circuit breaker; or loss of any category B element followed by another category B element with system adjustments between events; or loss of any two circuits of a multi circuit tower line or loss of a bipolar DC line; or a stuck breaker with delayed clearing of a generator, transmission circuit, transformer or bus section.	Category C: N-2 contingencies included all common-structure double circuit lines, all transmission buses and bus sections with 3 or more transmission elements, and all stuck transmission breakers. Category C: N-1-1 included a pairwise combination of all Category B elements followed by all other Category B elements.
D A-2; 6.1 a. PP4; 3.1 a.	Loss of a generator, transmission circuit, transformer or bus section; or other transmission planning entity selected critical outage or loss of a category B element followed by loss of any two circuits of a multi circuit tower or a stuck breaker	Category D was not performed in this study

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Section 6 Results of Analysis

6.1 Overview of Results

The following sections describe the results of the analysis. The thermal loading percentages described below are based on a percentage of the emergency rating for each facility.

6.1.1 N-0 Thermal and Voltage Violation Summary

For all cases, there are no thermal or voltage violations for the all lines in (N-0) state.

2013-14 – Case 1-Winter Peak, Normal Weather: For all elements in service (N-0) state, there were no thermal or voltage violations for 2013-14 winter peak, normal weather with all levels of conservation modeled (i.e. 100%, 75%, 50%, or 25%)

2013-14 – Case 3-Winter Peak, Extreme Weather: For all elements in service (N-0), there were no thermal or voltage violations for 2013-14 winter peak, extreme weather, with all levels of conservation modeled (i.e. 100%, 75%, 50%, or 25%) conservation.

2017-18 – Case 2-Winter Peak, Normal Weather: For all elements in service (N-0), there were no thermal or voltage violations for 2017-18 winter peak, normal weather, with all levels of conservation modeled (i.e. 100%, 75%, 50%, or 25%) conservation.

2017-18 – Case 3-Winter Peak, Extreme Weather: For all elements in service (N-0), there were no thermal or voltage violations for 2017-18 winter peak, extreme weather, with all levels of conservation modeled (i.e. 100%, 75%, 50%, or 25%) conservation.

2021-22 – Case 2-Winter Peak, Normal Weather: For all elements in service (N-0), there were no thermal or voltage violations for 2021-22 winter peak, normal weather, with all levels of conservation modeled (i.e. 100%, 75%, 50%, or 25%) conservation.

2021-22 – Case 3-Winter Peak, Extreme Weather: For all elements in service (N-0), there were no thermal or voltage violations for 2021-22 winter peak, extreme weather, with all levels of conservation modeled (i.e. 100%, 75%, 50%, or 25%) conservation.

6.1.2 2013-14 Thermal Summaries: Winter Peak, Normal and Extreme Weather & Summer Peak Normal Weather

Table 6-1 shows the summary of results for categories B (N-1) and C (N-1-1 & N-2) for 2013-14 winter and 2014 summer peaks with normal weather. Table 6-1 shows that for the winter peak, normal weather, 100% conservation, (PSE Load 5,055 MW), there are no Category B thermal violations but there are five (5) potential thermal violations in the King County area for Category C contingencies. Those five potential violations are as follows and highlighted in yellow in

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Table 6-2.

1. Talbot Hill - Lakeside #1 115 kV Line
2. Talbot Hill - Lakeside #2 115 kV Line
3. Talbot Hill 230-115 kV transformer #1
4. Talbot Hill 230-115 kV transformer #2
5. Talbot Hill - Boeing Renton - Shuffleton 115 kV Line

Those Category C contingencies can be mitigated by operational procedures and re-dispatching. Also, Table 6-1 lists six (6) additional facilities within the King County area, which are operating from 90% to 100% of the emergency operating limits and are above the operating limits. Those facilities are highlighted in gray on

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Table 6-2.

1. White River 230-115 kV transformer #2 – 97.4%
2. White River 230-115 kV transformer #1 – 96.9%
3. Talbot Hill - Berrydale #1 115 kV line – 96.0%
4. Berrydale 230-115 kV transformer – 92.4%
5. O'Brien 230-115 kV transformer #2 – 94%
6. O'Brien 230-115 kV transformer #1 – 93.2%

Table 6-2 also shows potential thermal overloads of elements outside of PSE's service area. Two lines of notice include Maple Valley - SnoKing #1 & #2 230 kV lines, which pass through the Eastside of King County.

For the 2014 summer peak normal weather, (PSE load of 3343 MW), high generation in the north and high imports from British Columbia (Table 6-1), there is one (1) potential Category B (N-1) thermal violation (Monroe - Novelty Hill 230 kV line) and for the same case with no generation in the north there is one (1) potential Category B thermal violation (Maple Valley - Sammamish 230 kV line). Those potential over loads are the result of losing [redacted]. Those facilities are owned by BPA. There is also one (1) potential Category C (N-1-1) potential thermal violation (Sammamish 230-115 kV transformer #2).

Table 6-3 show the potential impact of extreme winter weather with 100% and 50% conservation in 2013-14, (PSE load of 5,537 MW and 5,608 MW respectively). There are no potential Category B thermal violations, but there are three (3) elements which are operating at 90% or greater of the emergency limits and are above the operating limits; Talbot Hill 230-115 kV transformer #1, Talbot Hill 230-115 kV transformer #2, and White River 230-115 kV transformer #2.

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Table 6-1: Summary of Elements above Emergency and Operating Limits: 2013-14 Winter Peak, Normal Weather & Summer Peak Normal Weather

Year of Study	Normal or Extreme Weather	Case Conditions	Amount of Conservation/ System Load	Type of Contingency	Elements above Emergency Limit	Elements > 90% of Emergency Limit or above Operating Limit
2013-14 Winter	Normal	South-North NI Flow No Western Generation	100% 5055 MW	N-1		
2013-14 Winter	Normal	South-North NI Flow No Western Generation	100% 5055 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Talbot Hill-Boeing Renton-Shuffleton 115 kV Line	White River 230-115 kV transformer #2 White River 230-115 kV transformer #1 Talbot Hill-Berrydale #1 115 kV line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #2 O'Brien 230-115 kV transformer #1
2013-14 Winter	Normal	South-North NI Flow, No Western Generation	100% 5055 MW	N-2 or Common Mode		Talbot Hill-Lakeside #2 115 kV Line Berrydale 230-115 kV transformer
2013-14 Winter	Normal	South-North NI Flow, No Western Generation	75% 5090 MW	N-1		
2013-14 Winter	Normal	South-North NI Flow No Western Generation	75% 5090 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2	White River 230-115 kV transformer #2 White River 230-115 kV transformer #1 Talbot Hill-Berrydale #1 115 kV line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #2 O'Brien 230-115 kV transformer #1
2013-14 Winter	Normal	South-North NI Flow, No Western Generation	75% 5090 MW	N-2 or Common Mode		Talbot Hill-Lakeside #2 115 kV Line Berrydale 230-115 kV transformer
2013-14 Winter	Normal	South-North NI Flow, No Western Generation	50% 5126 MW	N-1		
2013-14 Winter	Normal	South-North NI Flow, No Western Generation	50% 5126 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2	White River 230-115 kV transformer #1 White River 230-115 kV transformer #2 Talbot Hill-Berrydale #1 115 kV line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #2 O'Brien 230-115 kV transformer #1
2013-14 Winter	Normal	South-North NI Flow, No Western Generation	50% 5126 MW	N-2 or Common Mode		Talbot Hill 230-115 kV transformer #2 Talbot Hill-Lakeside #2 115 kV Line Berrydale 230-115 kV transformer
2014 Heavy Summer	Normal	Hi Gen, Hi Import from BC	100% 3343 MW	N-1	Monroe-Novelty Hill 230 kV line	
2014 Heavy Summer	Normal	No Gen, Hi Export to BC	100% 3343 MW	N-1	Maple Valley - Sammamish 230 kV line	
2014 Heavy Summer	Normal	No Gen, Hi Export to BC	100% 3343 MW	N-1-1	Sammamish 230-115 kV transformer #2	Sammamish 230-115 kV transformer #1

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Table 6-2: Elements above Emergency and Operating Limits: 2013-14 Winter Peak, 100% Conservation, Normal Weather, Thermal Loadings (Redacted)

Case	Category	Worst Contingency	Owner of Facilities Out	Element(s)	Owner of Overloaded Facilities	Percent Overload
2013-14 Winter	B	[redacted]	BPA	Maple Valley - SnoKing #1 230 kV line	SCL	110.0%
2013-14 Winter	B	[redacted]	BPA	Maple Valley - SnoKing #2 230 kV line	SCL	107.8%
2013-14 Winter	C	[redacted]	BPA	Maple Valley - SnoKing #1 230 kV line	SCL	124.0%
2013-14 Winter	C	[redacted]	BPA	Maple Valley - SnoKing #2 230 kV line	SCL	123.8%
2013-14 Winter	C	[redacted]	BPA	Talbot Hill - Lakeside #1 115 kV line	PSE	97.1%
2013-14 Winter	C	[redacted]	BPA	Talbot Hill - Lakeside #2 115 kV line	PSE	96.9%
2013-14 Winter	C	[redacted]	PSE	Berrydale 230-115 kV transformer	PSE	96.6%
2013-14 Winter	C	[redacted]	BPA & SCL	Maple Valley - SnoKing #1 230 kV line	SCL	146.7%
2013-14 Winter	C	[redacted]	BPA & SCL	Maple Valley - SnoKing #2 230 kV line	SCL	145.0%
2013-14 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #1	PSE	100.9%
2013-14 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Lakeside #1 115 kV line	PSE	115.2%
2013-14 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Lakeside #2 115 kV line	PSE	115.1%
2013-14 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Boeing Renton - Shuffleton 115 kV line	PSE	101.1%

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Table 6-2: Elements above Emergency and Operating Limits: 2013-14 Winter Peak, 100% Conservation, Normal Weather, Thermal Loadings (Redacted) (CONTINUED)

2013-14 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	100.5%
2013-14 Winter	C	[redacted]	PSE	White River 230-115 kV transformer #2	PSE	97.4%
2013-14 Winter	C	[redacted]	PSE	White River 230-115 kV transformer #1	PSE	96.9%
2013-14 Winter	C	[redacted]	PSE	Talbot Hill - Berrydale #1 115 kV line	PSE	96.0%
2013-14 Winter	C	[redacted]	PSE	Berrydale 230-115 kV transformer	PSE	92.4%
2013-14 Winter	C	[redacted]	PSE	O'Brien 230-115 kV transformer #2	PSE	94.0%
2013-14 Winter	C	[redacted]	PSE	O'Brien 230-115 kV transformer #1	PSE	93.2%

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Table 6-3: Summary of Elements above Emergency and Operating Limits: 2013-14 Winter Peak, Extreme Weather

Year of Study	Normal or Extreme Weather	Case Conditions	Amount of Conservation/ System Load	Type of Contingency	Elements above Emergency Limit	Elements > 90% of Emergency Limit or above Operating Limit
2013-14 Winter	Extreme	South-North NI Flow No Western Generation	100% 5537 MW	N-1		Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River 230-115 kV transformer #2
2013-14 Winter	Extreme	South-North NI Flow No Western Generation	50% 5608 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River - Lea Hill - Berrydale 115 kV line Talbot Hill-Berrydale #1 115 kV line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #1 O'Brien 230-115 kV transformer #2 White River 230-115 kV transformer #1 White River 230-115 kV transformer #2	Shuffleton-Lakeside 115 kV line O'Brien 115 kV North bus section breaker O'Brien - Asbury 115 kV line Shuffleton - President Park - Lake Tradition 115 kV line
2013-14 Winter	Extreme	South-North NI Flow No Western Generation	50% 5608 MW	N-2 or Common Mode	Talbot Hill-Lakeside #2 115 kV Line Berrydale 230-115 kV transformer	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2

6.1.3 2017-18 Thermal Summaries: Winter Peak, Normal and Extreme Weather & Summer Peak Normal Weather

Table 6-4 shows the summary of results for categories B (N-1) and C (N-1-1 & N-2) for 2017-18 winter and summer peaks with normal weather.

Table 6-4 shows that for the winter peak, normal weather, 100% conservation, (PSE load of 5,208 MW), there are no potential Category B thermal violations but there are three (3) facilities which are loaded from 90% to 100% of the emergency ratings. These facilities are highlighted in gray in Table 6-5.

1. Talbot Hill - Lakeside #1 115 kV line – 98.6%
2. Talbot Hill - Lakeside #2 115 kV line – 98.4%
3. Talbot Hill 230-115 kV transformer #2 – 90.3%

If 50% of conservation is achieved, (PSE load of 5,442 MW), the number of potential Category B thermal overloads increase to two (2) facilities.

1. Talbot Hill - Lakeside #1 115 kV Line
2. Talbot Hill - Lakeside #2 115 kV Line

There are six (6) potential thermal violations (same as 2013-14) of PSE lines or transformers in the King County area for Category C contingencies. These facilities are highlighted in yellow on Table 6-5, which shows that the potential thermal overloads vary up to a high of 128%. Overloads caused by BPA facility outages which are controlled by BPA generation dispatch are not highlighted.

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1. Talbot Hill - Lakeside #1 115 kV Line
2. Talbot Hill - Lakeside #2 115 kV Line
3. Talbot Hill 230-115 kV transformer #1
4. Talbot Hill 230-115 kV transformer #2
5. Talbot Hill - Boeing Renton - Shuffleton 115 kV Line
6. Maple Valley - Sammamish 230 kV Line

If 75% of conservation is achieved, (PSE load of 5,325 MW), the number of potential Category C thermal overloads increase to seven (7) facilities and some occur for more than one Category C contingency.

1. Talbot Hill - Lakeside #1 115 kV Line
2. Talbot Hill - Lakeside #2 115 kV Line
3. Talbot Hill - Boeing Renton - Shuffleton 115 kV Line
4. Talbot Hill 230-115 kV transformer #1
5. Talbot Hill 230-115 kV transformer #2
6. White River - Lea Hill - Berrydale 115 kV line
7. Maple Valley - Sammamish 230 kV line

If 50% of conservation is achieved, (PSE load of 5,442 MW), the number of potential Category C thermal overloads increase to ten (10) facilities and some occur for more than one Category C contingency.

1. Talbot Hill- Lakeside #1 115 kV Line
2. Talbot Hill- Lakeside #2 115 kV Line
3. Talbot Hill - Boeing Renton-Shuffleton 115 kV Line
4. Talbot Hill 230-115 kV transformer #1
5. Talbot Hill 230-115 kV transformer #2
6. Maple Valley - Sammamish 230 kV line
7. White River - Lea Hill - Berrydale 115 kV line
8. Talbot Hill - Berrydale #1 115 kV line
9. Shuffleton - O'Brien 115 kV line
10. Shuffleton - Lakeside 115 kV line

For the 2018 summer peak, normal weather, (PSE load of 3,554 MW), high generation in the north and high imports from British Columbia (Table 6-12), there are two (2) potential Category B (N-1) thermal violations (Monroe - Novelty Hill 230 kV line and Maple Valley - Sammamish 230 kV line) and there are three (3) potential Category C (N-1-1 & N-2) thermal violations (Beverly Park - Cottage Brook 115 kV line, Sammamish 230-115 kV transformer #1, and Sammamish 230-115 kV transformer #2). The sections of the Monroe - Novelty Hill 230 kV line and Maple Valley - Sammamish 230 kV line that may overload are owned by BPA.

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Table 6-6 shows the results of the generation sensitivity case for 2017-18, in which 1,031 MW of Puget Sound area generation was turned on. For the winter peak, normal weather, 100% conservation, (PSE load of 5,208 MW), and Puget Sound generation of 1,031 MW, there are no potential Category B thermal violations. There are four (4) potential Category C (N-1-1) violations remaining above the emergency limits (Talbot Hill - Lakeside #1 & #2 115 kV lines, and Talbot Hill 230-115 kV transformers #1 and #2). Running this level of generation also resulted in a new transformer operating above 90% for an N-1-1 contingency; the Sammamish transformer #2 will be above 90% if there are outages of both Sammamish transformer #1 and the Novelty Hill transformer. In general, turning on 1,000 MW of generation in the northern part of the Puget Sound area can have a significant impact in reducing transmission line overloads, but minor impact for transformer overloads.

Table 6-7 shows that for the 2017-18 winter peak, extreme weather, (PSE load of 5,742 MW), no generation in the north and high exports to British Columbia, there are two (2) potential Category B (N-1) thermal violations (Talbot Hill - Lakeside #1 & #2 115 kV lines (99.2% & 98.6%)); and there are twelve (12) potential Category C (N-1-1 & N-2) thermal violations.

The operational solution to temporarily remedy the potential overloads on Talbot Hill #1 transformer for the Category C loss of the North Talbot Hill 230 kV bus during extreme winter weather is to open breakers preemptively [redacted]. When that occurs there is added risk of losing load with the next N-1 contingency.

REDACTED

Table 6-4: Summary of Elements above Emergency and Operating Limits: 2017-18 Winter Peak, Normal Weather & Summer Peak Normal Weather

Year of Study	Normal or Extreme Weather	Case Conditions	Amount of Conservation/ System Load	Type of Contingency	Elements above Emergency Limit	Elements > 90% of Emergency Limit or above Operating Limit
2017-18 Winter	Normal	South-North NI Flow No Western Generation	100% 5208 MW	N-1		Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #2
2017-18 Winter	Normal	South-North NI Flow No Western Generation	100% 5208 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Maple Valley-Sammamish 230 kV line	Talbot Hill-Berrydale #1 115 kV line White River - Lea Hill - Berrydale 115 kV Line Shuffleton-O'Brien 115 kV line Shuffleton-Lakeside 115 kV line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #2 O'Brien 230-115 kV transformer #1
2017-18 Winter	Normal	South-North NI Flow No Western Generation	100% 5208 MW	N-2 or Common Mode	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line	Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Berrydale 230-115 kV transformer
2017-18 Winter	Normal	South-North NI Flow No Western Generation	75% 5325 MW	N-1		Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2
2017-18 Winter	Normal	South-North NI Flow No Western Generation	75% 5325 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River - Lea Hill - Berrydale 115 kV line Maple Valley - Sammamish 230 kV line	Talbot Hill-Berrydale #1 115 kV line Shuffleton-O'Brien 115 kV line Shuffleton-Lakeside 115 kV line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #2 O'Brien 230-115 kV transformer #1 O'Brien 115 kV North bus section breaker O'Brien-Asbury 115 kV line
2017-18 Winter	Normal	South-North NI Flow No Western Generation	75% 5325 MW	N-2 or Common Mode	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line	Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Berrydale 230-115 kV transformer
2017-18 Winter	Normal	South-North NI Flow No Western Generation	50% 5442 MW	N-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line	Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Talbot Hill-Boeing Renton-Shuffleton 115 kV Line
2017-18 Winter	Normal	South-North NI Flow No Western Generation	50% 5442 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Maple Valley-Sammamish 230 kV line White River - Lea Hill - Berrydale 115 kV line Talbot Hill-Berrydale #1 115 kV line Shuffleton - O'Brien 115 kV line Shuffleton-Lakeside 115 kV line	Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #2 O'Brien 230-115 kV transformer #1 O'Brien 115 kV North bus section breaker O'Brien - Asbury 115 kV line Shuffleton - President Park - Lake Tradition 115 kV line
2017-18 Winter	Normal	South-North NI Flow No Western Generation	50% 5442 MW	N-2 or Common Mode	Talbot Hill-Lakeside #2 115 kV Line	Talbot Hill-Lakeside #1 115 kV Line Berrydale 230-115 kV transformer Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2
2018 Heavy Summer	Normal	Hi Gen, Hi Import from BC	100% 3554 MW	N-1	Monroe-Novelty Hill 230 kV line	

REDACTED

Table 6-4: Summary of Elements above Emergency and Operating Limits: 2017-18 – Winter Peak, Normal Weather & Summer Peak Normal Weather (CONTINUED)

2018 Heavy Summer	Normal	No Gen, Hi Export to BC	100% 3554 MW	N-1	Maple Valley - Sammamish 230 kV line	Talbot Hill-Lakeside #1 115 kV line Talbot Hill-Lakeside #2 115 kV line
2018 Heavy Summer	Normal	Hi Gen, Hi Import from BC	100% 3554 MW	N-1-1	Beverly Park - Cottage Brook 115 kV line Sammamish 230-115 kV transformer #1 Sammamish 230-115 kV transformer #2	Novelty Hill 230-115 kV transformer
2018 Heavy Summer	Normal	Hi Gen, Hi Import from BC	100% 3554 MW	N-2 or Common Mode		Sammamish-Lakeside #2 115 kV line

REDACTED

Table 6-5: Elements above Emergency and Operating Limits: 2017-18 Winter Peak, 100% Conservation, Normal Weather, Thermal Loadings (Redacted)

Case	Category	Worst Contingency	Owner of Facilities Out	Element(s)	Owner of Overloaded Facilities	Percent Overload
2017-18 Winter	B	[redacted]	BPA	Maple Valley - SnoKing #1 230 kV line	SCL	119.3%
2017-18 Winter	B	[redacted]	BPA	Maple Valley - SnoKing #2 230 kV line	SCL	118.2%
2017-18 Winter	B	[redacted]	BPA	Talbot Hill - Lakeside #1 115 kV line	PSE	98.6%
2017-18 Winter	B	[redacted]	BPA	Talbot Hill - Lakeside #2 115 kV line	PSE	98.4%
2017-18 Winter	B	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	90.3%
2017-18 Winter	C	[redacted]	BPA	Maple Valley - SnoKing #1 230 kV line	SCL	123.9%
2017-18 Winter	C	[redacted]	BPA	Maple Valley - SnoKing #2 230 kV line	SCL	123.3%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill - Lakeside #2 115 kV line	PSE	101.1%
2017-18 Winter	C	[redacted]	BPA	Talbot Hill - Lakeside #1 115 kV line	PSE	101.5%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #1	PSE	91.8%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	92.8%
2017-18 Winter	C	[redacted]	PSE	Berrydale 230-115 kV transformer	PSE	93.6%
2017-18 Winter	C	[redacted]	BPA & SCL	Maple Valley - SnoKing #1 230 kV line	SCL	176.6%

REDACTED

Table 6-5: Elements above Emergency and Operating Limits: 2017-18 Winter Peak, 100% Conservation, Normal Weather, Thermal Loadings (Redacted) (CONTINUED)

2017-18 Winter	C	[redacted]	BPA & SCL	Maple Valley - SnoKing #2 230 kV line	SCL	157.8%
2017-18 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Lakeside #1 115 kV line (Redispatch not enough)	PSE	127.8%
2017-18 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Lakeside #2 115 kV line (Redispatch not enough)	PSE	127.6%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #1 (Redispatch not enough)	PSE	105.7%
2017-18 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Boeing Renton - Shuffleton 115 kV line (Redispatch not enough)	PSE	110.6%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2 (Redispatch not enough)	PSE	105.7%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill - Berrydale #1 115 kV line	PSE	97.6%
2017-18 Winter	C	[redacted]	PSE	White River - Lea Hill - Berrydale 115 kV line	PSE	98.0%
2017-18 Winter	C	[redacted]	BPA & PSE	Shuffleton - O'Brien 115 kV line	PSE	97.9%
2017-18 Winter	C	[redacted]	PSE	Berrydale 230-115 kV transformer	PSE	93.8%
2017-18 Winter	C	[redacted]	BPA & SCL	Maple Valley - Sammamish 230 kV line	BPA	104.4%

REDACTED

Table 6-6: Elements above Emergency and Operating Limits: 2017-18 Winter Peak, 100% Conservation, Normal Weather, Low Generation Sensitivity Case, Thermal Loadings (Redacted)

						No Gen	With Gen
Case	Category	Worst Contingency	Owner of Facilities Out	Element(s)	Owner of Overloaded Facilities	% Overload	% Overload
2017-18 Winter	B	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	90.3%	87.4%
2017-18 Winter	B	[redacted]	BPA	Maple Valley - SnoKing #1 230 kV line	SCL	119.3%	86.5%
2017-18 Winter	B	[redacted]	BPA	Maple Valley - SnoKing #2 230 kV line	SCL	118.2%	84.2%
2017-18 Winter	B	[redacted]	BPA	Talbot Hill - Lakeside #1 115 kV line	PSE	98.6%	84.1%
2017-18 Winter	B	[redacted]	BPA	Talbot Hill - Lakeside #2 115 kV line	PSE	98.4%	83.9%
2017-18 Winter	C	[redacted]	BPA	Maple Valley - SnoKing #1 230 kV line	SCL	123.9%	89.0%
2017-18 Winter	C	[redacted]	BPA	Maple Valley - SnoKing #2 230 kV line	SCL	123.3%	87.1%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill - Lakeside #2 115 kV line	PSE	101.1%	87.2%
2017-18 Winter	C	[redacted]	BPA	Talbot Hill - Lakeside #1 115 kV line	PSE	101.5%	85.8%
2017-18 Winter	C	[redacted]	PSE	Berrydale 230-115 kV transformer	PSE	93.6%	90.2%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #1	PSE	91.8%	89.3%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	92.8%	90.5%
2017-18 Winter	C	[redacted]	BPA & SCL	Maple Valley - SnoKing #1 230 kV line	SCL	176.6%	112.9%
2017-18 Winter	C	[redacted]	BPA & SCL	Maple Valley - SnoKing #2 230 kV line	SCL	157.8%	110.9%
2017-18 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Lakeside #1 115 kV line	PSE	127.8%	108.7%

REDACTED

Table 6-6: Elements above Emergency and Operating Limits: 2017-18 Winter Peak, 100% Conservation, Normal Weather, Low Generation Sensitivity Case, Thermal Loadings (Redacted) (CONTINUED)

2017-18 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Lakeside #2 115 kV line	PSE	127.6%	108.5%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	105.7%	102.2%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #1	PSE	105.7%	102.0%
2017-18 Winter	C	[redacted]	BPA & PSE	Talbot Hill - Boeing Renton - Shuffleton 115 kV line	PSE	110.6%	98.8%
2017-18 Winter	C	[redacted]	PSE	Talbot Hill - Berrydale #1 115 kV line	PSE	97.6%	96.5%
2017-18 Winter	C	[redacted]	PSE	White River - Lea Hill - Berrydale 115 kV line	PSE	98.0%	94.8%
2017-18 Winter	C	[redacted]	PSE	Berrydale 230-115 kV transformer	PSE	93.8%	93.0%
2017-18 Winter	C	[redacted]	PSE	O'Brien 230-115 kV transformer #2	PSE	93.9%	91.3%
2017-18 Winter	C	[redacted]	PSE	O'Brien 230-115 kV transformer #1	PSE	93.1%	90.5%
2017-18 Winter	C	[redacted]	PSE	Sammamish 230-115 kV transformer #2	PSE	83.8%	90.3%
2017-18 Winter	C	[redacted]	BPA & PSE	Shuffleton - O'Brien 115 kV line	PSE	97.9%	86.4%
2017-18 Winter	C	[redacted]	BPA & PSE	O'Brien 115 kV North bus section breaker	PSE	92.5%	85.0%
2017-18 Winter	C	[redacted]	BPA & PSE	Shuffleton - Lakeside 115 kV line	PSE	97.3%	83.6%
2017-18 Winter	C	[redacted]	BPA & SCL	Maple Valley - Sammamish 230 kV line	BPA	104.4%	76.7%

REDACTED

Table 6-7: Summary of Elements above Emergency and Operating Limits: 2017-18 Winter Peak, Extreme Weather

Year of Study	Normal or Extreme Weather	Case Conditions	Amount of Conservation / System Load	Type of Contingency	Elements above Emergency Limit	Elements > 90% of Emergency Limit or above Operating Limit
2017-18 Winter	Extreme	South-North NI Flow No Western Generation	100% 5742	N-1	Talbot Hill-Lakeside #1 115 kV Line 99.1% Talbot Hill-Lakeside #2 115 kV Line 98.9%	Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Talbot Hill - Boeing Renton - Shuffleton 115 kV line
2017-18 Winter	Extreme	South-North NI Flow No Western Generation	100% 5742	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River - Lea Hill - Berrydale 115 kV line Shuffleton-Lakeside 115 kV line Talbot Hill-Berrydale #1 115 kV line Berrydale 230-115 kV transformer O'Brien 115 kV North bus section breaker O'Brien 230-115 kV transformer #1 O'Brien 230-115 kV transformer #2	O'Brien - Asbury 115 kV line Shuffleton - President Park - Lake Tradition 115 kV line White River 230-115 kV transformer #1 White River 230-115 kV transformer #2 Sammamish 230-115 kV transformer #2
2017-18 Winter	Extreme	South-North NI Flow No Western Generation	75% 5859	N-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line	Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Talbot Hill - Boeing Renton - Shuffleton 115 kV line Berrydale 230-115 kV transformer
2017-18 Winter	Extreme	South-North NI Flow No Western Generation	75% 5859	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River - Lea Hill - Berrydale 115 kV line Shuffleton-Lakeside 115 kV line Talbot Hill-Berrydale #1 115 kV line Berrydale 230-115 kV transformer O'Brien 115 kV North bus section breaker O'Brien 230-115 kV transformer #1 O'Brien 230-115 kV transformer #2	O'Brien - Asbury 115 kV line Shuffleton - President Park - Lake Tradition 115 kV line White River 230-115 kV transformer #1 White River 230-115 kV transformer #2 Sammamish 230-115 kV transformer #2 Shuffleton - O'Brien 115 kV line O'Brien - Midway #1 115 kV line Talbot Hill - Lake Tradition #1 115 kV line Sammamish 230-115 kV transformer #1
2017-18 Winter	Extreme	South-North NI Flow No Western Generation	75% 5859	N-2 or Common Mode	Berrydale 230-115 kV transformer Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2	Shuffleton - O'Brien 115 kV line Talbot Hill - Boeing Renton - Shuffleton 115 kV line O'Brien - Midway #1 115 kV line
2017-18 Winter	Extreme	South-North NI Flow No Western Generation	50% 5967 MW	N-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #1 (99.6%) Talbot Hill 230-115 kV transformer #2 (99.9%)	Berrydale 230-115 kV transformer Talbot Hill - Boeing Renton - Shuffleton 115 kV line
2017-18 Winter	Extreme	South-North NI Flow No Western Generation	50% 5967 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River - Lea Hill - Berrydale 115 kV line Shuffleton-Lakeside 115 kV line Talbot Hill-Berrydale #1 115 kV line Berrydale 230-115 kV transformer O'Brien 115 kV North bus section breaker O'Brien 230-115 kV transformer #1 O'Brien 230-115 kV transformer #2	Shuffleton-Lakeside 115 kV line O'Brien 115 kV North bus section breaker O'Brien - Asbury 115 kV line Shuffleton - President Park - Lake Tradition 115 kV line White River 230-115 kV transformer #1 White River 230-115 kV transformer #2 Shuffleton-O'Brien 115 kV line Sammamish 230-115 kV transformer #2
2017-18 Winter	Extreme	South-North NI Flow No Western Generation	50% 5967 MW	N-2 or Common Mode	Berrydale 230-115 kV transformer Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2	Talbot Hill 230-115 kV transformer #2 Shuffleton - O'Brien 115 kV line Talbot Hill - Boeing Renton - Shuffleton 115 kV line O'Brien - Midway #1 115 kV line O'Brien 230-115 kV transformer #2

REDACTED

6.1.4 2021-22: Winter Peak, Normal & Extreme Weather Thermal Summaries

Table 6-8 shows the summary of results for categories B (N-1) and C (N-1-1 & N-2) for 2021-22 winter and summer peaks with normal weather.

Table 6-9 indicates that the PSE load level for the winter peak, normal weather, 100% conservation, for 2021-22 is 5,193 MW. There are no potential Category B (N-1) thermal violations but there are five (5) elements with loadings from 90% to 100% of the emergency ratings. Those facilities are highlighted in gray on Table 6-9.

1. Talbot Hill - Lakeside #1 115 kV Line – 95.2%
2. Talbot Hill - Lakeside #2 115 kV Line – 95.1%
3. Talbot Hill 230-115 kV transformer #1 – 91.0%
4. Talbot Hill 230-115 kV transformer #2 – 91.5%
5. Talbot Hill - Boeing Renton - Shuffleton 115 kV Line – 91.5%

For Category C (N-1-1) contingencies there are six (6) elements above the emergency limits and an additional six (6) elements with loadings above 90% of their emergency limits. Those facilities are highlighted in yellow for overloads.

1. Talbot Hill - Lakeside #1 115 kV Line
2. Talbot Hill - Lakeside #2 115 kV Line
3. Talbot Hill 230-115 kV transformer #1
4. Talbot Hill 230-115 kV transformer #2
5. Talbot Hill - Boeing Renton - Shuffleton 115 kV Line
6. Shuffleton - Lakeside 115 kV Line

The PSE load level for the winter peak, normal weather, 75% conservation, for 2021-22 is 5,415 MW. Table 6-8 indicates that there are no potential Category B (N-1) thermal violations but there are five (5) elements with loadings above 90% of the emergency ratings (Talbot Hill-Lakeside #1 & 2 115 kV Lines, Talbot Hill 230-115 kV transformers #1 & 2, and Talbot Hill-Boeing Renton-Shuffleton 115 kV Line). For Category C (N-1-1) contingencies there are ten (10) elements above the emergency limits and an additional five (5) elements with loadings above 90% of their emergency limits.

Table 6-10 shows that for the 2021-22 winter peak, extreme weather, (PSE load of 5,772 MW), no generation in the north and high exports to British Columbia, there are four (4) potential Category B (N-1) thermal violations (Talbot Hill - Lakeside #1 & #2 115 kV lines, Talbot Hill-Boeing Renton-Shuffleton 115 kV line, and the Talbot Hill 230-115 kV transformer #1). There are fourteen (14) potential Category C (N-1-1 & N-2) thermal violations.

The extreme winter cases are run as an indication of the flexibility and robustness of the electric transmission system in a near or far future year. As shown in Tables 6-7 and 6-10, the increased load to be expected with extremely cold weather could lead to many more overloads than those projected with loads during normal weather, even with reduced conservation effects. While most utilities, including PSE, do not construct facilities on the basis of extreme seasonal temperatures, it does serve as an indicator of system stresses further into the future.

REDACTED

Table 6-8: Summary of Elements above Emergency and Operating Limits: 2021-22 Winter Peak, Normal Weather

Year of Study	Normal or Extreme Weather	Case Conditions	Amount of Conservation/ System Load	Type of Contingency	Elements above Emergency Limit	Elements > 90% of Emergency Limit or above Operating Limit
2021-22 Winter	Normal	South-North NI Flow No Western Generation	100% 5193 MW	N-1		Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Talbot-Boeing Renton-Shuffleton 115 kV Line
2021-22 Winter	Normal	South-North NI Flow No Western Generation	100% 5193 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot-Lakeside Hill #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Shuffleton-Lakeside 115 kV line	White River - Lea Hill - Berrydale 115 kV Line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #2 O'Brien 230-115 kV transformer #1 O'Brien 115 kV North bus section breaker Talbot Hill-Berrydale #1 115 kV line
2021-22 Winter	Normal	South-North NI Flow No Western Generation	100% 5193 MW	N-2 or Common Mode	Talbot Hill-Lakeside #2 115 kV Line	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Berrydale 230-115 kV transformer
2021-22 Winter	Normal	South-North NI Flow No Western Generation	75% 5415 MW	N-1		Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2
2021-22 Winter	Normal	South-North NI Flow No Western Generation	75% 5415 MW	N-1-1	Talbot Hill-Berrydale #1 115 kV line Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River - Lea Hill - Berrydale 115 kV line Shuffleton-Lakeside 115 kV line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #2	O'Brien 230-115 kV transformer #1 O'Brien 115 kV North bus section breaker O'Brien-Asbury 115 kV line Shuffleton-President Park - Lake Tradition 115 kV line Shuffleton-O'Brien 115 kV Line
2021-22 Winter	Normal	South-North NI Flow No Western Generation	75% 5415 MW	N-2 or Common Mode	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Berrydale 230-115 kV transformer	Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Shuffleton - O'Brien 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line
2021-22 Winter	Normal	South-North NI Flow No Western Generation	50% 5636 MW	N-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line	Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 Berrydale 230-115 kV transformer Talbot Hill - Boeing Renton - Shuffleton 115 kV line
2021-22 Winter	Normal	South-North NI Flow No Western Generation	50% 5636 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River - Lea Hill - Berrydale 115 kV line Talbot Hill-Berrydale #1 115 kV line Shuffleton-Lakeside 115 kV line Berrydale 230-115 kV transformer O'Brien 230-115 kV transformer #1 O'Brien 230-115 kV transformer #2 O'Brien 115 kV North bus section breaker	O'Brien - Asbury 115 kV line Shuffleton - President Park - Lake Tradition 115 kV line Shuffleton-O'Brien 115 kV line Sammamish 230-115 kV transformer #2 White River 230-115 kV transformer #1 White River 230-115 kV transformer #2 O'Brien-Midway #1 115 kV Line
2021-22 Winter	Normal	South-North NI Flow No Western Generation	50% 5636 MW	N-2 or Common Mode	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Berrydale 230-115 kV transformer Talbot Hill 230-115 kV transformer #1	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #2 Shuffleton - O'Brien 115 kV line

REDACTED

Table 6-9: Elements above Emergency and Operating Limits: 2021-22 Winter Peak, 100% Conservation, Normal Weather, Thermal Loadings (Redacted)

Case	Category	Worst Contingency	Owner of Facilities Out	Element(s)	Owner of Overloaded Facilities	Percent Overload
2021-22 Winter	B	[redacted]	PSE	Talbot Hill - Lakeside #1 115 kV line	PSE	95.2%
2021-22 Winter	B	[redacted]	PSE	Talbot Hill - Lakeside #2 115 kV line	PSE	95.1%
2021-22 Winter	B	[redacted]	PSE	Talbot Hill 230-115 kV transformer #1	PSE	91.0%
2021-22 Winter	B	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	91.5%
2021-22 Winter	B	[redacted]	PSE	Talbot Hill - Boeing Renton - Shuffleton 115 kV line	PSE	91.5%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill - Lakeside #2 115 kV line	PSE	107.1%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill - Lakeside #1 115 kV line	PSE	96.8%
2021-22 Winter	C	[redacted]	PSE	Berrydale 230-115 kV transformer	PSE	95.5%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	93.2%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #1	PSE	93.6%
2021-22 Winter	C	[redacted]	PSE	Shuffleton - O'Brien 115 kV line	PSE	90.0%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill - Berrydale #1 115 kV line	PSE	97.6%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #1	PSE	108.1%

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Table 6-9: Elements above Emergency and Operating Limits: 2021-22 Winter Peak, 100% Conservation, Normal Weather, Thermal Loadings (Redacted) (CONTINUED)

2021-22 Winter	C	[redacted]	PSE	Talbot Hill - Lakeside #1 115 kV line	PSE	117.8%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill - Lakeside #2 115 kV line	PSE	117.7%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill - Boeing Renton - Shuffleton 115 kV line	PSE	107.6%
2021-22 Winter	C	[redacted]	PSE	Talbot Hill 230-115 kV transformer #2	PSE	107.0%
2021-22 Winter	C	[redacted]	PSE	White River - Lea Hill - Berrydale 115 kV line	PSE	99.7%
2021-22 Winter	C	[redacted]	PSE	Shuffleton - Lakeside 115 kV line	PSE	100.8%
2021-22 Winter	C	[redacted]	PSE	Berrydale 230-115 kV transformer	PSE	96.1%
2021-22 Winter	C	[redacted]	PSE	O'Brien 230-115 kV transformer #1	PSE	94.3%
2021-22 Winter	C	[redacted]	PSE	O'Brien 230-115 kV transformer #2	PSE	95.1%
2021-22 Winter	C	[redacted]	PSE	O'Brien 115 kV North bus section breaker	PSE	94.6%
2021-22 Winter	C	[redacted]	PSE	O'Brien - Asbury 115 kV line	PSE	90.9%

REDACTED

Table 6-10: Summary of Elements above Emergency and Operating Limits: 2021-22 Winter Peak, Extreme Weather Thermal Loadings

Year of Study	Normal or Extreme Weather	Case Conditions	Amount of Conservation/ System Load	Type of Contingency	Elements above Emergency Limit	Elements > 90% of Emergency Limit or above Operating Limit
2021-22 Winter	Extreme	South-North NI Flow No Western Generation	100% 5772 MW	N-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1	Berrydale 230-115 kV transformer Talbot Hill 230-115 kV transformer #2
2021-22 Winter	Extreme	South-North NI Flow No Western Generation	100% 5772 MW	N-1-1	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #1 Talbot Hill 230-115 kV transformer #2 White River - Lea Hill - Berrydale 115 kV line Shuffleton-Lakeside 115 kV line Talbot Hill-Berrydale #1 115 kV line Berrydale 230-115 kV transformer O'Brien 115 kV North bus section breaker O'Brien 230-115 kV transformer #1 O'Brien 230-115 kV transformer #2 O'Brien - Asbury 115 kV line Shuffleton-O'Brien 115 kV line	Shuffleton - President Park - Lake Tradition 115 kV line White River 230-115 kV transformer #1 White River 230-115 kV transformer #2 Sammamish 230-115 kV transformer #1 Sammamish 230-115 kV transformer #2 Talbot Hill-Lake Tradition #1 115 kV Line O'Brien-Metro Renton – Talbot Hill 115 kV Line O'Brien – Christopher #1 115 kV Line
2021-22 Winter	Extreme	South-North NI Flow No Western Generation	100% 5772 MW	N-2 or Common Mode	Talbot Hill-Lakeside #1 115 kV Line Talbot Hill-Lakeside #2 115 kV Line Talbot Hill 230-115 kV transformer #1 Shuffleton-O'Brien 115 kV line Berrydale 230-115 kV transformer	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line Talbot Hill 230-115 kV transformer #2 O'Brien 230-115 kV transformer #2 O'Brien - Midway #1 115 kV line

6.1.5 Summary of Potential Thermal Violations

Based on Table 6-11, below, the PSE Winter load level where King County starts to have significant issues is approximately 5200 MW. The elements which are the most susceptible to potential overloads for the winter peak loads are in the Talbot Hill and Lakeside Substation areas.

The sensitivity cases with 75% conservation instead of 100% conservation indicate system performance concerns with higher winter loads. Those sensitivity studies show even higher overloads of the elements already overloaded in the 100% conservation cases. In general, should loads grow faster than forecast, or conservation not provide anticipated peak load relief, the potential overloads will be higher than the results reported. Even when the corporate load does not increase from 2017-18 to 2021-22, the Eastside load has grown, resulting in an increased number of potential violations.

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Table 6-11: Summary of Potential Thermal Violations for Winter Peak Load Season

Contingency	2013-14 5055 MW 100% Con	2013-14 5090 MW 75% Con	2017-18 5208 MW 100% Con	2017-18 5325 MW 75% Con	2021-22 5193 MW 100% Con	2021-22 5415 MW 75% Con
Cat B (N-1)			Talbot Hill - Lakeside #1 115 kV line – 98.6%	Talbot Hill - Lakeside #1 115 kV line – 99.9%	Talbot Hill - Lakeside #1 115 kV line – 95.2%	Talbot Hill - Lakeside #1 115 kV line – 99.2%
			Talbot Hill - Lakeside #2 115 kV line – 98.4%	Talbot Hill - Lakeside #2 115 kV line – 99.9%	Talbot Hill - Lakeside #2 115 kV line – 95.1%	Talbot Hill - Lakeside #2 115 kV line – 99.1%
			Talbot Hill 230-115 kV transformer #2 – 90.3%	Talbot Hill 230-115 kV transformer #1 – 90.9%	Talbot Hill 230-115 kV transformer #1 – 91.0%	Talbot Hill 230-115 kV transformer #1 – 94.7%
				Talbot Hill 230-115 kV transformer #2 – 92.4%	Talbot Hill 230-115 kV transformer #2 – 91.5%	Talbot Hill 230-115 kV transformer #2 – 93.6%
						Talbot Hill - Boeing Renton - Shuffleton 115 kV line - 95.4%
Cat C (N-1-1)	Talbot Hill-Lakeside #1 115 kV Line - 115.2%	Talbot Hill-Lakeside #1 115 kV Line - 115.9%	Talbot Hill--Lakeside #1 115 kV Line - 127.8%	Talbot Hill-Lakeside #1 115 kV Line - 129.9%	Talbot Hill--Lakeside #1 115 kV Line - 117.8%	Talbot Hill--Lakeside #1 115 kV Line - 122.9%
	Talbot Hill-Lakeside #2 115 kV Line - 115.1%	Talbot Hill-Lakeside #2 115 kV Line - 115.8%	Talbot Hill--Lakeside #2 115 kV Line - 127.6%	Talbot Hill-Lakeside #2 115 kV Line - 129.7%	Talbot Hill-Lakeside #2 115 kV Line - 117.7%	Talbot Hill-Lakeside #2 115 kV Line - 122.8%
	Talbot Hill 230-115 kV transformer #1 - 100.9%	Talbot Hill 230-115 kV transformer #1 - 101.6%	Talbot Hill 230-115 kV transformer #1 - 105.7%	Talbot Hill 230-115 kV transformer #1 - 108.1%	Talbot Hill 230-115 kV transformer #1 - 108.1%	Talbot Hill 230-115 kV transformer #1 - 112.8%
	Talbot Hill 230-115 kV transformer #2 - 100.5%	Talbot Hill 230-115 kV transformer #2 - 101.6%	Talbot Hill 230-115 kV transformer #2 - 105.7%	Talbot Hill 230-115 kV transformer #2 – 107.6%	Talbot Hill 230-115 kV transformer #2 - 107.0%	Talbot Hill 230-115 kV transformer #2 - 109.8%
	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line -101.1%	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 101.7%	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 110.6%	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 112.5%	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 107.6%	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 112.3%
				White River - Lea Hill - Berrydale 115 kV line - 100.2%	White River - Lea Hill - Berrydale 115 kV line - 99.7%	White River - Lea Hill - Berrydale 115 kV line - 104.0%
				Maple Valley - Sammamish 230 kV line - 100.5%		Talbot Hill-Berrydale #1 115 kV line - 101.9%
						Shuffleton-Lakeside 115 kV line - 105.2%
						Berrydale 230-115 kV transformer - 100.8%
						O'Brien 230-115 kV transformer #2 - 100.2%
						O'Brien 230-115 kV transformer #1 - 99.4%
Cat C (N-2 or Common Mode)			Talbot Hill-Lakeside #1 115 kV Line - 101.5%	Talbot Hill-Lakeside #1 115 kV Line - 103.0%	Talbot Hill - Lakeside #1 115 kV line – 96.8%	Talbot Hill-Lakeside #1 115 kV Line – 100.7%
			Talbot Hill-Lakeside #2 115 kV Line - 101.1%	Talbot Hill-Lakeside #2 115 kV Line - 100.5%	Talbot Hill - Lakeside #2 115 kV line – 107.1%	Talbot Hill-Lakeside #2 115 kV Line - 111.7%
					Talbot Hill 230-115 kV transformer #1 – 93.6%	Talbot Hill 230-115 kV transformer #1 – 97.3%
					Talbot Hill 230-115 kV transformer #2 – 93.2%	Talbot Hill 230-115 kV transformer #2 – 95.1%
					Berrydale 230-115 kV transformer - 95.5%	Berrydale 230-115 kV transformer - 100.2%

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Based on Table 6-12 below, the PSE summer load level where King County starts to have significant issues is approximately 3,500 MW. The elements which are the most susceptible to potential overloads for the summer peak loads are in the Sammamish Substation area.

Table 6-12: Summary of Potential Thermal Violations for Summer Peak Load Season

Contingency	2014 3343 MW 100% Con	2018 3554 MW 100% Con
Cat B (N-1)	Monroe-Novelty Hill 230 kV line - 132.6%	Monroe-Novelty Hill 230 kV line - 133.0%
	Maple Valley - Sammamish 230 kV line - 111.4%	Maple Valley - Sammamish 230 kV line - 132.3%
		Talbot Hill - Lakeside #1 115 kV line - 93.9%
		Talbot Hill - Lakeside #2 115 kV line - 93.8%
Cat C (N-1-1)	Sammamish 230-115 kV transformer #2 - 100.8%	Beverly Park - Cottage Brook 115 kV line - 100.5% (Have solution)
	Sammamish 230-115 kV transformer #1 - 95.5%	Sammamish 230-115 kV transformer #1 - 100.7% (Have solution)
		Sammamish 230-115 kV transformer #2 - 106.4% (Have solution)
Cat C (N-2)		Sammamish - Lakeside #2 115 kV line - 99.8%

6.1.6 Temporary Mitigations and Associated Risks

Based on the analysis described above there are a number of system events that require the Transmission Operators to implement operating procedures in place to temporarily reduce or mitigate the potential thermal violations. Table 6-13 indicates mitigation needed for each of the winter overload contingencies identified in 2017-18.

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Table 6-13: Mitigations for Worst Winter 2017-18 Contingencies

Contingency	2013-14 Winter Peak 5208 MW 100% Conservation	2017-18 Winter Peak 5208 MW 100% Conservation	2017-18 Winter Peak 5325 MW 75% Conservation	Contingency Causing Overload	Mitigation Plan - Worst Contingency	Customers at Risk
Cat B (N-1)		Talbot Hill - Lakeside #1 115 kV line – 98.6%	Talbot Hill - Lakeside #1 115 kV line – 99.9%	[redacted]	[redacted]	None
		Talbot Hill - Lakeside #2 115 kV line – 98.4%	Talbot Hill - Lakeside #2 115 kV line – 99.9%	[redacted]	[redacted]	None
		Talbot Hill 230-115 kV transformer #2 – 90.3%	Talbot Hill 230-115 kV transformer #2 – 92.4%	[redacted]	[redacted]	None
			Talbot Hill 230-115 kV transformer #1 – 90.9%	[redacted]	[redacted]	None
Cat C (N-1-1)	Talbot-Lakeside #1 115 kV Line - 115.2%	Talbot-Lakeside #1 115 kV Line - 127.8%	Talbot-Lakeside #1 115 kV Line - 129.9%	[redacted]	[redacted]	49,000 for line outage, 33,000 for transformer outage
	Talbot-Lakeside #2 115 kV Line - 115.1%	Talbot-Lakeside #2 115 kV Line - 127.6%	Talbot-Lakeside #2 115 kV Line - 129.7%	[redacted]	[redacted]	49,000 for line outage, 33,000 for transformer outage
	Talbot Hill 230-115 kV transformer #1 - 100.9%	Talbot Hill 230-115 kV transformer #1 - 105.7%	Talbot Hill 230-115 kV transformer #1 - 108.1%	[redacted]	[redacted]	More lines may need to be opened for next N-1-1 contingencies
	Talbot Hill 230-115 kV transformer #2 - 100.5%	Talbot Hill 230-115 kV transformer #2 - 105.7%	Talbot Hill 230-115 kV transformer #2 – 107.6%	[redacted]	[redacted]	More lines may need to be opened for next N-1-1 contingencies
	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 101.1%	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 110.6%	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 112.5%	[redacted]	[redacted]	23,000 for line outage, 33,000 for transformer outage

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Table 6-13: Mitigations for Worst Winter 2017-18 Contingencies (CONTINUED)

		O'Brien 230-115 kV transformer #1 - 93.1%	O'Brien 230-115 kV transformer #1 - 94.9%	[redacted]	[redacted]	More lines may need to be opened for next N-1-1 contingencies
		O'Brien 230-115 kV transformer #2 - 93.9%	O'Brien 230-115 kV transformer #2 - 95.7%	[redacted]	[redacted]	More lines may need to be opened for next N-1-1 contingencies
		Berrydale 230-115 kV transformer - 93.8%	Berrydale 230-115 kV transformer - 96.0%	[redacted]	[redacted]	More lines may need to be opened for next N-1-1 contingencies
		Talbot Hill-Berrydale #1 115 kV line - 97.6%	Talbot Hill-Berrydale #1 115 kV line - 99.8%	[redacted]	[redacted]	32,000 for line outage, 50,000 for transformer outage
		Shuffleton - Lakeside 115 kV line - 97.3%	Shuffleton - Lakeside 115 kV line - 98.9%	[redacted]	[redacted]	None
			White River - Lea Hill - Berrydale 115 kV line - 100.2%	[redacted]	[redacted]	32,000 for line outage, 50,000 for transformer outage
			Maple Valley - Sammamish 230 kV line - 100.5%	[redacted]	[redacted]	None
Cat C (N-2 or Common Mode)		Talbot-Lakeside #1 115 kV Line - 101.5%	Talbot-Lakeside #1 115 kV Line - 103.0%	[redacted]	[redacted]	32,000 for line outage, 50,000 for transformer outage
		Talbot-Lakeside #2 115 kV Line - 101.1%	Talbot-Lakeside #2 115 kV Line - 100.5%	[redacted]	[redacted]	None
		Talbot Hill 230-115 kV transformer #1 - 91.8%	Talbot Hill 230-115 kV transformer #1 - 93.8%	[redacted]	[redacted]	None
		Talbot Hill 230-115 kV transformer #2 - 92.8%	Talbot Hill 230-115 kV transformer #2 - 94.4%	[redacted]	[redacted]	None

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The following table indicates mitigation needed for each of the summer overload contingencies identified in 2018.

Table 6-14: Mitigation for Worst Summer 2018 Contingencies

Contingency	2014 Summer Peak 3343 MW 100% Conservation	2018 Summer Peak 3554 MW 100% Conservation	Contingency Causing Overload	Mitigation	Customers at Risk
Cat B (N-1)	Monroe-Novelty Hill 230 kV line - 132.6%	Monroe-Novelty Hill 230 kV line - 133.0%	[redacted]	[redacted]	None
	Maple Valley - Sammamish 230 kV line - 111.4%	Maple Valley - Sammamish 230 kV line - 132.3%	[redacted]	[redacted]	None
		Talbot Hill - Lakeside #1 115 kV line - 93.9%	[redacted]	[redacted]	None
		Talbot Hill - Lakeside #2 115 kV line - 93.8%	[redacted]	[redacted]	None
Cat C (N-1-1)	Sammamish 230-115 kV transformer #2 - 100.8%	Sammamish 230-115 kV transformer #2 - 106.4%	[redacted]	[redacted]	33,000
	Sammamish 230-115 kV transformer #1 - 95.5%	Sammamish 230-115 kV transformer #1 - 100.7%	[redacted]	[redacted]	33,000
		Beverly Park - Cottage Brook 115 kV line - 100.5%	[redacted]	[redacted]	27,000
Cat C (N-2)		Sammamish - Lakeside #2 115 kV line - 99.8%	[redacted]	[redacted]	None

6.2 Other Assessment Criteria Compliance

6.2.1 Columbia Grid

As stated in the ColumbiaGrid 2012 System Assessment[21], ColumbiaGrid was formed with seven founding members in 2006 to improve the operational efficiency, reliability, and planned expansion of the northwest transmission grid. Eleven parties have signed ColumbiaGrid's Planning and Expansion Functional Agreement (PEFA) to support and facilitate multi-system transmission planning through an open and transparent process. ColumbiaGrid's primary grid planning activity is to develop a biennial transmission expansion plan that looks out over a ten-year planning horizon and identifies the transmission additions necessary to ensure that the parties to the ColumbiaGrid Planning and Expansion Functional Agreement can meet their commitments to serve load and transmission service commitments. A significant feature of the transmission expansion plan is its single-utility planning approach. The plan has been developed as if the region's transmission grid were owned and operated by a single entity. This approach results in a more comprehensive, efficient, and coordinated plan than would otherwise be developed if each transmission owner completed a separate independent analysis.

[21] ColumbiaGrid 2012System Assessment, page 1 – Executive Summary, July 2012

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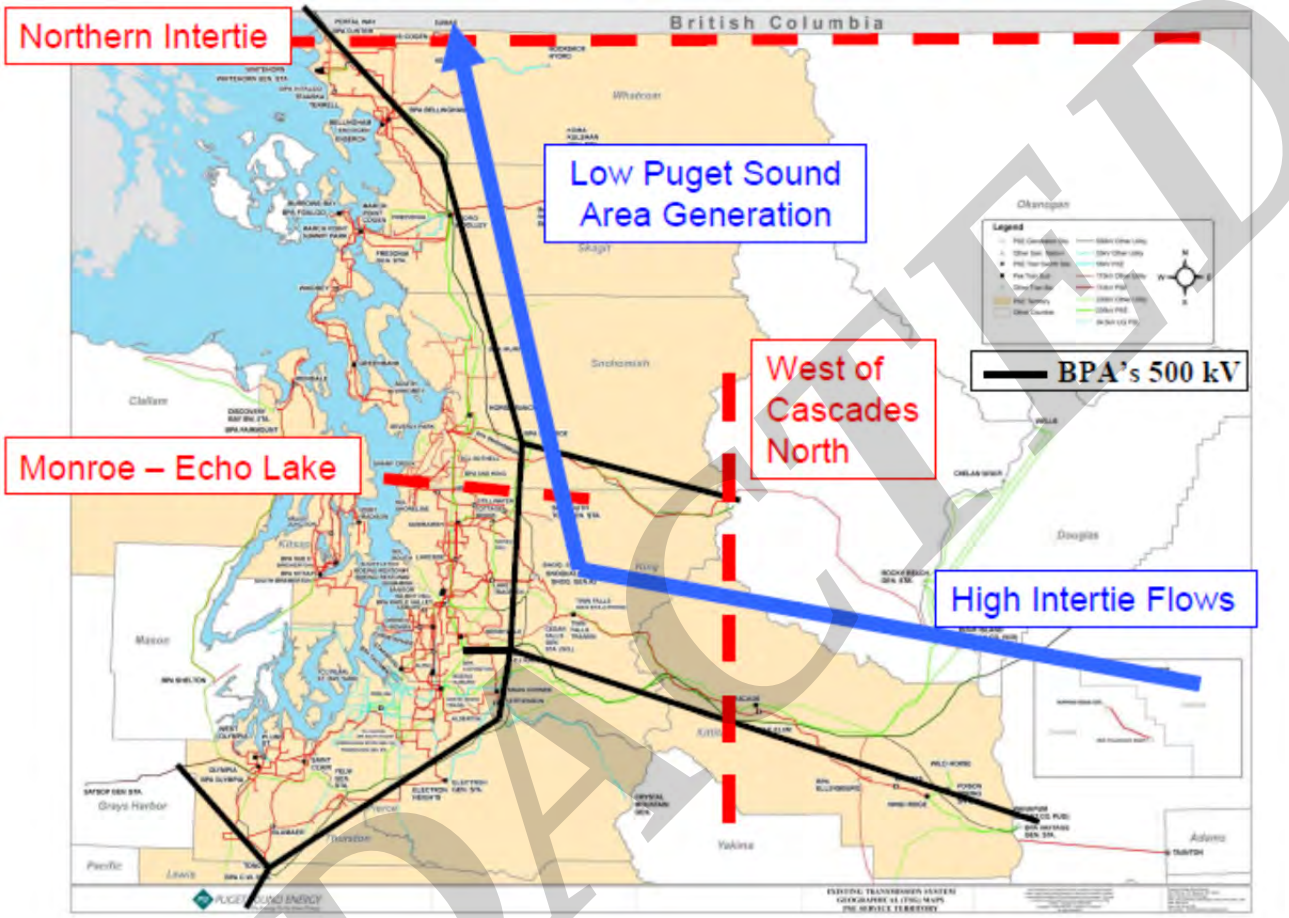
The capacity of the Northern Intertie path in the north to south direction is 2,850 MW on the west- side and 400 MW on the east-side with a combined total transfer capability limit of 3,150 MW (Figure 6-2). The total capacity of the path in the south to north direction is 2,000 MW, with a limit of 400 MW on the east-side (Figure 6-1). Both of these directional flows can impact the ability of the system to serve loads in the Puget Sound area.



[22]

Figure 6-1: Winter Power Flow resulting from Northern Intertie

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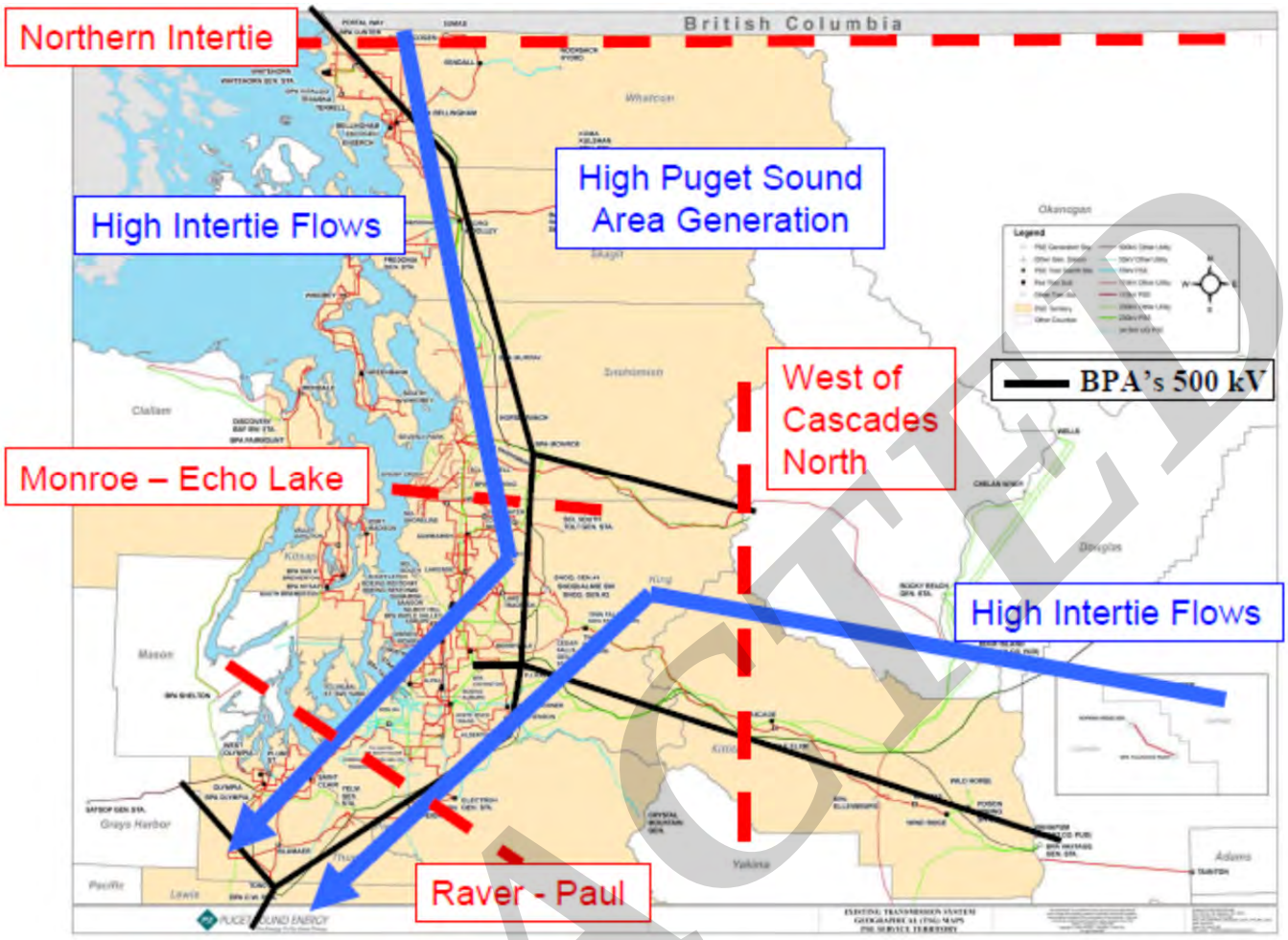
[22] PSE Attachment K, Puget Sound Area Transmission Meeting, PSE Presentation Slide #9, Dec 18, 2012



[23]

Figure 6-2: Summer Power Flow Resulting from Northern Intertie

The major issues in the PSE area were identified in the 2012 System Assessment, dated July 2012. The Assessment documented that: BPA is making commitments to increase flows across the Northern Intertie to 2,300 MW through the Network Open Season that will show up in the ten-year time frame. 200 MW of this new commitment is planned to be scheduled on the east side of the Northern Intertie at Nelway. Therefore in the ten- year summer cases this flow will increase to 2,300 MW to cover the additional commitments that are being made on the Northern Intertie including the 200 MW on the east side of the tie at Nelway.

6.2.2 2009 TPL Study Results

Issues associated with loading in the Talbot Hill area under winter conditions and south-north regional transmission flows were first shown in the 2009 TPL study. (The previous year's TPL study had noted high loading on Talbot Hill transformers, although these were not identified as Category B or C overloads in any of the study years used for the 2008 TPL.) As a result, PSE identified short-term mitigation in the form of CAPs and also began studying options for improving the power supply in the central King County area.

Load forecasts used in the 2009 TPL study followed corporate forecasts published in December 2008. There was an updated forecast in June 2009 which projected lower normal peaks. Due to the conservative approach used in the TPL report, it is deemed that the change in the peak loads would not influence any TPL results.

[23] PSE Attachment K, Puget Sound Area Transmission Meeting, PSE Presentation Slide #10, Dec 18, 2012

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The 2009 TPL Study assumed no generation in Puget Sound Area as opposed to minimum generation in earlier reports - for the low generation scenarios. Also, the NI (Northern Intertie) flows were assumed realistic based on season and historic flows. This information is tabulated in Table 6-15.

The winter season in years 2010 (2010-11) and 2019 (2018-19) was studied both in Northern Intertie (NI) import and export conditions. Loads used were 1 in 2 year winter peak. The summer season in years 2010 and 2019 was also studied both in Northern Intertie (NI) import and export conditions. Loads used were 1 in 2 year summer peak. PSE's system load peaks during the winter season; summer represents reduced-load conditions. For the near-term cases winter peak load of 5,329 MW and summer peak load of 3,417 MW is modeled. For the long-term cases a winter peak load of 5,765 MW and summer peak load of 3,678 MW is modeled. To cover a broad range of operating conditions, Northern Intertie flows and PSE generation levels were varied in all case studies.

Table 6-15 shows the different scenarios used for the study.

Table 6-15: Scenarios for the 2009 TPL Study

WECC case	Base case	Northern Intertie flows (North-South (N-S) or South –North (S-N)	Puget Sound Area Generation
2009 HS3A APPROVED OPERATING CASE	2010HS-A	N-S 2850/300 MW	Full generation
2009 HS3A APPROVED OPERATING CASE	2010HS-B	N-S 2850/300 MW	No generation
2009 HS3A APPROVED OPERATING CASE	2010HS-C	S-N 2000/0 MW	Full generation
2009 HS3A APPROVED OPERATING CASE	2010HS-D	S-N 2000/0 MW	No generation
2009-10 HW2 OPERATING CASE	2010-11HW-A	S-N 1500/300 MW	No generation
2009-10 HW2 OPERATING CASE	2010-11HW-B	S-N 1500/300 MW	Full generation
2009-10 HW2 OPERATING CASE	2010-11HW-C	N-S 1450/0 MW	No generation
2009-10 HW2 OPERATING CASE	2010-11HW-D	N-S 1450/0 MW	Full generation
2019 HEAVY SUMMER 1 BASE CASE	2019HS-A	N-S 2850/300 MW	Full generation
2019 HEAVY SUMMER 1 BASE CASE	2019HS-B	N-S 2850/300 MW	No generation
2019 HEAVY SUMMER 1 BASE CASE	2019HS-C	S-N 2000/0 MW	Full generation
2019 HEAVY SUMMER 1 BASE CASE	2019HS-D	S-N 2000/0 MW	No generation
2018-19 HW1 BASE CASE	2018-19HW-A	S-N 1500/300 MW	No generation
2018-19 HW1 BASE CASE	2018-19HW-B	S-N 1500/300 MW	Full generation
2018-19 HW1 BASE CASE	2018-19HW-C	N-S 1450/0 MW	No generation
2018-19 HW1 BASE CASE	2018-19HW-D	N-S 1450/0 MW	Full generation

The 2009 TPL study indicated that as soon as the winter of 2010-11, during south-north regional transmission flows with low Puget Sound Area generation, a Category C loss [redacted] or a Category C loss of [redacted] could overload the Talbot Hill transformer #2. The [redacted] outage would load the Talbot Hill transformer to 101% of its emergency limit, which could be mitigated by dispatching generation. The [redacted] outage was shown to result in a 107% load on Talbot Hill transformer #2, which would be mitigated by instituting a CAP to open [redacted]. Installation of 230-115 kV transformation in central King County was identified as a long-term mitigation and studies commenced as to best transformation location and associated system improvements.

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Section 7 Conclusions on Needs Assessment

This 2013 Eastside Needs Assessment has shown that PSE is facing a transmission capacity deficiency on the Eastside of Lake Washington. Overloads of Talbot Hill and Sammamish transformers as well as several 115 kV lines point to the need for a new power supply centered in the Eastside area. By the fall of 2017, additional 230-115 kV transformation or generation integrated at the 115 kV level will be required in the Eastside area to relieve the overloads predicted in this study. Depending on the location of a new transformer, additional 115 kV or 230 kV line capacity will also be required.

In multiple contingencies studied, different parts of the transmission system will overload or will be close to overloading within the 10 year study period. When the regional power flows are south to north, as is typical in the winter, there are potential overloads in the Talbot Hill Substation area, on both transformers and transmission lines. When the regional power flows are north to south, as is typical in the summer, there are potential overloads in the Sammamish Substation area. In each case, it is the need to provide power to PSE communities in the Eastside area that is stressing the local power system.

The Eastside area has no utility generation sources. In King County, local generation covers less than 10% of the peak load. Therefore the King County area is quite dependent on transmission interties to Bonneville Power Administration and other neighboring utilities that can transport bulk power from generation located north, south and east of King County, primarily in the east. Bulk power is most often transported at 230 kV or higher voltage. This study has indicated possible overloads of existing 230 kV lines in future years. A 2012 Columbia Grid study has also indicated the need for additional 230 kV capacity in the King County area.

The core area of the Eastside in Bellevue is eight miles from any 230-115 kV source. This has placed a strain on the two nearest substations providing 230-115 kV transformation to the Eastside: Sammamish and Talbot Hill Substations. Continuing load growth in the Eastside area would increase the overload problems being shown in the first 5 years of the study.

This study examined thermal overloads for Category A (N-0), Category B (N-1) and Category C (N-2 and N-1-1) outages as required by NERC, WECC and PSE Transmission Planning Guidelines.

At approximately 5,200 MW PSE system load, as forecast for 2017-18 winter, multiple elements are at risk of overload. If the load growth is higher or conservation goals are not achieved as projected, the overloads will be higher and occur sooner.

PSE uses CAPs to automatically or manually prevent overloads under the NERC reliability requirements. The CAPs required to prevent N-1-1 overloads would open lines between Sammamish and Talbot Hill. Some of the CAPs place customers at risk of outage due to transmission lines being switched into a radial mode, with a feed from just one end. In the future, load growth will result in additional lines required to be opened, putting over 60,000 customers at risk of subsequent outages.

This analysis has shown a transmission capacity deficiency in the Eastside area of Lake Washington will develop by the winter of 2017-18. This transmission capacity deficiency will continue to increase beyond that date.

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Appendix A: Load Forecast

Table A-1: 2012 Annual Peak Load Forecast Distribution

	100% Conservation		Net of 100% Conservation			Gross of Conservation (0% Conservation)		
Year	Normal 23º	Extreme 13º	Normal Peak (23º)	Extreme Peak (13º)	ERM Peak (PSO)	Normal Peak (23º)	Extreme Peak (13º)	ERM Peak (PSO)
2012	68	68	4,837	5,316	5,316	4,905	5,384	5,384
2013	140	140	4,785	5,267	5,267	4,926	5,408	5,408
2014	226	226	4,836	5,333	5,333	5,063	5,560	5,560
2015	319	319	4,865	5,375	5,375	5,184	5,694	5,694
2016	394	394	4,909	5,432	5,432	5,303	5,826	5,826
2017	468	468	4,938	5,472	5,472	5,406	5,940	5,940
2018	562	562	4,938	5,483	5,483	5,500	6,045	6,045
2019	651	651	4,946	5,501	5,501	5,597	6,152	6,152
2020	778	778	4,923	5,490	5,490	5,701	6,268	6,268
2021	885	885	4,923	5,502	5,502	5,808	6,386	6,386
2022	944	944	4,972	5,562	5,562	5,916	6,506	6,506
2023	986	986	5,039	5,641	5,641	6,025	6,627	6,627
2024	1,023	1,023	5,117	5,732	5,732	6,140	6,754	6,754
2025	1,061	1,061	5,193	5,820	5,820	6,254	6,881	6,881
2026	1,100	1,100	5,266	5,905	5,905	6,365	7,004	7,004
2027	1,138	1,138	5,341	5,993	5,993	6,479	7,131	7,131
2028	1,172	1,172	5,426	6,090	6,090	6,598	7,262	7,262
2029	1,203	1,203	5,515	6,192	6,192	6,718	7,396	7,396
2030	1,236	1,236	5,605	6,296	6,296	6,840	7,531	7,531
2031	1,270	1,270	5,694	6,399	6,399	6,964	7,668	7,668
2032	1,305	1,305	5,785	6,504	6,504	7,090	7,808	7,808
2033	1,341	1,341	5,878	6,610	6,610	7,219	7,951	7,951

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Table A-2: 2012 Annual Peak Load Forecast for Eastside Area

	Normal Peaks (23 ^{0}F) Net of Conservation			Extreme Peaks (13 ^{0}F) Net of Conservation			Normal Peaks (23 ^{0}F) Gross of Conservation		Extreme Peaks (13^{0}F) Gross of Conservation	
Year	Eastside % of King Co	Eastside	King	Eastside % of King Co	Eastside	King	Eastside	King	Eastside	King
2012	27.5	646	2,348	27.4	709	2,586	655	2,381	718	2,619
2013	27.5	652	2,371	27.5	718	2,615	671	2,440	737	2,685
2014	27.5	660	2,399	27.5	729	2,652	691	2,512	760	2,764
2015	28.0	676	2,413	28.0	748	2,672	720	2,572	793	2,831
2016	28.5	694	2,434	28.5	769	2,699	750	2,630	825	2,896
2017	28.8	706	2,448	28.8	782	2,719	773	2,681	849	2,952
2018	29.0	710	2,449	29.0	790	2,725	792	2,729	872	3,006
2019	29.5	724	2,454	29.5	807	2,735	820	2,779	903	3,061
2020	30.0	733	2,445	30.0	820	2,732	850	2,834	937	3,122
2021	30.9	756	2,449	30.8	845	2,742	893	2,892	982	3,187
2022	30.9	765	2,476	31.0	861	2,776	912	2,950	1,008	3,251
2023	30.9	777	2,514	31.0	874	2,821	930	3,010	1,028	3,317
2024	30.9	790	2,558	31.0	890	2,871	949	3,073	1,050	3,387
2025	30.9	804	2,602	31.0	906	2,922	969	3,137	1,072	3,458
2026	30.9	818	2,646	31.0	922	2,973	989	3,201	1,094	3,530

NOTES:

1. Normal and Extreme County Peaks taken from PSE F2012: Electric County Peaks worksheet.
2. Eastside Normal and Extreme Peaks for years 2013, 2017 and 2021 are taken from the E230 Project worksheet: Eastside Load. The King County load was adjusted for expected block loads known to PSE Planning within the 10-year study period.
3. The Eastside load is calculated for years 2013, 2017 and 2021 based on the expected block loads with interpolation being used to calculate the in between years.

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Appendix B: Upgrades Included in Base Cases

Table B-1: Projects Added to the Eastside Needs Assessment Winter Base Case

2013-14	2017-18	2021-22
Beverly Park - Cottage Brook breaker replacement	Beverly Park - Cottage Brook breaker replacement	Beverly Park - Cottage Brook breaker replacement
Cottage Brook - Moorlands line reconductor	Cottage Brook - Moorlands line reconductor	Cottage Brook - Moorlands line reconductor
Saint Clair 230-115 kV transformer	Saint Clair 230-115 kV transformer	Saint Clair 230-115 kV transformer
Talbot Hill - Berrydale #1 line uprate	Talbot Hill - Berrydale #1 line uprate	Talbot Hill - Berrydale #1 line uprate
Starwood autotransformer removal / Tacoma Power voltage increase	Starwood autotransformer removal / Tacoma Power voltage increase	Starwood autotransformer removal / Tacoma Power voltage increase
	Alderton 230-115 kV transformer	Alderton 230-115 kV transformer
	Lake Holm Substation (block load)	Lake Holm Substation (block load)
	Beverly Park 230-115 kV transformer	Beverly Park 230-115 kV transformer
	Sensitivity Study 2: Raver 500-230 kV transformer	Sensitivity Study 2: Raver 500-230 kV transformer
	Sensitivity Study 2: SCL series inductors	Sensitivity Study 2: SCL series inductors

Table B-2: Projects Added to the Summer NERC TPL Base Case for the Eastside Area

2014	2018
Beverly Park - Cottage Brook breaker replacement	Beverly Park - Cottage Brook breaker replacement
Cottage Brook - Moorlands line reconductor	Cottage Brook - Moorlands line reconductor
Saint Clair 230-115 kV transformer	Saint Clair 230-115 kV transformer
Talbot Hill - Berrydale #1 line uprate	Talbot Hill - Berrydale #1 line uprate
Starwood autotransformer removal / Tacoma Power voltage increase	Starwood autotransformer removal / Tacoma Power voltage increase
	Alderton 230-115 kV transformer
	White River - Electron Heights 115 kV line re-route into Alderton
	White River 2nd bus section breaker
	Lake Hills - Phantom Lake 115 kV line
	Lake Holm Substation (block load)
	Cumberland Substation 115 conversion (block load)
	Beverly Park 230-115 kV transformer

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Appendix C: Quanta Technology and Puget Sound Energy Author Biographies

Quanta Technology assisted Puget Sound Energy in conducting this study, including research, analysis and documentation. Quanta Technology is an expertise-based, independent consulting company providing business and technical expertise to the energy and utility industries. They assist with deploying strategic and practical solutions to improve a company's business performance. Their mission is to provide value to clients in every engagement with the industry-best technical and business expertise, holistic and practical advice, and industry thought leadership.

Thomas J. Gentile, PE, *Quanta Technology Vice President Transmission Strategy,* is based in Massachusetts and has over 36 years of experience and proven leadership with transmission and distribution system planning, analysis, engineering, program/project management and interfacing with RTOs/ISOs and regulatory agencies. Mr. Gentile has participated in various planning, operating and market committees at NERC, NPCC, NYISO and ISO-NE. Tom received MSEE and BSEE degrees from Iowa State University and Northeastern University. He is a registered professional engineer in the State of Massachusetts.

Donald J. Morrow, PE, *Quanta Technology Partner, Senior Vice President of Corporate Strategy and Quanta Technology Expert*, has more than 30 years of utility and consulting experience. During the course of his career, Don has held a wide range of technical and management responsibilities including system planning, control area operations, transmission operations, energy trading, maintenance scheduling, operator training, protection, distribution operations, energy management systems and natural gas dispatch. Don received his BSEE and MBA from the University of Wisconsin, Madison. Don developed the transmission practice at Quanta Technology and he has led several transmission planning projects since 2006, including the SPP EHV Overlay study, the Smartransmission Project (www.smartstudy.biz), and Companhia de Electricidade de Macau in Macua, China. He is a registered professional engineer in the states of Wisconsin and Arkansas.

Carol O. Jaeger, PE, *Puget Sound Energy Consulting Engineer*, *Transmission Planning*, has over 30 years experience in transmission and distribution planning, distribution design, and substation design and operations. She received her BSEE from the University of Washington and is a registered professional engineer in the state of Washington.

Zach Gill Sanford, *Puget Sound Energy Engineer, Transmission Planning*, has over 4 years experience in transmission planning and NERC compliance. He received his BSEE from the University of Washington.

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PUGET SOUND ENERGY

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Smart Solutions, Real Results

Supplemental Eastside Needs Assessment Report

Transmission System
King County

April 2015

Puget Sound Energy

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Executive Summary

This document summarizes the changes to the Eastside Needs Assessment Report dated October 2013, based upon the recent updates to the Puget Sound Energy (PSE) load forecast, system topology, facility ratings, changes affecting the Northern Intertie as the monitored flowgate for the Puget Sound Area Northern Intertie ("PSANI") issues, and changes to the Seattle City Light (SCL) system. This is a supplemental document that should be read in concert with the 2013 Eastside Needs Assessment Report ("2013 Needs Assessment").

The 2013 Needs Assessment concluded that there is a transmission capacity deficiency in the Eastside area which will develop by the winter of 2017-18. The assessment also concluded that the transmission capacity deficiency will continue to get worse as load grows. The 2013 Needs Assessment identified a number of concerns related to this transmission capacity deficiency, which included:

- Overload of PSE facilities in the Eastside area under certain contingencies
- Increasing use and expansion of Corrective Action Plans ("CAPs") to manage these overloads
- Inherent load forecast uncertainties which leave a small margin for error for the CAPs to be effective

The supplemental studies, utilizing the updated information discussed in this report, verified that there is still a transmission capacity deficiency in the Eastside area that will develop by the winter of 2017-18 and require the expanded use of CAPs to manage overloads for certain contingencies. In addition, the studies continued to show that this transmission capacity deficiency is expected to increase beyond that date. Cities in the deficiency area include: Redmond, Kirkland, Bellevue, Clyde Hill, Medina, Mercer Island, Issaquah, Newcastle, and Renton, along with towns of Yarrow Point, Hunts Point, and Beaux Arts.

The supplemental studies also verified that a transmission capacity deficiency still develops by the summer of 2018. However, the supplemental study showed that transmission capacity deficiency is actually worse than what was identified in the 2013 Needs Assessment. In the 2013 Needs Assessment, CAPs were required to mitigate the transmission capacity deficiency but load shedding was not required. In the supplemental study, both CAPs and load shedding are required to mitigate the transmission deficiency.

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1. Introduction

This document summarizes the changes and results to the Eastside Needs Assessment dated October 2013, based upon the recent updates to the PSE load forecast, system topology, facility ratings, changes affecting the use of the Northern Intertie as the monitored flowgate for PSANI issues, and changes to the SCL system. This document also presents a comparison of the results using the updated information. The method, criteria, and key assumptions are the same as utilized in the 2013 Needs Assessment with the exception of those items discussed below.

2. Differences between the 2013 and 2015 Needs Assessments

2.1 Changes to the Power Flow Cases which have Minimal Impact

There are three changes that have minimal impact on the results of the supplemental study.

2.1.1 WECC Base Case Differences

Each year, Western Electric Coordinating Council (WECC), in coordination with its members, develops a set of "base cases" to model the bulk electric system. These base cases include the most up-to-date electrical system information for the entire WECC model including updated loads, generators, transmission lines, etc. All electric providers use these base cases as starting points to study their proposed system improvements and to understand the potential impacts to the regional electric grid, thereby ensuring no adverse impacts to the reliability and operating characteristics of its system or any surrounding system. The 2013 Needs Assessment was based on WECC base cases for the winter peak for years 2013-14, 2017-18, and 2021-22. Summer peak was analyzed for years 2014 and 2018 for the annual 2012 NERC TPL analysis.

For the 2015 Needs Assessment analysis, PSE utilized WECC winter peak base cases for the years 2019-20 and 2023-24. A 2017-18 case was developed from the 2019-20 base case. Summer peak base cases included the 2020 and 2024 WECC base cases. A 2018 summer case was developed from the 2020 base case.

2.1.2 Topology Changes in the Base Case

The studies within the 2015 Needs Assessment included all projects in the 2013 Needs Assessment, which are listed in Section 9 and Appendix B Tables B-1 and B-2 of the 2013 Needs Assessment. Changes in topology between the previous set of study cases and the current study cases are included in Appendix A of this report. Based on our analysis, no topology changes listed in Appendix A significantly impacted the study results. There was one change, the Talbot 230-115 kV transformer #1 replacement, which increased the winter normal and emergency limits from 383 MW and 464 MW to 398 MW and 484 MW respectively.

2.1.3 Northern Intertie vs. North of Echo Lake and South of Custer Flowgates

Prior to 2013, Bonneville Power Administration (BPA) used the West-Side Northern Intertie as the monitored flowgate for electricity transfers between the Puget Sound area and British Columbia. A one-line diagram of this flowgate is included in Appendix D. This flowgate was managed through the use of nomograms that would dictate the amount of capacity available on the Northern Intertie based on varying Puget Sound area generation levels, expected load levels, ambient temperature, and the next worst contingency. Nomograms were published on this Path for flows in both the north-south direction

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and the south-north direction. The amount of power that could be transferred between the Northwest and BC Hydro's system on the West-Side Northern Intertie was somewhat dependent on generation in the Puget Sound area. Transmission across the Northern Intertie would be curtailed if it was found that conditions would not support transfers, both in real time and in the operations planning timeframe. In February of 2013, BPA moved away from using the Northern Intertie as the basis for determining available transfer capability through the Puget Sound area and instead developed two new flowgates. These flowgates are the South of Custer (SOC) flowgate, used for determining acceptable north-south transfer levels through the Puget Sound area and the North of Echo Lake (NOEL) flowgate, used for determining acceptable south-north transfer levels. The lines that make up these new flowgates are included in Table 2-1. One-line diagrams of these updated flowgates are also included in Appendix D. These changes are used operationally to monitor flows that do not impact the study results but help determine and prevent adverse reliability impacts when power is flowing between the Northwest and BC Hydro's system.

Table 2-1: Definitions of PSANI Flowgates

North of Echo Lake (NOEL) Flowgate Definition:	South of Custer (SOC) Flowgate Definition:
Echo Lake – SnoKing Tap 500 kV	Monroe – Custer #1 & #2 500 kV
Echo Lake – Maple Valley 500 kV	Murray – Custer 230 kV
Covington – Maple Valley 230 kV	Bellingham – Custer 230 kV

2.2 Changes to the Power Flow Cases which had Substantial Impact

There are three changes that have a substantial impact on the results of the 2013 Needs Assessment. They are described below.

2.2.1 PSE has updated the Facility Ratings for all transmission lines in the system

For the 2013 Needs Assessment analysis, PSE used an Electric Power Research Institute (EPRI) tool called DYNAMP to establish transmission line facility ratings. By 2014, DYNAMP was no longer supported and PSE converted to a program called PLS–CADD. As a result of the conversion to this new tool, the transmission line facility ratings increased over the ratings used in the previous assessment. This increase in line ratings had an impact on post-contingency loadings, effectively reducing the percentage of overloads on facilities throughout the PSE system.

For example, the winter Emergency Facility Rating of the Talbot-Lakeside 115 kV line increased from 238.6 MVA to 249 MVA. In the 2017-18 Heavy Winter case, actual post-contingency MVA loading on the line for the worst Category B contingency in the 2013 Needs Assessment was 235.3 MVA or 98% of the 238.6 MVA line rating in the case. Actual post-contingency MVA loading on the line for the worst Category B contingency in the current study case was 218.3 MVA, or 87.6% of the 249 MVA line rating used in the case. If the line rating had not changed, loading in the current case would be 91.5% of the rating. Overloads seen on this line decreased by approximately 4% due to the change in line rating.

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2.2.2 Seattle City Light Load Levels Decreased

In 2014, Seattle City Light made some corrections and adjustments to the load levels used in the WECC power flow base cases. These changes resulted in decreased Seattle City Light load levels.

2.2.3 Differences in load forecast levels utilized in the 2013 and 2015 Needs Assessments

The following briefly describes the PSE load forecasting process and the resulting differences between the 2012 and 2014 load forecast that were used in the 2013 and 2015 Needs Assessments.

PSE's service territory is very diverse, and hence, PSE experiences highly variable growth across its service territory. For the 2014 load forecast, PSE prepared a more detailed county-by-county forecast than had been done previously. The 2014 load forecast disaggregated the system wide forecast to county and sub-county regions to examine reasonableness from both system and sub-system perspectives. A small area forecast was also performed to focus on the Eastside study area.

PSE used data from PSE's electric demand and consumption history and federal and local government sources as inputs to develop an econometric load forecast using econometric-time series approach. PSE's electric demand and energy consumption history was also used to forecast future trending. Regional temperature taken at the National Oceanic and Atmospheric Administration (NOAA) station at SeaTac International Airport during the system peak was used to compare peak load reading. The load readings were normalized to 23˚ F, which was used as a 1-in-2 year normal ambient temperature at the time of system peak. Forecasts were also performed for a 1-in-20 year (or extreme temperature) forecast at 13˚ F.

To perform the system and county level forecasts, population data was also taken from the US Census as well as the US Bureau of Economic Analysis (BEA) and WA State Office of Financial Management (OFM). Employment data was taken from BEA, US Bureau of Labor Statistics (BLS), and Washington State Employment Security Department. Additionally, historic and forecasted US level data was from Moody's Analytics. At the sub-county level, population and employment data were obtained from Puget Sound Regional Council (PSRC) and WA State OFM.

PSE used the population and employment forecast evaluated by the PSRC for King, Pierce, and Kittitas counties. Population data was also taken from the US Census as well as the US BEA and WA State OFM. Employment forecast data were taken from the US BLS and PSRC.

To augment the data provided by the government agencies, PSE provided information about expected significant new loads, known as "block loads," over the next few years. This information was used for the first three years of the forecast period at full value, then at 50% value for the next three years. After six years, the forecast block loads were considered to be included in the data available on employment and population provided by the forecasting agencies so no additional load was added to the load forecast after year six.

Once an econometric forecast was developed for each county, or for the company as a whole, the peak demand and energy consumption were reduced by a forecast amount of conservation based on conservation target determined as optimal from the 2013 Integrated Resource Plan (IRP). This conservation target includes energy efficiency programs, Energy Independence and Security Act (EISA), distribution efficiency, and demand response. PSE has not implemented an active demand response program, so the demand response included in this forecast consisted of conservation programs and intrinsic conservation due to measures required by modern building codes.

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It should be noted that a segment of PSE's transmission customers were not included in the corporate load forecast. These are interconnection or high voltage customers who connect to PSE for transmission service, but do not purchase energy from PSE. Approximately 250-300 MWs are required by the transmission customers on a nearly continuous basis.

There are some differences between the 2012 and 2014 load forecast worth noting:

a. The 2012 load forecast assumed faster recovery of the US economy from the recession than the 2014 load forecast.
b. The 2014 load forecast used updated US population growth forecast from the US Bureau of Census, which is lower compared to what was used in the 2012 load forecast.
c. Because of slower housing recovery, customer growth and customer counts in the 2014 load forecast are lower than the 2012 load forecast.
d. Peak load growth and peak load levels for the system and for King County are projected to be lower in the 2014 load forecast as compared to the 2012 load forecast.
e. Based on PSRC's population and employment growth forecasts, Eastside peak loads in the 2014 load forecast are projected to grow by 2.4% per year in the next 10 years, which is driven by growth in the commercial sector and high density residential sector. Also, updates to block loads over the study period influenced the load growth in the Eastside area.

The following tables show the comparison between the 2012 and 2014 system corporate load forecast and a breakdown by county of the 2014 corporate load forecast.

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Table 2-2: Comparison of PSE's 2012 and 2014 Corporate Load Forecast

PSE Corporate Load Forecast				
	Forecasted 2012		Forecasted 2014	
Year	Max of Normal Peak w/ DSR	Max of Extreme Peak w/ DSR	Max of Normal Peak w/ DSR	Max of Extreme Peak w/ DSR
2012	4,837	5,316		
2013	4,785	5,267		
2014	4,836	5,333	4,803	5,255
2015	4,865	5,375	4,820	5,283
2016	4,909	5,432	4,844	5,317
2017	4,938	5,472	4,891	5,377
2018	4,938	5,483	4,891	5,385
2019	4,946	5,501	4,904	5,406
2020	4,923	5,490	4,856	5,365
2021	4,923	5,502	4,850	5,366
2022	4,972	5,562	4,863	5,388
2023	5,039	5,641	4,888	5,421
2024	5,117	5,732	4,961	5,504
2025	5,193	5,820	5,029	5,581
2026	5,266	5,905	5,085	5,645
2027	5,341	5,993	5,148	5,716
2028	5,426	6,090	5,224	5,802
2029	5,515	6,192	5,302	5,889
2030	5,605	6,296	5,376	5,972
2031	5,694	6,399	5,444	6,049
2032	5,785	6,504	5,512	6,126
2033	5,878	6,610	5,580	6,203
2034			5,649	6,282

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Table 2-3: PSE's 2014 Corporate Peak Load Forecast by County

2014 PSE Corporate Peak Load Forecast by County									
Year	King	Thurston	Pierce	Whatcom	Skagit	Island	Kitsap	Kittitas	Total PSE
2014	2391	549	498	374	265	144	524	59	4803
2015	2410	550	500	373	263	143	523	59	4820
2016	2427	552	503	372	262	143	524	61	4844
2017	2458	557	508	375	262	143	526	62	4891
2018	2454	559	510	375	260	143	526	64	4891
2019	2465	561	511	375	259	143	526	65	4904
2020	2445	555	506	371	254	140	518	66	4856
2021	2443	555	505	370	252	140	516	68	4850
2022	2454	557	506	370	251	139	516	70	4863
2023	2472	559	508	371	250	139	517	71	4888
2024	2515	567	515	376	252	141	522	74	4961
2025	2555	574	521	380	253	142	527	76	5029
2026	2590	580	526	384	254	143	531	78	5085
2027	2628	586	531	388	255	144	536	80	5148
2028	2675	594	538	392	256	145	541	82	5224
2029	2723	601	545	397	258	146	547	84	5302
2030	2769	609	551	402	259	147	553	87	5376
2031	2814	615	555	406	260	148	557	88	5444
2032	2859	621	559	410	261	149	562	90	5512

The 2013 Needs Assessment used PSE's 2012 corporate load forecast as the basis for the analyses and adjusted the load based on PSE's knowledge of future block loads and non-PSE customers supplied by PSE. In PSE's 2012 corporate load forecast, the forecast was provided for PSE's system as a whole, and sub-area forecasts were proportionally derived from this overall forecast. For the 2015 Needs Assessment, PSE's 2014 corporate load forecast was used and was also adjusted for non-PSE load supplied by PSE. This 2014 corporate load forecast provided an overall PSE system forecast and it also included bottom-up sub-area load forecasts for the King County and Eastside areas.

Table 2-4 below lists the Eastside and King County load levels for the cases used in the 2013 Needs Assessment and Table 2-5 lists the load levels using the 2014 load forecast. Comparing the results of the load levels for winter 2017-18, the total load level for PSE's system is 46 MW less using the 2014 load forecast (5162 MW) than the 2012 forecast (5208 MW). Using the 2014 load forecast, the King County area, without the Eastside load, is 27 MW higher (1854 MW – 1881 MW) and the Eastside area is 11 MW less than 2012 forecast (699 MW–688 MW). The remaining reduction is distributed over the rest of PSE.

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Table 2-4 Eastside and King County Load Levels Using 2012 Load Forecast in MW

Case	King County (excluding Eastside)	Eastside	Remainder of system	Total
17-18HW	1854	699	2654	5208
18HS	1258	550	1744	3552
21-22HW	1862	748	2548	5193

Table 2-5: Eastside and King County Load Levels Using 2014 Load Forecast in MW

Case	King County (excluding Eastside)	Eastside	Remainder of system	Total
17-18HW	1881	688	2592	5162
17-18EHW	2091	728	2828	5647
18HS	1379	538	1707	3625
19-20HW	1858	708	2609	5175
19-20EHW	2084	749	2843	5676
20HS	1373	561	1747	3681
23-24HW	1817	764	2577	5158
23-24EHW	2053	804	2833	5691
24HS	1399	618	1800	3817

2.3 Base Cases Used for Analysis

The WECC base cases are updated annually. The cases available for this update were Heavy Winter 2019-20 and 2023-24 and Heavy Summer 2020 and 2024. All other cases were derived from those WECC cases. Table 2-6 below includes a comparison of the cases utilized in the 2013 Needs Assessment and the 2015 Needs Assessment study cases using 2014 updated data.

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Table 2-6: Comparison of the Cases Utilized in the Eastside Needs Assessment

Case	2012	2014
2013-14 Heavy Winter	✓	--
2017-18 HW SN 100% Cons	✓	✓
2017-18 HW SN 75% Cons	✓	--
2017-18 HW SN 50% Cons	✓	--
2019-20 HW SN 100% Cons	--	✓
2021-22 HW SN 100% Cons	✓	--
2021-22 HW SN 75% Cons	✓	--
2021-22 HW SN 50% Cons	✓	--
2021-22 HW SN Extreme 100% Cons	✓	--
2021-22 HW SN Extreme 75% Cons	✓	--
2023-24 HW SN 100% Cons	--	✓
2014 HS NS	✓	--
2018 HS NS	✓	✓
2018 HS SN	✓	--
2024 HS NS	--	✓
2024 HS SN	--	✓

2.4 Points of Clarification from the 2013 Needs Assessment

2.4.1 Use of Corrective Action Plans (CAPs)

PSE uses operating procedures, such as corrective action plans (CAPs), to prevent any loss of firm load, either intentionally or due to a credible outage condition while remaining compliant with mandatory NERC/WECC reliability requirements. CAPs are generally considered temporary in nature with the understanding that permanent solutions are forthcoming. NERC Standard TPL-001-4 allows CAPs to be used to meet the performance requirements for most N-1-1 and N-2 contingencies while specifying how long they will be needed as part of the CAPs.

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2.4.2 Use of Load Shedding

While NERC and WECC allow dropping "non-consequential[1]" load for certain contingencies, intentionally dropping firm load for an N-1-1 or N-2 contingency to meet its federal planning requirements is not a practice that PSE endorses. All load modeled in the Needs Assessment studies was firm load and PSE does not consider any of its firm requirements to be non-consequential. This is consistent with the view of most utilities. It is also consistent with the views of virtually all community officials who do not consider intentionally blacking out segments of customers as a responsible way to operate a modern electricity delivery system.

PSE's concern about using load shedding for N-1-1 contingencies is best illustrated by the outage of two 230 kV-115 kV transformers in the Eastside area. Losing two 230 kV-115 kV transformers could result in the other remaining 230 kV-115 kV transformers being overloaded. In this scenario, simply re-dispatching PSE generation does not reduce these transformer overloads below the emergency rating. A transformer outage would require a minimum 24-hour outage to test and re-energize the transformer. Further, if the outaged transformer tests bad, then it must be replaced, and this can take up to another five to seven weeks. This scenario results in a significant amount of time to place PSE customers at risk either with CAPs or with exposure to load shedding.

To illustrate how other utilities in WECC address load shedding, the CAISO Planning Standards indicates in their Section 6, Planning for High Density Urban Load Area:

> *"Increased reliance on load shedding to meet these needs would run counter to historical and current practices, resulting in general deterioration of service levels. For local area long-term planning, the ISO does not allow non-consequential load dropping in high density urban load areas in lieu of expanding transmission or local resource capability to mitigate NERC TPL-001-4 standards P1-P7 contingencies and impacts on the 115 kV or higher voltage systems….In the near-term planning, where allowed by NERC standards, load dropping, including high density urban load, may be used to bridge the gap between real-time operations and the time when system reinforcements are built."*

3. Results of 2015 Needs Assessment

The detailed results of the 2015 Needs Assessment are shown in Appendix A for winter peak conditions and Appendix B for summer peak conditions. The results verified that there is a transmission capacity deficiency in the Eastside area that will develop by the winter of 2017-18. This transmission capacity deficiency in the Eastside area is expected to increase beyond that date.

Using the same methodology as the 2013 Needs Assessment, the supplemental analysis shows that a transmission capacity deficiency develops at a winter Eastside area load of 688 MW, requiring the use of CAPs, and worsens at an Eastside area load of 708 MW, requiring both the use of CAPs and exposing some PSE customers to load shedding. The transmission capacity deficiency also develops at a summer Eastside area load of 538 MW.

[1] Non-Consequential Load is defined as Non-Interruptible Load loss that does not include: (1) Consequential Load Loss, (2) the response of voltage sensitive Load, or (3) Load that is disconnected from the System by end-user equipment. Consequential Load is defined as all Load that is no longer served by the Transmission system as a result of Transmission Facilities being removed from service by a Protection System operation designed to isolate the fault.

DRAFT

Similar to the 2013 results, there were a significant number of overloads that showed up in the results of power flow studies due to outages of high voltage lines owned by other utilities that interconnect to PSE. Most of these are outages in BPA's 230 kV or 500 kV network. BPA and the other interconnected utilities have operating procedures in place to prevent overloads of area facilities, including PSE lines and equipment. For example, the most frequent external contingency that causes PSE overloads is an outage of the [redacted]. BPA operates the interchange flows and generation levels so that this [redacted] line outage does not cause overloads. Therefore, overloads resulting from this [redacted] BPA line were not considered as necessary for PSE to resolve.

In addition, a number of overloads of area transmission lines can be partially mitigated by adjusting PSE generation levels in Western Washington. As such, this type of generation re-dispatch costs more than the optimal generation levels that PSE would elect, thereby driving up customer costs. Therefore, while these system adjustments are not a desirable operating condition, they are acknowledged as an available action to mitigate these types of overloads while remaining NERC compliant.

There are still a number of transmission transformer overloads which cannot be addressed by dispatching generation, similar to the 2013 Needs Assessment. These transformer overloads will require CAPs in the future to shift load; at some point the CAPs will be expanded to include load shedding in order to remain NERC compliant.

3.1 Winter Analysis

Utilizing the 2014 load forecast and the results of the winter analysis, Figure 3-1 shows two system capacity lines for the Eastside area – both of which are reflected on the graph as dashed red lines. These lines highlight the area of concern where the 2015 Needs Assessment indicates violations of the mandatory performance requirements developed for certain contingencies that put customer reliability at risk. The area of concern starts at an Eastside area load of 688 MW in the winter of 2017-18 and continues to 708 MW in the winter of 2019-20. The 2015 Needs Assessment established that a transmission capacity deficiency exists at an Eastside area load level of 688 MW that requires the use of CAPs to manage Category C overloads in winter of 2017-18. The 2015 Needs Assessment also established that the transmission capacity deficiency continues to worsen at an Eastside area load level of 708 MW, which requires the use of additional CAPs by winter of 2019-20. These additional CAPs placed approximately 63,200 customers at risk of losing power due to being served radially. By the winter of 2023-24 the CAPs will require load shedding affecting approximately 16,800 customers to prevent thermal violations under certain conditions.

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DSD 001979

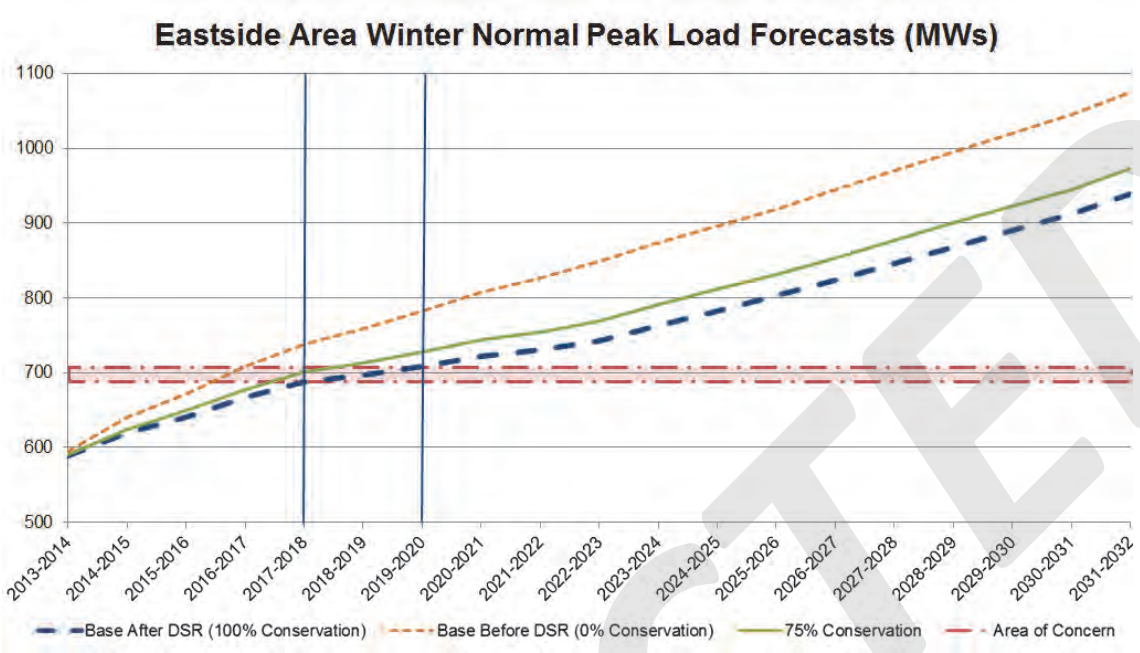

Figure 3-1: Capacity Need Results with 2015 Updated Information

The area of concern shown in Figure 3-1 is consistent with the 706 MVA level of concern identified for the Eastside area in the 2013 Needs Assessment. This value was reflected in the graph shown in Figure 4-3 of the 2013 Needs Assessment (where the units were mislabeled as "MW"). The actual MW value for the level of concern was 699 MW in the 2013 Needs Assessment. The 699 MW value reflected the load level of the Eastside area in the winter of 2017-18 in the previous study where the power flows indicated violations of the mandatory performance requirements that put customer reliability at risk. For ease of reference, this figure is repeated below as Figure 3-2.

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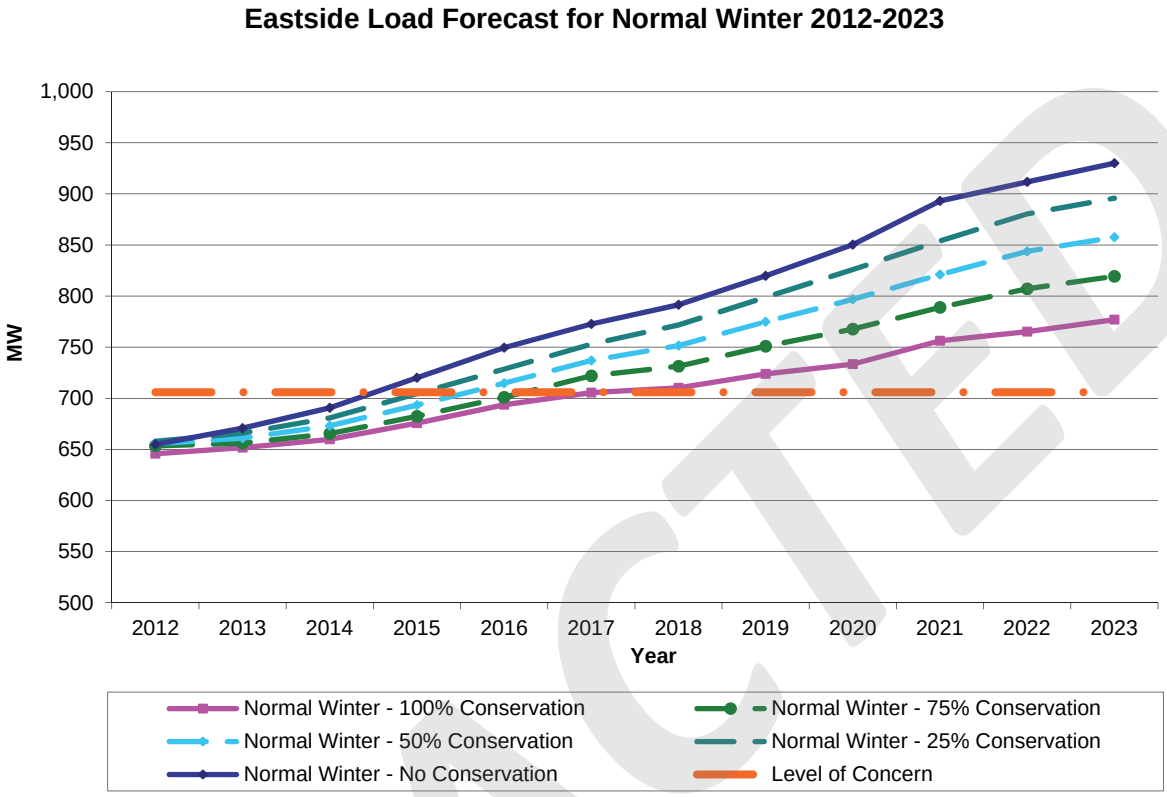

Figure 3-2: Level of Concern for Eastside Area Load in 2013 Needs Assessment

As the winter summary in Table 3-1 shows, CAPs are needed throughout the study period. As noted above, CAPs are required starting in the winter of 2017-18 to manage overloads on five elements from 12 Category C contingencies. By 2019-20, the overloads on these same five elements will be created from 18 Category C contingencies, which require additional CAPs to manage and which place approximately 63,200 customers at risk by placing them on radial feeds. By 2023-24 the overloads on these same five elements will be caused by 40 Category C contingencies, which require the use of even more CAPs and place approximately 68,800 customers at risk. In addition, by 2023-24 load shedding of approximately 133 MW will be needed to maintain a reliable and secure transmission system.

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Table 3-1: Winter Power Flow Summary Comparison of 2013 and 2015 Needs Assessment

Winter Power Flow Summary						
	2012 Load Forecast			2014 Load Forecast		
	2013-14 Winter 5055 MW 100% Conserv-ation Eastside Load = 545 MW	2017-18 Winter 5208 MW 100% Conserv-ation Eastside Load = 699 MW	2021-22 Winter 5193 MW 100% Conserv-ation Eastside Load = 748 MW	2017-18 Winter 5162 MW 100% Conserv-ation Eastside Load = 688 MW	2019-20 Winter 5175 MW 100% Conserv-ation Eastside Load = 708 MW	2023-24 Winter 5158 MW 100% Conserv-ation Eastside Load = 764 MW
Elements Above Emergency Limit:						
Category B (N-1)	0	0	2	0	0	0
Category C (N-1-1 & N-2)	5	6	5	5	5	5
Corrective Action Plans Required	Yes	Yes	Yes	Yes	Yes	Yes
Customers at Risk from Corrective Action Plans	0	68,800	76,300	0	63,200	68,800
Customers at Risk from Load Shedding	0	0	4,400	0	0	16,800
Load Shed MW	0	0	22	0	0	133
Elements Above Normal Limit or 90% of Emergency Limit:						
Category B (N-1)	0	4	6	0	3	3
Category C (N-1-1 & N-2)	6	7	8	7	6	5
Contingencies that cause post-contingency loading above 100% of Emergency Limit:						
Category B (N-1)	0	0	1	0	0	0
Category C (N-1-1 & N-2)	13*	23*	37*	12	18	40

* Note: There were additional contingencies in the study using the 2012 Load Forecast that resulted in overloads between 100% and 104%. In the supplemental study, overloads on the PSE lines between 100% and 104% were eliminated to account for the change in line ratings from 2012 to 2014. Those overloads are not included in the 2012 Load Forecast counts provided in this table.

Detailed results of the winter analysis are shown in Appendix A.

DSD 001982

3.2 Summer Analysis

The 2013 Needs Assessment showed a PSE area summer load level of need at approximately 3340 MW. This need was illustrated in Figure 1-2 of that document and is included as Figure 3-3 below for ease of reference.

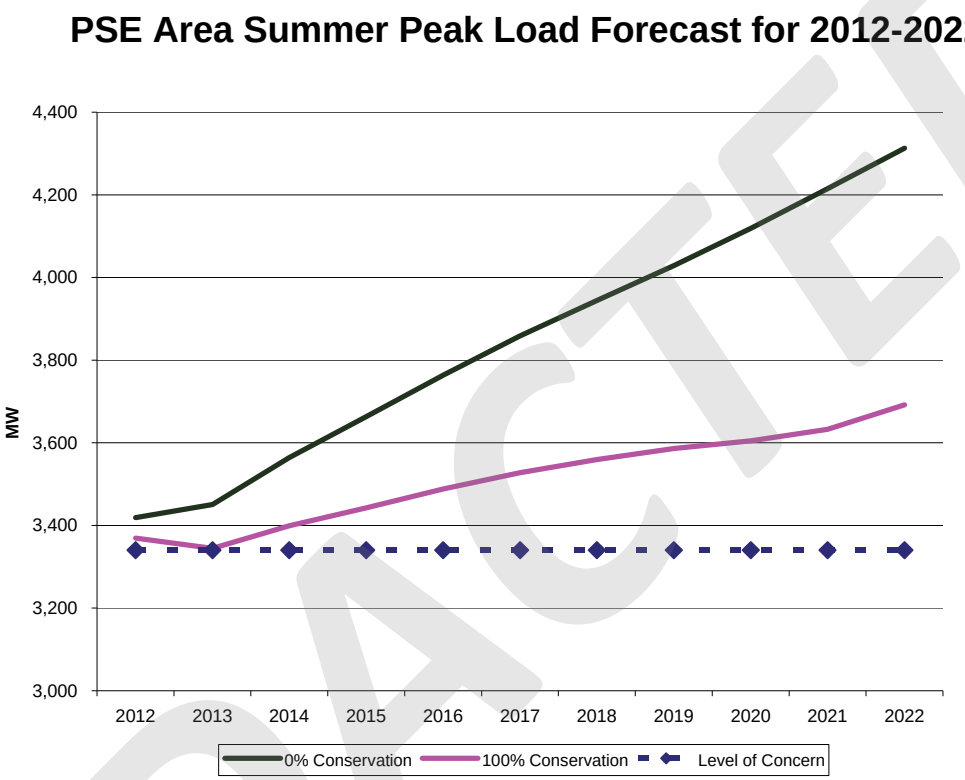

Figure 3-3: PSE Area Summer Peak Load Forecast for 2012-2022

The 2013 Needs Assessment, analyzed the summer of 2018, had a PSE area summer peak of approximately 3,552 MW. That 2013 assessment found there were two 230 kV elements above 100% and two 115 kV elements above 93% loadings for Category B (N-1) contingencies. Also, there were three elements above 100% loading and one above 99% loading for Category C (N-1-1) contingencies. In the 2013 Needs Assessment, the 3,552 MW system load corresponds to an Eastside Area load level of 550 MW. In the 2013 Needs Assessment, we identified that CAPs were needed to manage the Category C (N-1-1) contingencies and that up to 33,000 customers would be put at risk when those CAPs were utilized.

The 2015 Needs Assessment shows an Eastside summer load level of need at approximately 538MW. This need is shown in Figure 3-4 below.

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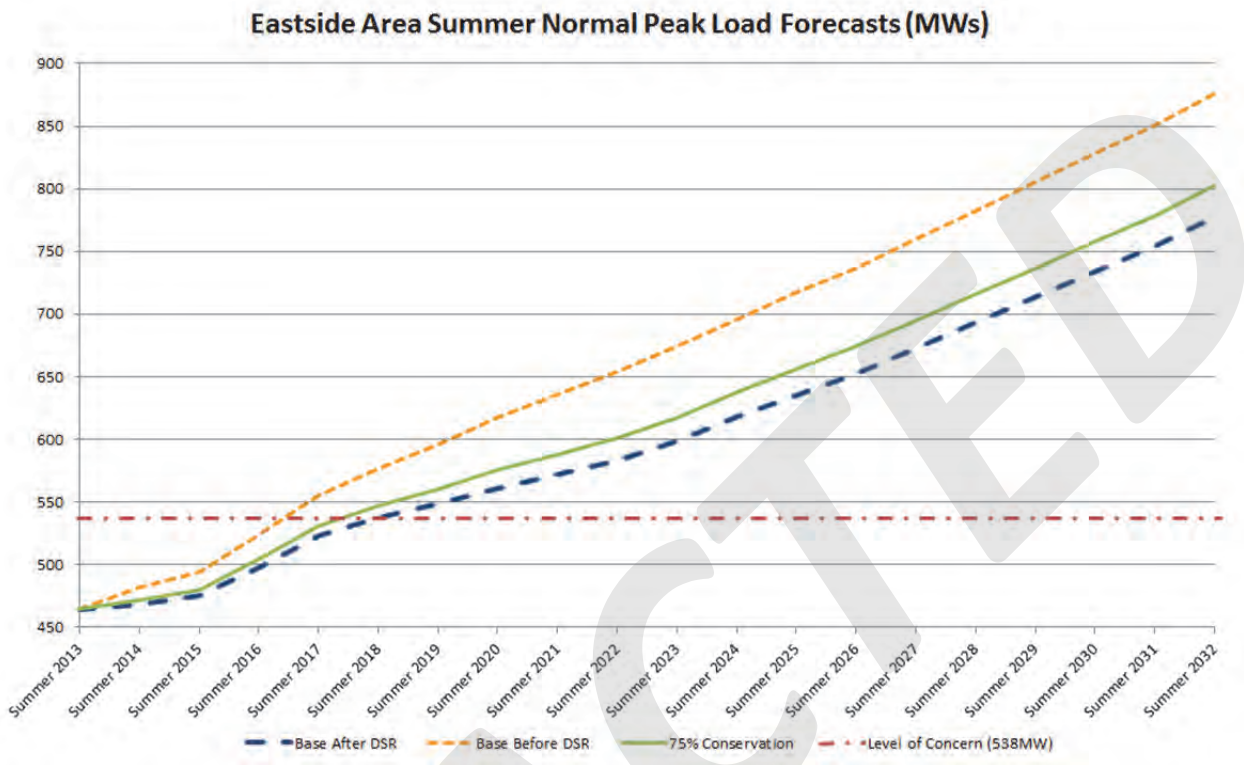

Figure 3-4: Eastside Summer Peak Load Forecast for 2012-2023

Table 3-2 summarizes the results of the 2015 Needs Assessment and it shows that the amount of customers at risk for losing power will increase to approximately 68,800 by the summer of 2018. The 2015 Needs Assessment also shows that load shedding of approximately 74 MW will be needed to maintain a reliable and secure transmission system starting in the summer 2018, increasing to approximately 78 MW in 2020 and approximately 123 MW by 2024. The number of contingencies that cause post-contingency loading above 100% Emergency Limit is six by the summer of 2018 and grows to nine by 2024.

REDACTED

Table 3-2: Summer Power Flow Summary Comparison of October 2013 and 2015 Updated Results

Summer Power Flow Summary				
	2012 Load Forecast	2014 Load Forecast		
	2018 Summer 3552 MW 100% Conservation Eastside Load = 550 MW	2018 Summer 3625 MW 100% Conserv-ation Eastside Load = 538 MW	2020 Summer 3681 MW 100% Conserv-ation Eastside Load = 561 MW	2024 Summer 3817 MW 100% Conserv-ation Eastside Load = 618 MW
Elements Above Emergency Limit:				
Category B (N-1)	2 [1]	1 [1]	2 [1]	2 [1]
Category C (N-1-1 & N-2)	3	5 [2]	5 [2]	5 [2]
Corrective Action Plans Required	Yes	Yes	Yes	Yes
Customers at Risk from Corrective Action Plans	62,800	68,800	68,800	68,800
Customers at Risk from Load Shedding	0	10,900	10,900	12,700
Load Shed MW	0	74	78	123
Elements Above Normal Limit or 90% of Emergency Limit:				
Category B (N-1)	4	1	2	2
Category C (N-1-1 & N-2)	4	6	6	6
Contingencies that cause post-contingency loading above 100% of Emergency Limit:				
Category B (N-1)	2	2	2	2
Category C (N-1-1 & N-2)	8	6	7	9

[1] These elements are BPA transmission lines leased by PSE

[2] These elements include 1 BPA transmission line leased by PSE

Detailed results of the summer analysis are shown in Appendix B.

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4. Conclusions of the 2015 Needs Assessment using the 2014 PSE Load Forecast

The project date of need will remain the same at the winter of 2017-18 due to these key risk factors:

- The 2017-18 winter power flow cases still require the use of CAPs to mitigate transmission transformer overloads with load risk beginning between 2017-18 to 2019-20.
- The number of contingencies requiring the use of CAPs steadily increases as load grows.
- The forecast uses a 1-in-2 year weather forecast. Colder weather will result in higher load levels.
- 100% conservation may not be achieved, which would result in a higher load level. Even if 100% conservation is achieved, it may not be in the appropriate locations and magnitudes assumed for this assessment.
- There is only 20 MW difference on the Eastside between the winters of 2017-18 and 2019-20, and in the winter of 2019-20 with over 60,000 customers are at risk.
- By the summer of 2018, studies show that 68,800 customers will be at risk of outages and 10,900 customers at risk of load shedding using CAPs to mitigate transmission transformer overloads.
- Load shedding becomes an increasingly necessary action as load grows.

5. Statement of Need

The 2015 Needs Assessment reconfirmed that, by winter of 2017-18, there is a transmission capacity deficiency on the Eastside that impacts PSE customers and communities in and around Kirkland, Redmond, Bellevue, Issaquah, Newcastle, and Renton along with Clyde Hill, Medina, and Mercer Island. The transmission deficiency focuses on the two 230 kV supply injections into central King County at Sammamish substation in the north and Talbot Hill substation in the south. The transmission capacity becomes a need at an Eastside winter load level of approximately 688 MW, where overloads will result in operating conditions that require CAPs to manage. By winter of 2019-20, at an Eastside load level of approximately 706 MW, additional CAPs are required that will put approximately 63,200 Eastside customers at risk of outages. These results are summarized in Table 3-1 above.

The 2015 Needs Assessment also reconfirmed that by summer of 2018, there will be a transmission capacity deficiency on the Eastside which impacts PSE customers and communities in and around Kirkland, Redmond, Bellevue, Issaquah, and Newcastle along with Clyde Hill, Medina, and Mercer Island. By summer of 2018, CAPs will be required to manage overloads under certain Category C contingencies and the use of these CAPs will place approximately 68,800 customers at risk and will require 74 MW of load shedding, affecting approximately 10,900 customers. These results are summarized in Table 3-2 above.

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DSD 001986

Appendix A. 2015 Needs Assessment Results for Winter Peak Season

Table A-1: Summary of Potential Thermal Violations for Winter Peak Load Season

2013-14 5055 MW 100% Con Eastside Load = 545 MW		2017-18 5208 MW 100 % Con Eastside Load = 699 MW		2021-22 5193 MW 100% Con Eastside Load = 748 MW		2017-18 5162 MW 100% Conservation Eastside Load = 688 MW		2019-20 5175 MW 100% Conservation Eastside Load = 708 MW		2023-24 5153 MW 100% Conservation Eastside Load = 764 MW		2023-24 Extreme 5690 MW 100% Conservation Eastside Load = 804 MW	
Category B: N-1 Contingency Results													
[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload
		[redacted]	Talbot Hill - Lakeside #1 115 kV line – 98.6%	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 97.4%	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 87.7%[3]	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 91.1%	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 96.1%	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 101.0%
		[redacted]	Talbot Hill - Lakeside #2 115 kV line – 98.4%	[redacted]	Talbot Hill - Lakeside #2 115 kV line – 97.2%	[redacted]	Talbot Hill - Lakeside #2 115 kV line – 87.5%	[redacted]	Talbot Hill - Lakeside #2 115 kV line – 90.9%	[redacted]	Talbot Hill - Lakeside #2 115 kV line – 92.4%	[redacted]	Talbot Hill - Lakeside #2 115 kV line – 97.1%
		[redacted]	Talbot Hill 230-115 kV transformer #1 – 89.0%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 91.0% (see footnote 4)	[redacted]	Talbot Hill 230-115 kV transformer #1 – 85.1%[4]	[redacted]	Talbot Hill 230-115 kV transformer #1 – 85.6%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 87.1%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 95.9%
		[redacted]	Talbot Hill 230-115 kV transformer #2 – 90.3%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 91.5%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 89.3%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 90.2%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 92.8%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 101.9%

[2] All contingencies involving loss of the Monroe – Echo Lake – SnoKing 500 kV three-terminal line are unsolvable in the 21-22HW case without modeling the Intalco load tripping RAS. Study results reflect opening all Intalco loads, totaling about 300 MW, to get the case to a solvable state. Opening these loads slightly changes line flows in the case and may contribute to the decrease in post-contingency line loading.

[3] Decrease in post-contingency line loading can be attributed to lower area load, lower SCL load and increased line ratings between the 2012 study and the current study.

[4] The Talbot 230/115 kV transformer #1 is scheduled to be replaced in 2015 and the new expected ratings and impedance were included in the 2014 cases.

DSD 001987

2013-14 5055 MW 100% Con Eastside Load = 545 MW		2017-18 5208 MW 100 % Con Eastside Load = 699 MW		2021-22 5193 MW 100% Con Eastside Load = 748 MW		2017-18 5162 MW 100% Conservation Eastside Load = 688 MW		2019-20 5175 MW 100% Conservation Eastside Load = 708 MW		2023-24 5153 MW 100% Conservation Eastside Load = 764 MW		2023-24 Extreme 5690 MW 100% Conservation Eastside Load = 804 MW	
				[redacted]	Sammamish-Lakeside #1 115 kV Line - 104.7%								
				[redacted]	Sammamish-Lakeside #2 115 kV Line - 104.5%								
Category C: N-1-1 Contingency Results													
[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload
[redacted]	Talbot Hill-Lakeside #1 115 kV Line - 115.2%	[redacted]	Talbot Hill--Lakeside #1 115 kV Line - 127.5%	[redacted]	Talbot Hill--Lakeside #1 115 kV Line – 125.9%	[redacted]	Talbot Hill--Lakeside #1 115 kV Line – 113.3%	[redacted]	Talbot Hill-Lakeside #1 115 kV Line – 117.4%	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 123.9%	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 130.5%
[redacted]	Talbot Hill-Lakeside #2 115 kV Line - 115.1%	[redacted]	Talbot Hill--Lakeside #2 115 kV Line - 127.7%	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 125.8%	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 113.1%	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 117.3%	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 120.8%	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 127.2%
[redacted]	Talbot Hill 230-115 kV transformer #1 - 100.9%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 105.8%	[redacted]	Talbot Hill 230-115 kV transformer #1 - 108.1%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 101.0%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 101.3%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 103.1%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 113.7%
[redacted]	Talbot Hill 230-115 kV transformer #2 - 100.5%	[redacted]	Talbot Hill 230-115 kV transformer #2 - 105.7%	[redacted]	Talbot Hill 230-115 kV transformer #2 - 107.0%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 104.6%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 105.4 %	[redacted]	Talbot Hill 230-115 kV transformer #2 – 108.1%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 118.5%

DSD 001988

2013-14 5055 MW 100% Con Eastside Load = 545 MW		2017-18 5208 MW 100 % Con Eastside Load = 699 MW		2021-22 5193 MW 100% Con Eastside Load = 748 MW		2017-18 5162 MW 100% Conservation Eastside Load = 688 MW		2019-20 5175 MW 100% Conservation Eastside Load = 708 MW		2023-24 5153 MW 100% Conservation Eastside Load = 764 MW		2023-24 Extreme 5690 MW 100% Conservation Eastside Load = 804 MW	
[redacted]	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 101.1%	[redacted]	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line - 110.4%	[redacted]	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line – 110.5%	[redacted]	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line – 101.1%	[redacted]	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line – 103.0%	[redacted]	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line – 102.9%	[redacted]	Talbot Hill-Boeing Renton-Shuffleton 115 kV Line – 110.2%
[redacted]	White River - Lea Hill - Berrydale 115 kV line - 91.7%	[redacted]	White River - Lea Hill - Berrydale 115 kV line – 98.0%	[redacted]	White River - Lea Hill - Berrydale 115 kV line - 99.7%	[redacted]	White River - Lea Hill - Berrydale 115 kV line – 90.6%	[redacted]	White River - Lea Hill - Berrydale 115 kV line – 92.0%	[redacted]	White River - Lea Hill - Berrydale 115 kV line – 88.4%[4]	[redacted]	White River - Lea Hill - Berrydale 115 kV line – 98.2%
Category C: N-2 and Common Mode Contingency Results													
[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload
		[redacted]	Talbot Hill-Lakeside #1 115 kV Line - 101.5%	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 96.8%[5]	[redacted]	Talbot Hill-Lakeside #1 115 kV Line – 89.9%	[redacted]	Talbot Hill-Lakeside #1 115 kV Line – 92.3%	[redacted]	Talbot Hill-Lakeside #1 115 kV Line – 98.9%	[redacted]	Talbot Hill-Lakeside #1 115 kV Line – 102.3%
		[redacted]	Talbot Hill-Lakeside #2 115 kV Line - 102.1%	[redacted]	Talbot Hill - Lakeside #2 115 kV line – 107.1%[6]	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 94.5%	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 99.4%	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 103.4%	[redacted]	Talbot Hill-Lakeside #2 115 kV Line – 107.7%
		[redacted]	Talbot Hill 230-115 kV transformer #1 – 91.8%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 93.6%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 88.1%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 88.2%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 90.1%	[redacted]	Talbot Hill 230-115 kV transformer #1 – 99.6%

[5] Using the 2012 load forecast in the 2021-22 Heavy Winter case, this contingency is unsolvable, even with the Intalco load tripping RAS modeled.

[6] N-2: ADJ Talbot – Lake Tradition #1 & Talbot – Lakeside #1 115 kV was second most limiting contingency and overloaded this element by 106.6%. It is possible that, as load drops, the limiting contingency will change.

DSD 001989

2013-14 5055 MW 100% Con Eastside Load = 545 MW		2017-18 5208 MW 100 % Con Eastside Load = 699 MW		2021-22 5193 MW 100% Con Eastside Load = 748 MW		2017-18 5162 MW 100% Conservation Eastside Load = 688 MW		2019-20 5175 MW 100% Conservation Eastside Load = 708 MW		2023-24 5153 MW 100% Conservation Eastside Load = 764 MW		2023-24 Extreme 5690 MW 100% Conservation Eastside Load = 804 MW	
		[redacted]	Talbot Hill 230-115 kV transformer #2 – 92.8%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 93.2%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 93.14%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 92.6%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 95.7%	[redacted]	Talbot Hill 230-115 kV transformer #2 – 104.8%
		[redacted]	Berrydale 230-115 kV transformer – 93.6%	[redacted]	Berrydale 230-115 kV transformer - 95.5%	[redacted]	Berrydale 230-115 kV transformer – 95.6%	[redacted]	Berrydale 230-115 kV transformer – 87.6%	[redacted]	Berrydale 230-115 kV transformer – 88.3%[7]	[redacted]	Berrydale 230-115 kV transformer – 96.7%

[7] BF: White River 115 kV bus section breaker resulted in loading the Berrydale 230/115 kV transformer to 87.3% for this case. As loading shifts off of the Berrydale transformer, the White River BSBF is less critical.

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Appendix B. Supplemental Needs Assessment Results for Summer Peak Season

Table B-2: Summary of Potential Thermal Violations for Summer Peak Load Season

2014 3343 MW 100% Con		2018 3554 MW 100% Con Eastside Load = 550 MW		2018 3625 MW 100% Conservation Eastside Load = 538 MW		2020 3681 MW 100% Conservation Eastside Load = 561 MW		2024 3813 MW 100% Conservation Eastside Load = 618 MW	
Category B: N-1 Contingency Results									
[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload
[redacted]	Monroe-Novelty Hill 230 kV line - 132.6%	[redacted]	Monroe-Novelty Hill 230 kV line - 133.0%	[redacted]	Monroe-Novelty Hill 230 kV line – 143.9%	[redacted]	Monroe-Novelty Hill 230 kV line – 143.1%	[redacted]	Monroe-Novelty Hill 230 kV line – 139.8%
[redacted]	Maple Valley - Sammamish 230 kV line - 111.4%	[redacted]	Maple Valley - Sammamish 230 kV line - 132.3%	[redacted]	N/A	[redacted]	Maple Valley - Sammamish 230 kV line – 110.0%[9]	[redacted]	Maple Valley - Sammamish 230 kV line – 116.4%
		[redacted]	Talbot Hill - Lakeside #1 115 kV line - 93.9%	[redacted]	N/A	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 81.5%	[redacted]	Talbot Hill - Lakeside #1 115 kV line – 87.8%
		[redacted]	Talbot Hill - Lakeside #2 115 kV line - 93.8%	[redacted]	N/A	[redacted]	Talbot Hill - Lakeside #2 115 kV line – 81.3%	[redacted]	Talbot Hill - Lakeside #2 115 kV line – 87.6%
Category C: N-1-1 Contingency Results									
[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload

[8] Loading reported on the Maple Valley – Sammamish 230 kV and Talbot Hill – Lakeside #1 & #2 115 kV lines occurred for a Heavy Summer condition with south-to-north transfers through the system. A 2018 Heavy Summer case with south-to-north flows was not available for this study. Due to consistency in the 2020 Heavy Summer and 2024 Heavy Summer with the results encountered in 2012 (see footnote 8 for discrepancies found in this case), the 2018 case was not developed and run.

[9] The 2012 TPL study modeled the Northern Intertie gen tripping scheme which trips Whitehorn and Fredonia generation and runs back Mica and Revelstoke generation in BC. Tripping this generation in a south-to-north condition without tripping the Northern Intertie exacerbates this overload. If the limiting contingency is run without the RAS in place, overloads on the Maple Valley – Klahanie line are only 106%.

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[redacted]	Sammamish 230-115 kV transformer #1 - 95.5%	[redacted]	Sammamish 230-115 kV transformer #1 - 100.03%	[redacted]	Sammamish 230-115 kV transformer #1 – 104.2%	[redacted]	Sammamish 230-115 kV transformer #1 – 108.1%	[redacted]	Sammamish 230-115 kV transformer #1 – 109.4%
[redacted]	Sammamish 230-115 kV transformer #2 - 100.8%	[redacted]	Sammamish 230-115 kV transformer #2 - 106.4%	[redacted]	Sammamish 230-115 kV transformer #2 - 110.1%	[redacted]	Sammamish 230-115 kV transformer #2 – 114.3%	[redacted]	Sammamish 230-115 kV transformer #2 – 115.6%
				[redacted]	Novelty Hill 230/115kV Transformer #2 - 102%	[redacted]	Novelty Hill 230/115kV Transformer #2 - 103%	[redacted]	Novelty Hill 230/115kV Transformer #2 - 100%
		[redacted]	Beverly Park - Cottage Brook 115 kV line – 101.4%	[redacted]	Beverly Park - Cottage Brook 115 kV line – 110.5%	[redacted]	Beverly Park - Cottage Brook 115 kV line – 110.2%	[redacted]	Beverly Park - Cottage Brook 115 kV line – 106.4%

Category C: N-2 and Common Mode Contingency Results

[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload	[redacted]	Overload
		[redacted]	Sammamish - Lakeside #2 115 kV line - 99.8%	[redacted]	Sammamish – Lakeside #2 115 kV – 90.8%	[redacted]	Sammamish - Lakeside #2 115 kV line 95.4%	[redacted]	Sammamish - Lakeside #2 115 kV line 99.2%
				[redacted]	Monroe-Novelty Hill 230 kV line – 143.6%	[redacted]	Monroe-Novelty Hill 230 kV line – 143.1%	[redacted]	Monroe-Novelty Hill 230 kV line – 139.9%

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Appendix C. Upgrades Included in Base Cases

Table C-3: Projects Added to the Eastside Needs Assessment Winter Base Case

2017-18	2019-20	2023-24
Bothell – SnoKing reconductor	Bothell – SnoKing reconductor	Bothell – SnoKing reconductor
Cumberland substation reconfigured to 115 kV	Cumberland substation reconfigured to 115 kV	Cumberland Substation reconfigured to 115 kV
White River – Electron Heights reroute to Alderton	White River – Electron Heights reroute to Alderton	White River – Electron Heights reroute to Alderton
Talbot 230/115 kV transformer #1 replacement	Talbot 230/115 kV transformer #1 replacement	Talbot 230/115 kV transformer #1 replacement
Spurgeon substation, Similk substation & Maxwelton substation	Spurgeon substation, Similk substation & Maxwelton substation	Spurgeon substation, Similk substation & Maxwelton substation
Carpenter substation removed	Carpenter substation removed	Carpenter substation removed
Bus section breakers at BPA Olympia and BPA Tacoma	Bus section breakers at BPA Olympia and BPA Tacoma	Bus section breakers at BPA Olympia and BPA Tacoma
Switched shunt at Paul 500 kV, Broad St. 115 kV	Switched shunt at Paul 500 kV	Switched shunt at Paul 500 kV

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Table C-4: Projects Added to the Summer NERC TPL Base Case for the Eastside Area

2018	2020	2024
Bothell – SnoKing reconductor	Bothell – SnoKing reconductor	Bothell – SnoKing reconductor
Cumberland substation reconfigured to 115 kV	Cumberland substation reconfigured to 115 kV	Cumberland substation reconfigured to 115 kV
Talbot 230/115 kV transformer #1 replacement	Talbot 230/115 kV transformer #1 replacement	Talbot 230/115 kV transformer #1 replacement
White River – Electron Heights reroute to Alderton	White River – Electron Heights reroute to Alderton	White River – Electron Heights reroute to Alderton
Spurgeon substation, Similk substation	Spurgeon substation, Similk substation	Spurgeon substation, Similk substation
Denny Way substation Phase 1	Denny Way substation Phase 1	Denny Way substation Phase 1 & Phase 2
Bus section breakers at BPA Olympia, BPA Tacoma and BPA Covington	Bus section breakers at BPA Olympia, BPA Tacoma and BPA Covington	Bus section breakers at BPA Olympia, BPA Tacoma and BPA Covington
Raver 500-230 kV Transformer	Raver 500-230 kV Transformer	Raver 500-230 kV Transformer
Switched shunt at Paul 500 kV	Switched shunt at Paul 500 kV	Switched shunt at Paul 500 kV
Switched shunt at Lake Tradition 115 kV removed	Switched shunt at Lake Tradition 115 kV removed	Switched shunt at Lake Tradition 115 kV removed

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Appendix D. West-side Northern Intertie, North of Echo Lake and South of Custer Flowgate One-Line Diagrams

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Figure D-1: One-Line Diagram – West-Side Northern Intertie

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Figure D-2: One-Line Diagram - North of Echo Lake

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Figure D-3: One-Line Diagram - South of Custer

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Independent Technical Analysis of Energize Eastside

for the

City of Bellevue, WA

April 28, 2015
Version 1.3

Prepared by
Utility System Efficiencies, Inc.

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1. Executive Summary

Utility System Efficiencies, Inc. (USE) was engaged by the City of Bellevue in December, 2014 to conduct an independent technical analysis of the purpose, need, and timing of the Energize Eastside project. Energize Eastside (EE) is Puget Sound Energy's (PSE's) proposed project to build a new electric substation and new higher–capacity (230 kilovolt) electric transmission lines in the East King County area, which encompasses Bellevue, Clyde Hill, Medina, Mercer Island, Newcastle, the towns of Yarrow Point, Hunts Point, and Beaux Arts, and portions of Kirkland, Redmond, and Renton (the Eastside). The transmission lines would extend from an existing substation in Redmond to one in Renton (See Figure 3.1).

The goals of the technical analysis were to determine:

- Is there a need for this project to address growth in Bellevue? In answering this question, the analysis included determining if PSE's load forecast is reasonable, and if their studied contingencies were reasonable. Here, reasonable is defined as just, rational, appropriate, ordinary, or usual in the circumstances.[1] If the actions or data are consistent with industry practice, it is deemed reasonable.
- Is the EE project needed to address the reliability of the electric grid on the Eastside? This question assesses the purpose of the project and its timing. In other words, is the need a local issue?
- Is there a need for the project to address regional flows, with imports/exports to Canada (ColumbiaGrid[2])? This question is examined in Appendix B, Optional Technical Analysis.

This independent technical analysis (ITA) included reviewing EE documentation, examining the forecast and growth assumptions, reviewing historical demand (MW load) of the area, reviewing weather volatility, and assessing potential variability from the forecast assumptions used in the EE study. The ITA reviewed PSE's forecasting methodology, the major elements that made up the forecast, and decisions made in the forecasting procedure (including choices on what elements or variables to include). The ITA compared PSE's forecast variables with typical industry forecast variables. The ITA also looked at the assumptions that PSE used in electrically modeling the Energize Eastside area, including generation assumptions, local loads, and regional flows. The ITA reviewed PSE's powerflow cases[3] to determine whether the modeling in the cases was consistent with the forecast, and whether the outage scenarios resulted in PSE's identified transmission deficiency.

The optional technical analysis (OTA) at Appendix B examined several hypothetical scenarios, called sensitivity studies. The OTA looked at the effect of a) reducing load growth in the Eastside area, b) reducing load growth in King County while keeping the Eastside growth the same, c) increasing Puget Sound area generation, and d) reducing the Northern Intertie[4] flow to zero (no transfers to Canada). Reduced Northern Intertie flow was examined only to assess the relative impact of local need

[1] http://www.nolo.com/dictionary/reasonable-term.html
[2] ColumbiaGrid (single word) is a regional transmission planning organization with a footprint encompassing Oregon, Washington, parts of Idaho and Montana.
[3] powerflow case: Computer model of the electric grid representing a snapshot in time with a specific scenario of electric load, generation, and equipment, including what is in service and what isn't.
[4] Northern Intertie - transmission interconnection between Washington and British Columbia (also called Path 3.)

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versus regional need and does not reflect a realistic planning scenario. The OTA also looked at the impact of an Extreme Winter forecast.

A key purpose of the ITA and the OTA was to provide an increased level of *understanding* of the purpose, need and timing of the EE project to the City Council and community stakeholders. Over the course of the project, dozens of questions were received from various stakeholders. City staff filtered stakeholder comment through the Task's scope, and submitted the need related questions to USE (Other comments as appropriate were directed to the Environmental Impact Statement (EIS) process, the Integrated Resource Plan[5] (IRP) process, etc.). A Q & A discussion is included at the end of each section of the ITA. All questions analyzed are also set forth in Appendix D.

Disclaimer: This report seeks to describe the findings in terms that a non-expert can understand. Thus, some descriptions or definitions may not be exact, in an effort to make the general concept clear. However, some questions received required a higher level of technical detail. Again, the effort was made to simplify the explanations while still providing a helpful response. A glossary is provided in Appendix A.

Results:

IS THERE A NEED FOR THIS PROJECT TO ADDRESS GROWTH IN BELLEVUE? YES.

The ITA examined the forecasting methodology used by PSE in its 2014 forecast, completed in February 2015. The 2014 forecast methodology provided improved visibility of where growth was occurring within PSE's service area. The PSE forecast shows a growing peak load demand[6] of 2.4% per year for years 2014 – 2024.

The typical utility industry forecast is composed of 1) weather normalization[7], 2) economic and demographic data, 3) application of end-use data[8] including conservation and efficiency measures, and 4) adjustment for large specific load additions (such as for a new building).

The ITA concludes that PSE has followed industry practice in forecasting its demand load, incorporating the four major components of forecasting:

- PSE incorporated weather normalizing. The variables used in the weather normalizing process were typical based on industry practice.
- PSE used typical data set elements and multiple data sources for its economic/demographic data as shown in Table 6.1, acquiring data at the county level, and for the Eastside area at the census track level, in order to differentiate growth rates within the service territory. Data on jobs and

[5] Integrated Resource Plan - A comprehensive and long-range road map for meeting the utility's objective of providing reliable and least-cost electric service to its customers while addressing applicable environmental, conservation and renewable energy requirements. A process used by utility companies to determine the mix of Supply-Side Resources and Demand-Side Resources that will meet electricity demand at the lowest cost. The IRP is often developed with input from various stakeholder groups.

[6] MW demand

[7] Weather normalization is a process that adjusts actual energy (MWh) or demand (peak MW) values to what would have happened under normal weather conditions. Normal weather conditions are expected on a 50 percent probability basis (i.e., there is a 50 percent probability that the actual peak realized will be either under or over the projected peak).

[8] End-use: How is the electricity being used? What appliances are used? What efficiency measures are employed? What load can be controlled or interrupted? Utilities and cities can influence electric end-use through Demand-Side Management technologies and practices, city code changes, efficiency programs or incentives, awareness campaigns, et cetera. The end-use data is generally limited to new DSR measures. Historical end-use data is generally not captured due to the difficulty in acquiring it (surveys, etc.).

DSD 002001

employment in the Eastside region were obtained by PSE from the Puget Sound Regional Council and the WA State Office of Financial Management, and included census tract level analysis. PSE employed regression analysis[9] at this step, an industry standard computer analysis technique, to determine the forecast before new conservation measures and block load adjustments. (The computerized regression analysis was not analyzed as part of this study, but the technique is a computerized estimation of the best fit of the variables to the given data.)

- PSE acquired/developed significant end-use data via their IRP process, including over four thousand Demand Side Resources (DSR) measures, incorporated National and State requirements on conservation and RPS, and optimized the achievable, technical measures with a resultant 100% Conservation scenario which projects 135 MW of winter peak DSR by 2031.
- PSE gathered block load data (major projects) and utilized short-term forecast adjustments (1-year ramp in based on certificates of occupancy and 2-year ramp-out) to account for the impact on demand.

No forecast is perfect, but by following industry practice, the ITA concludes that PSE used reasonable methods to develop the forecast. PSE's resultant forecast shows the Eastside area growing at a higher level than at the county and system level, and these growth rates are based on the data it received.

PSE is applying the Northwest US practice (as does Seattle City Light (SCL)) of basing projects on a normal 50/50 forecast (actual load will be more than forecast half the time, and less than forecast half the time). This 50/50 forecast is less conservative than scenarios utilized by many other electric utilities elsewhere in the country. Basing projects on an adverse weather scenario is more conservative, but seeks to ensure that the lights stay on given the adverse weather event.

IS THE EE PROJECT NEEDED TO ADDRESS THE RELIABILITY OF THE ELECTRIC GRID ON THE EASTSIDE?
YES.

Although the new 2014 forecast resulted in an 11 MW decrease in the Eastside area's 2017/18 winter forecast, the reduced loading still resulted in several overloaded transmission elements in winter 2017/2018, which drive the project need.

Although the corrective action plan (CAP) required in the 2017/18 winter to avoid facility overload doesn't require dropping load (turning off customers' power), by winter 2019/20 approximately 63,200 customers are at risk of losing power. In addition, by summer 2018, studies show that customers will be at risk of outages and load shedding[10] due to CAPs used to mitigate transmission overloads. Despite the possibility of an in-service date shift to summer 2018 from winter 2017/18, balancing a six month delay in a complex and multi-year EIS process (which can have its own delays) against the risk of an adverse winter and less realized conservation (which could increase 2017/18 winter loading to a point where customers are at risk of load

[9] Regression analysis is a statistical process for estimating the relationships among variables. It seeks to determine the strength of the relationship between one dependent variable (usually denoted by Y) and a series of other changing variables (known as independent variables). It is also known also as curve fitting or line fitting because a regression analysis equation can be used in fitting a curve or line to data points. It includes many techniques for modeling and analyzing variables.

[10] Load shedding - An intentional electrical power shutdown to a portion of the system (customers experience an outage) to protect the network from a greater impact or from potential damage.

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shedding), suggests it is reasonable to maintain the schedule for the existing project in-service date.

Several hypothetical scenarios were studied as part of the Optional Technical Analysis (OTA). Each one showed overloads in the 2017/18 timeframe, indicating project need in order for PSE to meet federal regulatory requirements for system reliability. The OTA results showed that reducing the Eastside area growth from 2.4% to 1.5% per year in the period from winter 2013/14 to winter 2017/18 still resulted in project need. Reducing PSE's King County growth while keeping the Eastside growth the same similarly resulted in a project need. Turning on additional generation in the Puget Sound area also resulted in a project need. (See Appendix B.)

IS THE PROJECT NEEDED TO ADDRESS REGIONAL GRID POWER FLOWS, SPECIFICALLY POWER FLOWS ON THE NORTHERN INTERTIE (TO AND FROM CANADA)? The project is necessary to address local need.

The Optional Technical Analysis examined this issue by reducing the Northern Intertie[11] flow to zero (no transfers to Canada). Although this scenario is not actually possible due to extant treaties, it was modeled to provide data on the drivers for the EE project, to examine if regional requirements might be driving the need. The results showed that in winter 2017/18, even with the Northern Intertie adjusted to zero flow, the Talbot Hill 230/115 kV transformer #2 would still be overloaded by several contingencies (several different outage scenarios). Again, the projected overloads indicate a project need at the local level to meet reliability regulations. (See Appendix B for more details.)

[11] Northern Intertie - transmission interconnection between Washington and British Columbia (Also called Path 3.)

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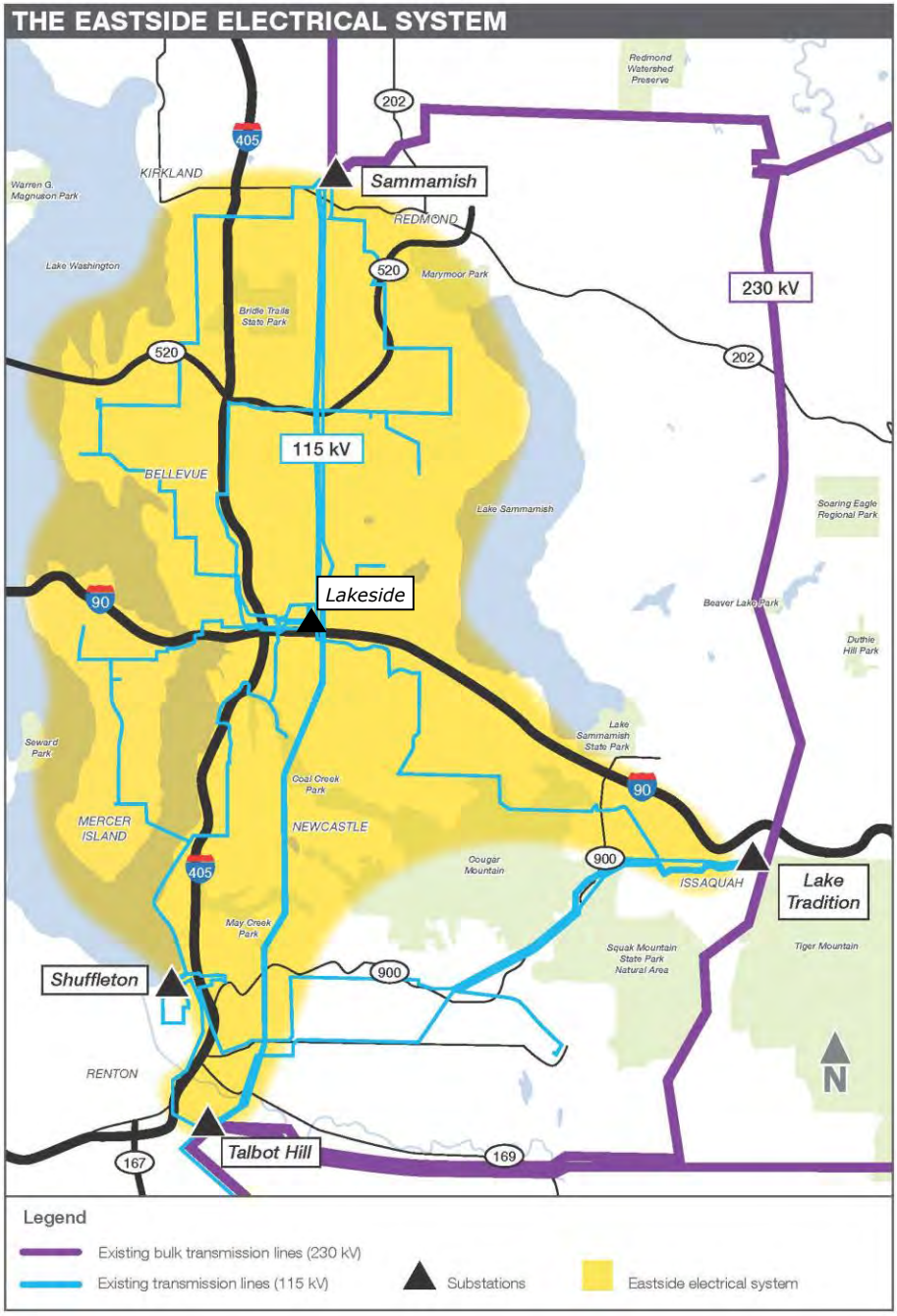
2. Eastside Area

The Eastside area is highlighted in yellow below, and was defined electrically as the area served by the 115 kV transmission lines that connect with the Lakeside Transmission Substation. Geographically it is bounded by Lake Washington and Lake Sammamish. The area is also north of PSE's Talbot Hill Substation and south of PSE's Sammamish Substation.

Figure 3.1: Eastside Area (Figure provided by PSE)



3. 2013 Eastside Needs Assessment Report

This section is included in the ITA report because PSE's 2013 Needs Assessment report is public whereas there is no updated PSE report documenting the 2014 forecast results as of the date of this writing.

The "Eastside Needs Assessment Report", published in October 2013 by PSE, focused on the central King County portion of PSE's service territory. It was based on PSE's corporate forecast which was published in June, 2012. The study determined that there was a transmission capacity deficiency in the Eastside area that would develop by the winter of 2017/2018.

Key Assumptions in PSE's 2013 Study:

- System load levels used the PSE corporate forecast published in June 2012.
- Area forecasts were adjusted by substation to account for expected community developments as identified by PSE customer relations and distribution planning staff.
- Generation dispatch patterns reflected reasonably stressed conditions to account for generation outages as well as expected power transfers from PSE to its interconnected neighbors.
- Winter peak Northern Intertie transfers were 1,500 MW exported to Canada.
- Summer peak westside Northern Intertie transfers were 2,850 MW imported from Canada.

Per PSE's 2013 study report, specific areas of concern for the 2017/2018 winter are shown in Table 4.1 below. The table lists the overloaded elements within each category of contingency.

Each of the three contingency types (N-1, N-1-1, and N-2) shown below are part of the required study process and are defined in the report glossary.

Table 4.1: PSE's 2013 Study Report: 2017/2018 Overloaded Elements

	2017/2018 Normal Winter (23° F) 100% Conservation		
	Type of Contingency		
Transmission Line or Transformer	N-1	N-1-1	N-2
Talbot Hill - Lakeside #1 115 kV line		OL	OL
Talbot Hill - Lakeside #2 115 kV line		OL	OL
Talbot Hill 230-115 kV transformer #1		OL	
Talbot Hill 230-115 kV transformer #2		OL	
Talbot Hill-Boeing Renton-Shuffleton 115 kV line		OL	
Shuffleton – O'Brien 115 kV line			
Shuffleton – Lakeside 115 kV line			

OL = Overload of Emergency Rating.

PSE's 2013 Needs Assessment report drove many need-related Stakeholder questions about the forecast, the weather scenarios, the regional scenarios, exports and imports to Canada, the outage contingencies studied and whether they were needed, the probability of having the issues, etc. PSE develops a new forecast every two years, and in February, 2015, PSE completed their new forecast with actuals through 2014. They have since restudied the situation with the new forecast. The remainder of this ITA report will relate the questions received to the new forecast and the new results.

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4. Energy versus Demand

Forecasts are developed for both energy and demand. A useful analogy is to compare energy to a car odometer and demand to a car speedometer.

- Energy (kWh) is analogous to an odometer reading, which is a cumulative measure of total miles traveled over time. Energy is a cumulative measure of total power produced or consumed over time.

Demand (kW) is analogous to a speedometer reading, which shows a snapshot of the speed at a precise moment. Demand is a snapshot of power required or power used. Peak demand is the highest demand that will be required at any particular moment during a period of time. An odometer doesn't indicate how fast someone drives, but does indicate how much driving has been done. Similarly, an energy forecast (kWh) indicates increases or decreases in the use of electricity, but doesn't indicate peak usage (kW).

Bellevue's Resource Conservation Manager (RCM) program stats on declining energy use are reflecting a decline in the average use per customer. The DSM programs, solar, etc. are showing success with this decline. But, that is one piece of the story - the energy piece on a per customer basis. The number of customers continues to increase, and the aggregate peak usage (peak demand), is continuing to increase. Growth in peak demand drives the size and amount of infrastructure required and drives the issue of grid reliability.

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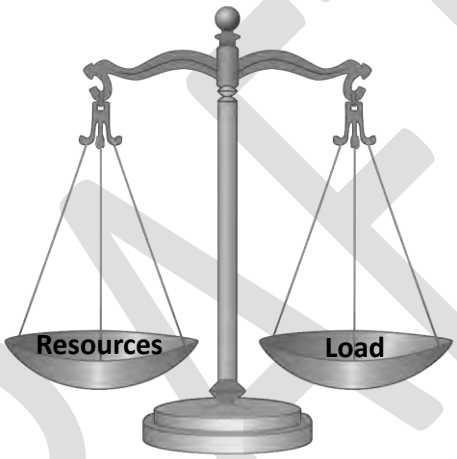
5. Typical Electric Forecast Elements

The typical utility industry forecast is composed of four main parts which will each be further explained later in this section: 1) adjustment for weather, 2) economic and demographic data, 3) application of end-use data, including energy efficiency and conservation effects, and 4) adjustment for large specific load additions (such as for a new building).

Resource planning is a related activity which provides direction on some of the forecasting elements. Resource planning (ensuring there are sufficient generation and conservation/efficiency resources to serve the customer load) requires a load forecast to know how much load one must serve. The resources must balance the load.



National Level

There are NERC Reliability Standards which pertain to the collection of data necessary to analyze the resource needs to serve peak demand while maintaining a sufficient margin to address operating events. One Standard (NERC MOD-021-1) requires that "forecasts shall each clearly document how the Demand and energy effects of DSM programs (such as conservation, time-of-use rates, interruptible Demands, and Direct Control Load Management) are addressed." Another Standard (NERC MOD-019-0.1) requires "forecasts of interruptible demands and Direct Control Load Management (DCLM) data".

State Level

There are state requirements for resource planning, which identifies generation resources and conservation/efficiency measures to serve the customer load. State Law (RCW 19.280.030), identifies the requirements of a resource plan, and states that the integrated resource plan must include:

> "(1)(a) A range of forecasts, for at least the next ten years or longer, of projected customer demand which takes into account econometric data[12] and customer usage;"

[12] Econometrics is the application of mathematics and statistical methods to economics. The data to which it is applied is called econometric data. Econometrics tests hypotheses and forecasts future trends by applying statistical and mathematical theories to economics. It's concerned with setting up mathematical models and testing the validity of economic relationships to measure the strengths of various influences.

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> "(1) (b) An assessment of commercially available conservation and efficiency resources. Such assessment may include, as appropriate, high efficiency cogeneration, demand response and load management programs, and currently employed and new policies and programs needed to obtain the conservation and efficiency resources;"

Item 1(a) above requires econometric and end-use data in the forecast. Item 1(b) requires that the forecast account for conservation and efficiency resources. Both are industry practices.

Resources consist of Supply-Side Resources (conventional generation plants, renewables, etc.) and Demand-Side Resources (resources that reduce the demand (load)).

5.1. Simplified Description of the Forecasting Procedure

1) WEATHER NORMALIZING.

The North American Electric Reliability Corporation (NERC[13]) provides direction at the national level for normalizing the demand (MW) forecast to account for weather impact.

> "The fundamental test for determining the adequacy of the Bulk Electric Power System (BEPS) is to determine the amount of resources and the certainty of these resources to be available to serve peak demand while maintaining a sufficient margin to address operating events. This test requires the collection and aggregation of demand forecasts on a normalized basis. This is defined as a forecast that has been adjusted to reflect normal weather conditions and is expected on a 50 percent probability basis, also known as a 50/50 forecast (i.e., there is a 50 percent probability that the actual peak realized will be either under or over the projected peak). This forecast can then be used to test against more extreme conditions." [14]

Normalizing the forecast seeks to remove the variation in load due to weather related factors including the temperature at the time of the peak, the temperature on the days prior to the peak, whether the peak occurred on a weekend, a weekday, a holiday, etc. Reactions to these variables vary throughout the United States, yet for a localized area there will be a typical reaction that can be calculated. These are addressed when normalizing the forecast. For example, many office buildings use less power on the weekend or on a holiday. Moreover, some residential customers will put up with a short cold or hot spell, but if it lasts "too long", they will be more likely to increase their use of heating or air conditioning.

[13] NERC: North American Electric Reliability Corporation. NERC is a not-for-profit international regulatory authority whose mission is to assure the reliability of the bulk power system in North America. NERC develops and enforces Reliability Standards as one of its duties. NERC's area of responsibility spans the continental United States, Canada, and the northern portion of Baja California, Mexico.
[14] NERC, Normalizing "NERC | MOD C White Paper | April 24, 2014", page 5 http://www.nerc.com/pa/Stand/Project%20201004%20Demand%20Data%20MOD%20C/MOD_C_White_Paper_Redline_20140424.pdf

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In addition to calculating the normalized peaks, industry also typically calculates an adverse or extreme peak. Many utilities utilize a 90/10 forecast[15] to justify projects, some use an 80/20 forecast to justify projects. Utilities in the Northwest area of the United States typically base their projects on the normal (50/50) forecast, although they develop a 95/05 forecast (1-in-20) for reference.

A typical industry source for the weather data is a National Oceanic and Atmospheric Administration (NOAA) weather station. Some utilities may have their own weather recording data.

Stakeholder Questions on weather adjustment

Q1. Please explain weather adjustment. Is it reasonable/appropriate?

- A *Please see the above discussion.*
- A *Weather adjustment is reasonable and appropriate, and is required by NERC.*

2) DEVELOP A MATHEMATICAL RELATIONSHIP (EQUATION) BETWEEN A) THE ECONOMIC AND DEMOGRAPHIC DATA AND B) EITHER ENERGY USAGE (KWH) OR ELECTRIC DEMAND (KW).

For each customer class (e.g. industrial, commercial and residential), estimate the relationship between electricity consumption (usage) or demand, and the major variables that affect it (e.g. population, price, economic growth, etc.). This relationship is usually developed first, without accounting for new Demand-Side Resources (DSR), in order to show the effect of the DSR on the forecast.

Econometrics utilizes multiple sources of data. Table 5.1 lists examples of data sets that may be used in the econometric modeling.

Table 5.1: Examples of Data Used in Econometric Models

Example Data Sets used in Econometrics
Household Size
Population
Customer Count by Customer Class
Employment (Manufacturing, Non-Manufacturing, by NAICS Code[16], etc.)
GDP (Gross Domestic Product)
GMP (Gross Metropolitan Product) – a measure of the size of the economy of a metropolitan
Personal Income

[15] 90/10 forecast: 90% probability that the weather will be less severe and a 10% probability that the weather will be more severe. This is also called a 1-in-10 forecast.

[16] NAICS - The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy (Source: Census.gov)

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3) ACCOUNT FOR END-USE DATA INCLUDING ENERGY EFFICIENCY AND CONSERVATION EFFECTS (TYPICALLY FROM AN INTEGRATED RESOURCE PLAN (IRP))

End-Use Analysis projects the quantity and use of electricity-using equipment (or a subset of them) to make a forecast or to revise one. *End-use analysis is responsive to consumer changes in kinds of equipment and allows analysis of conservation programs, energy efficiency improvements, building code modifications, increase in household electronics or typical housing square footage, etc. It breaks the data into user sectors and needs an extensive inventory of data. It readily reflects changes in the factors that influence consumption, but requires detailed assumptions on the use going forward.*

Utilities and cities can influence electric end-use through Demand-Side Management technologies and practices, city code changes, efficiency programs or incentives, awareness campaigns, et cetera. Example end-use programs are listed below.

- Residential mass market lighting and appliances
- Residential HVAC replacement
- Residential new construction
- Residential retrofits
- Commercial/Industrial lighting, equipment, HVAC
- Customized programs for larger customers
- Demand Response incentive/enabling programs
- Pricing—interruptible, time of use pricing, real time pricing

Demand-Side Management (DSM) can be broken into two components: energy efficiency and Demand Response. Energy efficiency attempts to permanently reduce the demand for energy in intervals ranging from seasons to years and concentrates on end-use energy solutions. Demand Response is designed to change on-site demand for energy in intervals from minutes to hours, targeting the lowering of electric demand/energy use during peak periods by transmitting changes in prices, load control signals or other incentives to end-users to reflect existing production and delivery costs.

When end-use factors are taken into account in the forecast, there will be multiple variables representing different elements of end-use. Some may offset others. For example, the U.S. Department of Energy noted that "Homes built between 2000 and 2005 used 14% less energy per square foot than homes built in the 1980s and 40% less energy per square foot than homes built before 1950. However, larger home sizes have offset these efficiency improvements."[17]

When utilized, the IRP process is where the end-use data is analyzed. The IRP is a comprehensive and long-range road map and is where a utility examines both Supply-Side and Demand-Side options with the objective of providing reliable and least-cost electric service to its customers while addressing applicable environmental, conservation and renewable energy requirements. Because energy efficiency is generally a low-cost resource, the IRP tends to incorporate energy efficiency as a utility system resource and reduce the need for additional Supply-Side resources.

The end-use data is generally limited to new DSR measures. Historical end-use data is not usually captured due to the difficulty in acquiring it.

[17] "Buildings Energy Data Book", US Department of Energy

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4) ADJUST FOR BLOCK LOADS (MAJOR LOAD ADDITIONS)

Known large load additions would be added to or removed from the forecasted load. This could include new large commercial buildings, major customers leaving the area, etc.

The above forecast discussion represents the system forecast, referring to the forecast for the utility's entire service area. A system forecast may be broken into sub-areas at the utility's discretion, or separate forecasts may be developed for sub-areas. Various scenarios may be modeled, to examine higher or lower conservation levels, adverse weather, et cetera.

5.2. Utilizing the System Forecast in Powerflow Cases

In order to conduct studies on the transmission system, the substation loads are calibrated to the system forecast. Once calibrated, the substation loads are modeled in the transmission planning cases for study. Multiple seasons and years may be studied.

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6. PSE's Forecast Methodology

PSE updates their load forecasts every two years. In early February, 2015, PSE completed their 2014 forecast which included historical data through 2014, and thus included the summer 2014 peak and the winter 2013/2014 peak. This new forecast was based on a new methodology. PSE shifted from a predominately system-wide view to a county by county examination. Particular focus was placed on King County, where the Eastside study area was further separated out from King County using census tract data to develop a separate Eastside forecast. This new forecast methodology provided improved visibility of where growth was occurring and where it wasn't. Consequently, after conferring with the City, USE decided to wait for the new forecast, with its improved visibility of the Eastside area, as well as its more recent actual load information.

The review of PSE's forecast methodology in this report is specific to PSE's 2014 forecast.

6.1. Weather Adjustment (Weather Normalizing)

PSE's 2014 system forecast incorporated weather normalizing consistent with industry practice.

PSE's weather normalizing process tests the following major variables via regression analysis. The regression analysis process selects out the variables that result in the best fit to the data.

- Peak hourly load for the month
- Maximum hourly load on each of the three days prior to the peak day
- Minimum and maximum temperature on the peak day
- The minimum temperature on each of the three days prior to the peak day
- The average temperature on the peak day
- The average temperature on each of the three days prior to the peak day
- Temperature 1, 2, and 3 hours before the peak
- Temperature at the peak hour
- Total monthly load
- Average monthly temperature
- The season the peak occurred in
- Whether the average temperature on the peak day, or the day before, fell below a certain threshold (cold snap variables)
- Whether it is an El Niño
- Day of the week

The factors PSE uses to normalize the effect of weather are quite typical for electric forecasting. Some utilities use humidity as a variable, PSE does not. PSE stated it did not consider humidity a significant factor. Realistically, humidity is less likely to be a factor in the winter. Heating the cold air lowers the relative humidity[18], so it feels dryer.

[18] Relative humidity is the amount of water vapor present in air. It is expressed as a percentage of the amount needed for saturation at the same temperature. Thus relative humidity varies with temperature.

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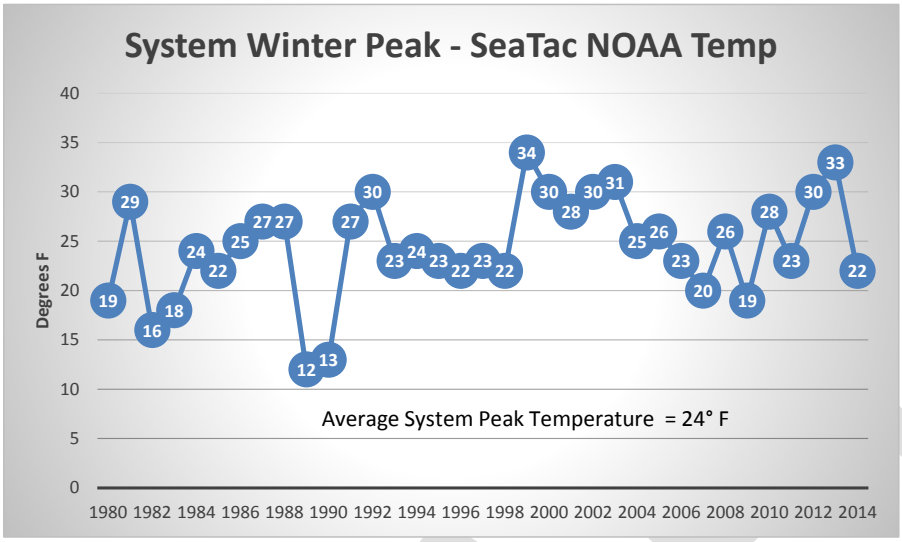
PSE utilizes the SeaTac NOAA weather station for weather data. Figure 6.1 shows the historic winter system peak[19] actual temperatures through winter 2013/2014.

Figure 6.1: Historical Temperature Data



PSE has defined their winter season as November 1 – February 28, and the normal temperature at which PSE's winter load peaks is 23° F (normal peak load temperature). PSE also defines an extreme winter peak load that has a probability of occurring once every twenty years and occurs at a temperature of 13° F. Although PSE develops the extreme winter forecast and models the effect, they only use it as an indicator of future deficiencies. PSE does not use the extreme winter forecast to justify transmission projects, they only use the normal forecast to justify projects. (Utilities in the Northwest area, including Seattle City Light (SCL), use the normal forecast for justifying projects. Many utilities outside this area use an adverse forecast to justify projects.)

Comments:

PSE uses a normal peak load temperature of 23° F. The average winter peak load temperature since 2008 is 24°F, though examining a longer span of time may show that it is 23° F. It is likely that a 1° shift upwards in temperature would reduce the normal winter forecast, but it may not be significant. One could say the normal forecast is a bit conservative. On the other hand, PSE does not use any type of adverse weather (anything worse than a 50/50 forecast) to justify a project. Many utilities design their system based on adverse weather, such as a 90/10 or 80/20 scenario where the forecast is exceeded 10% or 20% of the time. Per the Western Electricity Coordinating Council (WECC) Data Collection Manual (2014), NERC has requested that each Balancing Authority provide a 90/10 forecast. In NERC's 2014-2015 Winter Reliability Assessment, it recommends that scenarios should be assessed that reflect severe winter conditions, such as a "… higher-than-normal peak load (e.g. 90/10 forecast)." PSE does study a 95/5 (1 in 20) extreme winter, but does not use it to justify projects

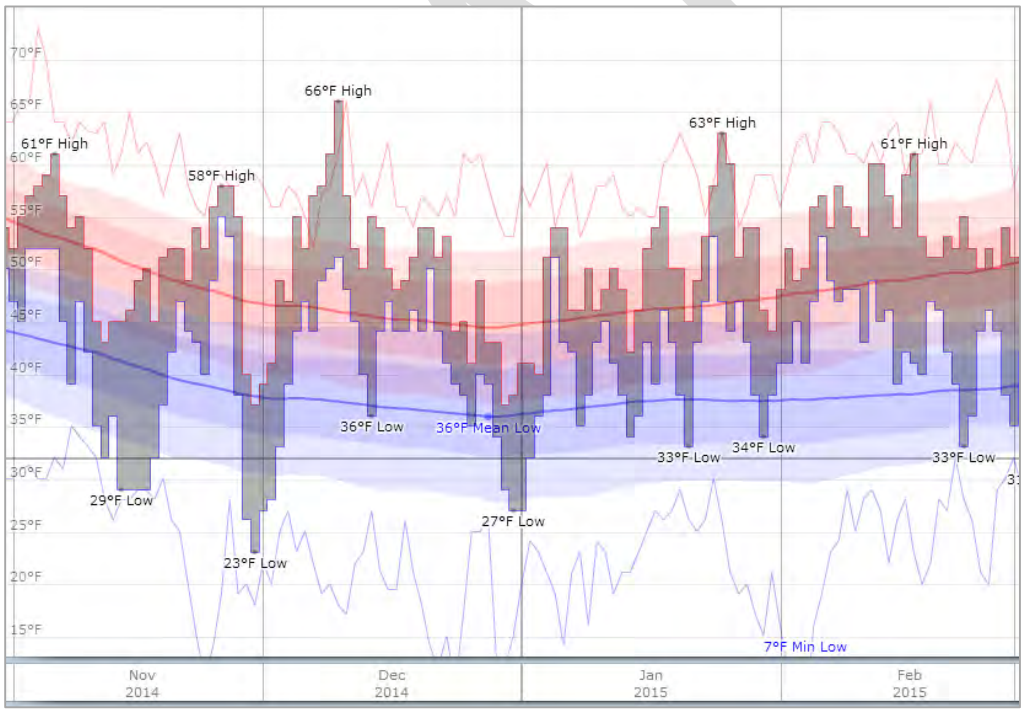
PSE uses one weather station for their service area. Some utilities use more than one weather station to reflect significant weather differences in their service territory.

[19] A system peak refers to the peak demand. In winter, this would be driven by low temperatures.

PSE feels there is not enough weather variation within their service territory to require using more than one weather station. In addition, they expressed concern that the while the SeaTac weather station is very reliable, not all the weather stations are maintained as well and there might be data reliability issues.

Although the 2014/2015 winter peak period ended February 28th, the winter peak data is not yet available. The data verification and normalizing process is not complete and typically occurs mid-year, but it is known that the 2014/15 winter peak was an unusually warm one. Figure 6.2 is taken from Weatherspark.com, and simply shows the highs and lows for each day during the winter season. The very lowest temperature for the entire season was 23°F on November 30th at 2am, per Weatherspark.com. PSE's winter peak (demand) typically occurs either in the morning between 7am and 9am or in the late afternoon/early evening between 4:30pm and 7pm. In either case the winter system peak would have occurred at a warmer temperature. Does this drive any change? At this point, no. It is expected that actual temperatures will not be the same as the defined "normal" temperature. A single data point is unlikely to change a trend. When PSE revises their forecast in two years, they will have two more data points and will recheck the trends through a new regression analysis.

Figure 6.2: Historical Temperature Data 2014/15 Winter Season – Weatherspark.com



6.2. PSE's Econometric Modeling

PSE incorporates economic and demographic data into their forecast, subdivided by customer class, using typical data set elements. See Table 6.1 for the sources of data used in their model.

Table 6.1: Data used in PSE's Economic/Demographic Model

Data Set	Historical Data Frequency	Source of Historical Data	Source of Forecasted Data
County Level Employment			
Labor Force, Employment, Unemployment Rate	Quarterly	US Bureau of Labor Statistics (BLS)	PSE's Economic/Demographic Model
Total Non-Farm Employment Goods Producing & Service Providing Sectors	Monthly	WA State Employment Security Department (ESD), using data from Quarterly Census of Employment & Wages	
County Level Personal Income			
Personal Income, Wages and Salaries	Yearly	US Bureau of Economic Analysis (BEA)	PSE's Economic/Demographic Model
County Level Population and Households			
Population (thousands)	Yearly	US BEA/ WA State Office of Financial Management (OFM)	PSE's Economic/Demographic Model
Households, Single-family & Multi-Family (thousands.)	Annual forecasts	US Census	
Household size, Single- and Multi-family (number)	Quarterly	Building Industry Association of Washington	
Eastside Area by Census Tracts			
Population	Yearly	WA State Office of Financial Management (OFM), 9/28/14	PSRC data, April 2014
Employment	Yearly	PSRC, June 2014	PSRC data, April 2014
US Level Macroeconomy			
GDP ($ x Billions, in year 2000 $), Industrial Production Index	Quarterly	Moody's	Moody's
Employment (mils.), Unemployment Rate (%)			
Personal Income ($ x Billions) Wages & salary disbursements, Other Income			
CPI (82-84=1.00[20]), consumer expenditures deflator (2000=1.0)			
Housing Starts (millions)			
Population (millions)			
T-bill rate, 3 months (%), Conventional mortgage rage (%)			

The Puget Sound Regional Council (PSRC) intends for the City of Bellevue to be a hub for regional growth. In their Vision 2040 Regional Growth Strategy report, PSRC designated five Metropolitan Cities to serve as the focal point for accommodating population and employment growth. These are Bellevue, Bremerton, Everett, Seattle, and Tacoma. The strategy is for the Metropolitan Cities "… to accommodate 32 percent of regional population growth and 42 percent of regional employment growth by the year 2040." It was also noted that it would be in the spirit of the strategy for them to accommodate an even higher percentage.

In addition, the City of Bellevue provided the following information on expected population and employment growth. "Currently there are an estimated 11,000 residents living in Downtown, and that number is expected to grow to 19,000 by 2030. Currently there are about 45,000 jobs within Downtown and that number is expected to increase to 70,300 by 2030."

Given the above, one could expect a higher growth in the Eastside area than in some of the other areas served by PSE.

[20] The average of the 1982-1984 data is set to 1.00

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The following graphs display the historic and forecasted data for population, employment, and customer count, provided by PSE. Data is shown for the PSE service territory, PSE's portion of King County, and Eastside. The graphs for Eastside were developed from data sets at the census tract level. Graphs for these data sets are provided for comparison of growth rates between Eastside, King County and the PSE service territory.

The historic graph data for the PSE system goes back to 2000, and includes Jefferson County up until March 2013. The historic graph data for King County and Eastside only goes back to 2006. The Eastside customer count graphs are missing the actual data for year-end 2013; PSE recently updated their billing system with a new IT company, and not all of their customer reports were available at the time of the 2014 forecast.

Because the system graph data goes back to 2000, it shows the trend prior to the recession. The King County and Eastside graph data only goes back to 2006, so the historical trend is obscured by the recession.

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Employment and population are increasing. (Data provided by PSE. See Table 6.1 for original data sources.)

Figure 6.3: Population and Employment - PSE Service Territory

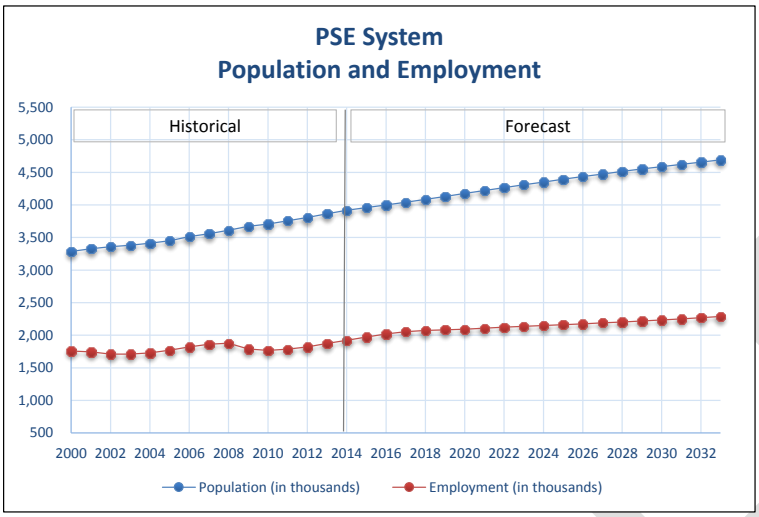


Figure 6.4: Population and Employment – King County

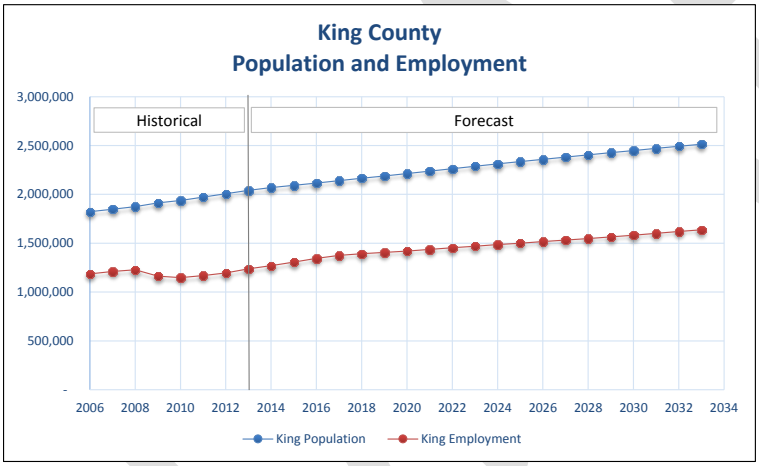
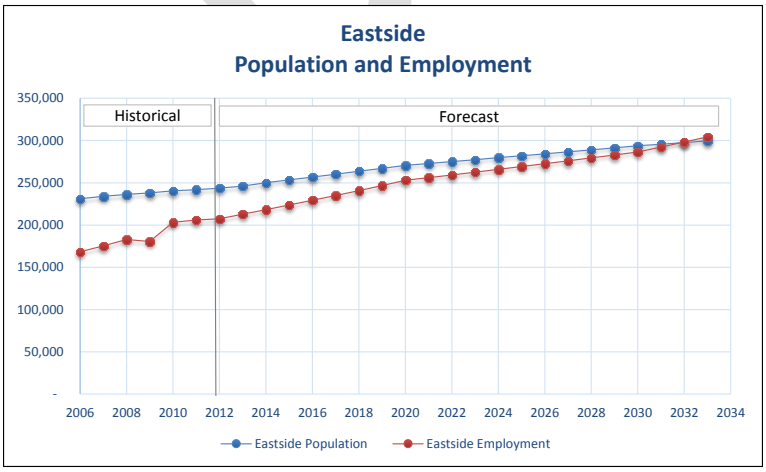
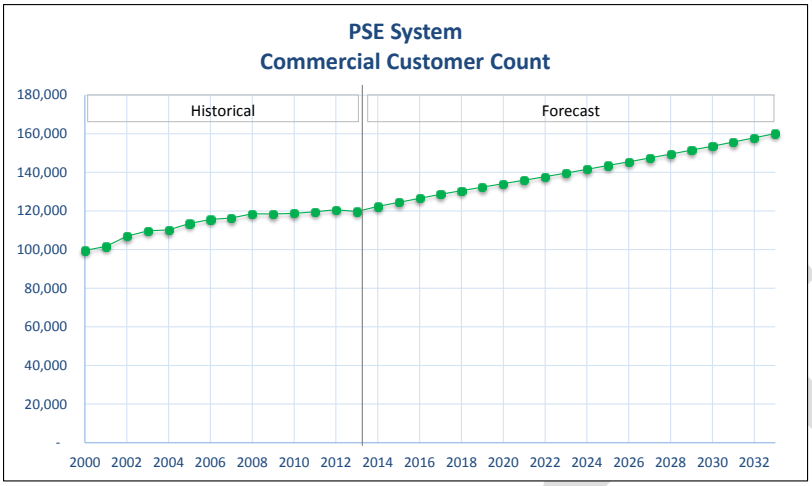


Figure 6.5: Population and Employment – Eastside



Forecasts for the commercial customer counts are increasing.

Figure 6.6: Commercial Customer Count - PSE Service Territory



The PSE system data goes back to 2000 and shows the trend prior to the recession. The King County and Eastside data only goes back to 2006, so the historical trend is obscured by the recession.

Figure 6.7: Commercial Customer Count – King County

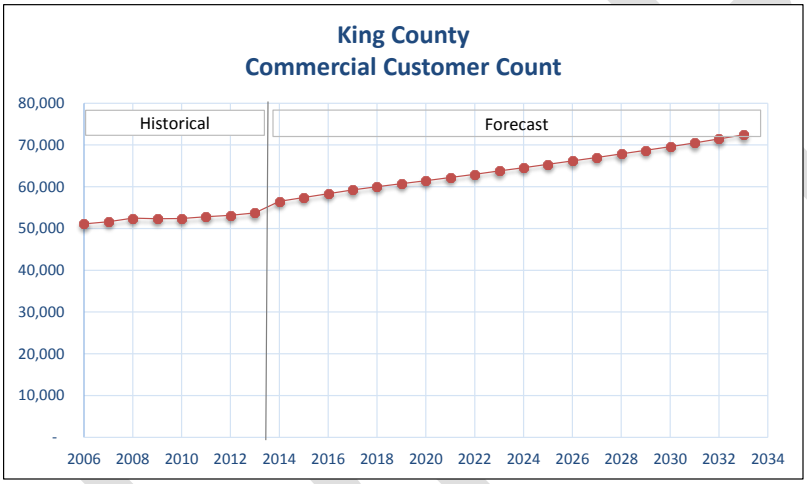
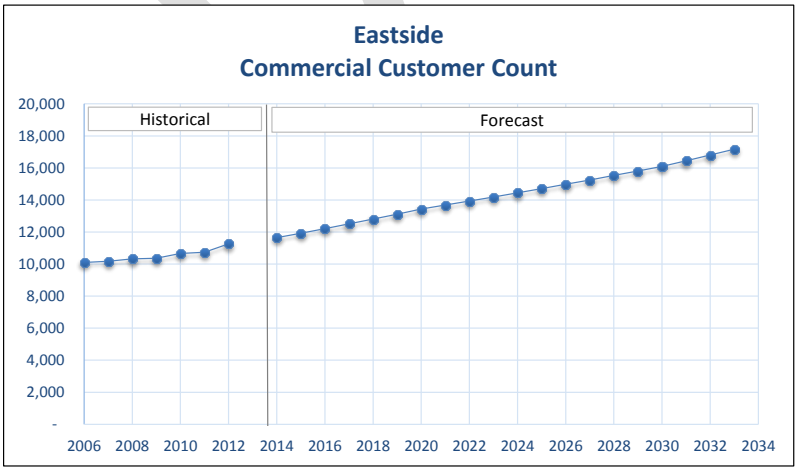
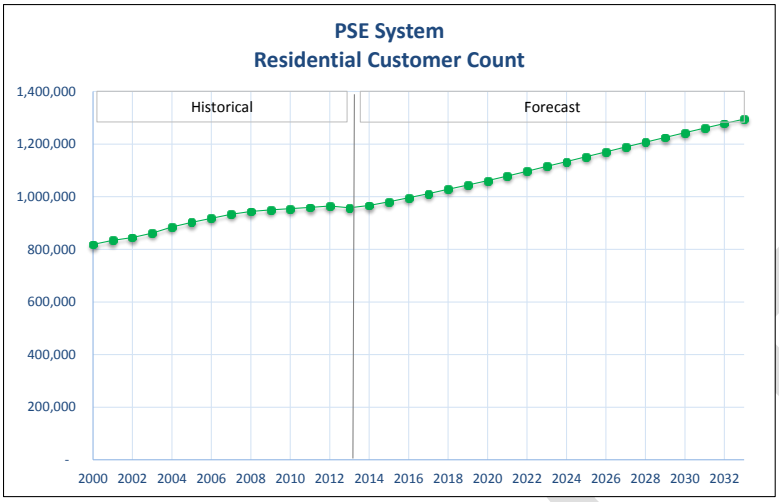


Figure 6.8: Commercial Customer Count – Eastside



Forecasts for the residential customer counts are increasing.

Figure 6.9: Residential Customer Count - PSE Service Territory



The PSE system data goes back to 2000 and shows the trend prior to the recession. The King County and Eastside data only goes back to 2006, so the historical trend is obscured by the recession.

Figure 6.10: Residential Customer Count – King County

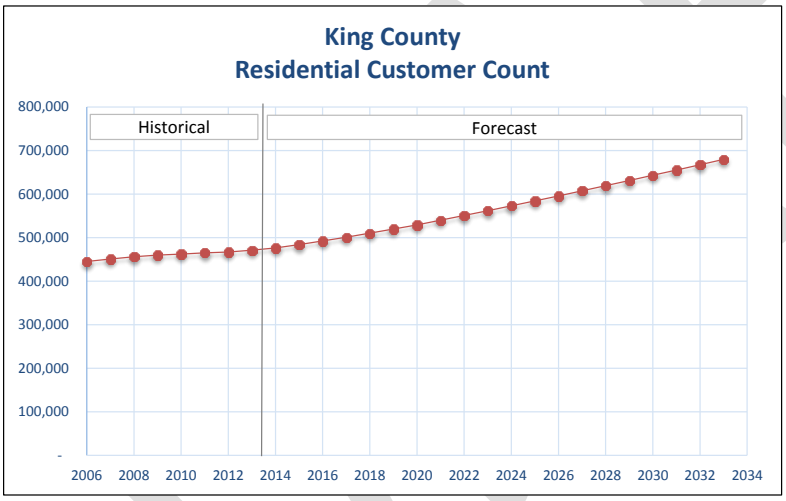
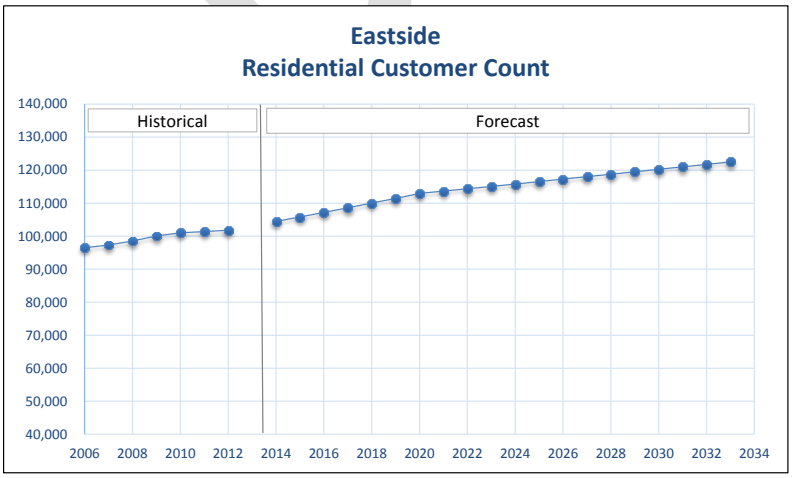
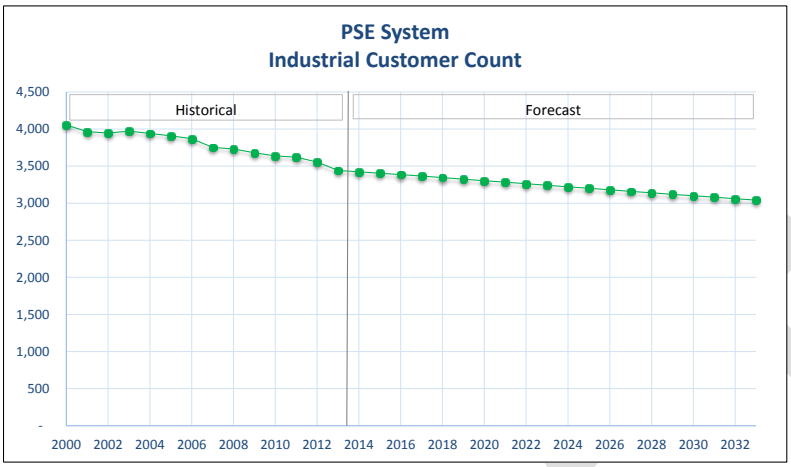


Figure 6.11: Residential Customer Count – Eastside



The industrial customer count is continuing to decline as more industrial customers move out of the area and more commercial moves in.

Figure 6.12: Industrial Customer Count - PSE Service Territory



Industrial customers include warehousing.

Figure 6.13: Industrial Customer Count – King County

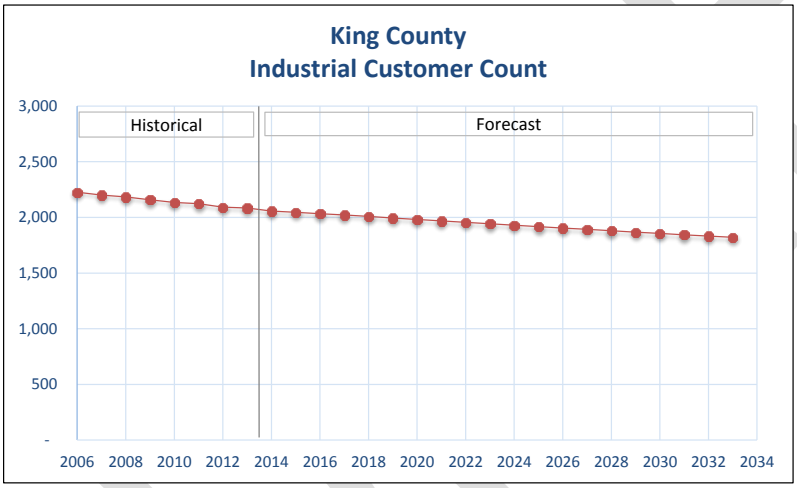
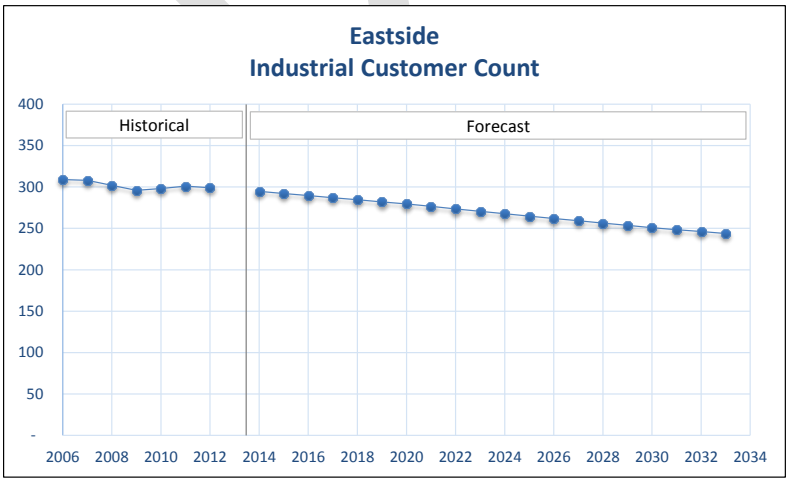


Figure 6.14: Industrial Customer Count – Eastside



6.3. End-Use Data, Including Demand-Side Response and Energy Efficiency

End-use data is evaluated in Integrated Resource Planning. The IRP is where a utility examines both Supply-Side and Demand-Side options with the objective of providing reliable and least-cost electric service to its customers while addressing applicable environmental, conservation and renewable energy requirements. Because energy efficiency is generally a low-cost resource, the IRP tends to incorporate energy efficiency as a utility system resource and reduce the need for additional Supply-Side resources.

Washington State's Renewable Portfolio Standard (RPS) law requires conservation potential be developed using Northwest Power & Conservation Council (NWPCC) methodology, and conservation targets are based on IRP with penalties for not achieving them. It requires PSE to meet specific percentages of its load with renewable resources or renewable energy credits (RECs) by specific dates.

The Energy Independence and Security Act (EISA, 2007) provides for minimum federal standards for lighting and other appliances beginning in 2012. It also sets standards for increasing the production of clean renewable fuels, increasing the efficiency of buildings and vehicles, and more.

PSE commissioned The Cadmus Group, Inc. (Cadmus) to conduct an independent study of Demand-Side Resources (DSR) in the PSE service territory as part of its biennial integrated resource planning (IRP) process. The study considered energy efficiency, fuel conversion, Demand Response, and distributed generation, totaling over four thousand measures. PSE also considered distribution efficiency. The achievable, technically feasibly Demand-Side measures were combined into bundles[21] based on levelized cost[22] for inclusion in the generation optimization analysis. The optimization model developed and tested different portfolios, combining Supply-Side Resources with Demand-Side bundles, to find the lowest cost combination of resources that: a) met capacity need; b) met renewable resources/RECs need; and c) included as much conservation as was cost effective. (Once the capacity and renewable resources/RECs needs are met, the decision to include additional conservation bundles is simply whether that next bundle of measures increases the cost or decreases it.) The final set of cost effective measures is identified as the "100% conservation" set. By 2033, the 100% conservation scenario is projected to reduce PSE's winter system peak by 1226 MW, 209 MW from the EISA programs and 1017 MW from all the other Demand-Side Resources. Only new opportunities are captured.

The table below breaks out the 100% conservation DSR at the King County and Eastside area level. The MW column shows the impact (reduction) to the demand forecast. For the Eastside area, 51 MW of peak DSR is projected by 2017, and 135 MW by 2031. These reductions are incorporated into the 100% Conservation forecast, which is what is being reviewed in this report.

[21] All the bundles are cost bundles, with the exception of a standards bundle (expected effects of codes and standards such as EISA) and a distribution efficiency bundle. An example bundle is the set of measures that cost between $28/MWh and $55/MWh.

[22] Levelized Cost - An economic assessment of the cost to build and operate a power-generating asset over its lifetime divided by the total power output of the asset over that lifetime. It is also used to compare different methods of electricity generation in cost terms on a comparable basis.

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Table 6.2: Cumulative DSR Impact (2013 IRP)

King County		
year	Annual DSR (MWh)	Peak DSR (MW)
2014	112,730	45
2015	348,463	88
2016	557,863	131
2017	756,295	171
2018	951,360	213
2019	1,147,137	246
2020	1,393,906	309
2021	1,668,547	350
2022	1,902,423	387
2023	2,112,925	421
2024	2,274,243	432
2025	2,351,296	444
2026	2,431,870	457
2027	2,508,352	471
2028	2,589,821	483
2029	2,658,889	494
2030	2,731,640	505
2031	2,798,219	517
2032	2,875,530	532
2033	2,931,133	533

Eastside Area		
year	Annual DSR (MWh)	Peak DSR (MW)
2014	94,667	21
2015	152,559	31
2016	207,980	41
2017	262,563	51
2018	317,493	61
2019	386,767	74
2020	464,427	86
2021	529,013	96
2022	585,484	107
2023	629,201	110
2024	650,086	113
2025	672,152	116
2026	693,168	120
2027	715,397	123
2028	734,411	127
2029	754,139	130
2030	771,869	134
2031	793,300	135

Source: PSE

Stakeholder Questions on Demand-Side Response:

Q2. What is the effect of the LED street light program on load?

A *The Eastside load is forecasted at 641 MW under normal conditions (Winter 15/16). The funded street light conversion program would reduce this load by 282 kW and the full conversion would reduce the load by 798 kW. On a percentage basis, the funded conversion would reduce Eastside load by 0.044% and the full conversion would reduce Eastside load by 0.12%. Though not evaluated in the 2013 IRP and thus not part of the 100% conservation measures, there will be limited impact to the overall load in any given year.*

Q3. Does the load forecast take into account local government actions, such as Bellevue's street light and traffic light initiatives?

A *The LED programs were not specifically identified in the 2013 IRP. The LED technology and availability is different today than it was when the 2013 IRP study began. PSE is planning on including LED lighting in the 2015 IRP.*

Q4. What is the effect of the planned 289 kW of renewable generation (including Solarize Bellevue, the Bellevue College and the Bellevue Service Center), to the grid?

A *The Eastside load is forecasted at 641 MW under normal conditions (Winter 15/16). The planned 289 kW of renewable generation is nameplate rating, so actual output may be 80-85% of that on a sunny day. For a summer*

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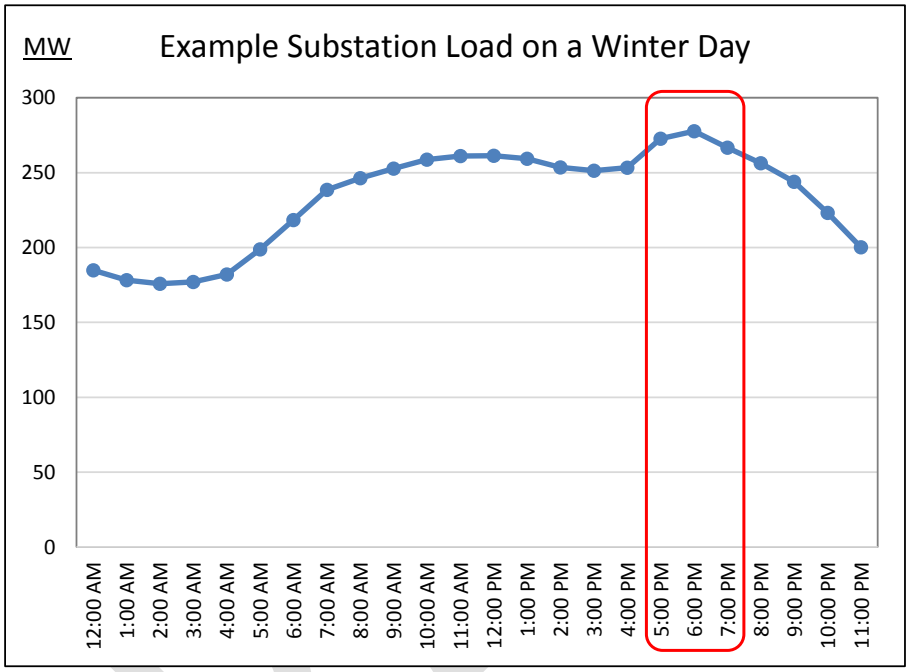
peak, the Eastside load could be reduced by 0.04%. For a winter peak, solar output would be significantly less or non-existent. PSE assumes that solar will not be available for the winter peak, since the winter peak usually occurs when it is dark out. The sample graph below reflects a mixed commercial/residential area, with the peak driven by the residential load. (A substation with the peak driven by commercial load could have a different load profile (different peaking curve).)

Figure 6.15: Sample Winter Load Profile



Q5. Is PSE using all the available Demand Response initiatives/opportunities?

A *Available Demand Response initiatives/opportunities were evaluated as to whether they were achievable and technically feasible. Then PSE used a generation optimization tool to identify the lowest cost combination of resources that a) meet capacity need b) meet renewable resources/RECs need, and c) included as much conservation as was cost effective. (Once the capacity and renewable resources/RECs needs are met, the decision to include additional conservation bundles is simply whether that next bundle of measures increases the cost or decreases it. The IRP has the objective of providing reliable and least-cost electric service to its customers while addressing applicable environmental, conservation and renewable energy requirements. For example, Pacificorp states that the objective of the IRP is "…providing reliable and least-cost electric service to all of our customers while addressing the substantial risks and uncertainties inherent in the electric utility business." Energy Efficient West Virginia states that IRP is a process used by utility companies to determine the mix of resources that will meet electricity demand at the lowest cost.*

Q6. How does efficiency affect energy usage?

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- *Energy efficiency elements were described above. The 2013 IRP identified 521 aMW[23] of market achievable, technically feasible electric energy-efficiency potential by the end of 2033. To gauge achievability, Cadmus relied on customer response to past PSE energy programs, the experience of other utilities offering similar programs, and the Northwest Power and Conservation Council's most recent energy efficiency potential assessment. For the 2013 IRP, PSE assumed achievable electric energy efficiency potentials of 85 percent in existing buildings and 65 percent in new construction. If this potential proves cost-effective and realizable, it would result in a 16% reduction in 2033 forecast retail sales. (Note: this is an energy usage question, not a demand (MW) question. That said, the forecast and need are based on incorporating all of the cost-effective conservation measures (100% Conservation).)*

Q7. Provide details on cost-effective energy efficiency and Demand Response (DR) elements included in the forecast, and how "cost-effective" is determined.

- *See Tables B-2-1, B-2-2, and B-2-3 (pages 156 – 265) of IRP Appendix N (2013) for a list of the thousands of electric measures studied. Table 13, page 20 provides a summary of the number of energy efficiency measures by customer class. The energy efficiency measures make up the majority of the DSR measures.*
- *Cost-effective: The short answer is that PSE has an optimization tool that ensures that the capacity needs are met, ensures that the renewable resources/RECs requirements are met, then minimizes total revenue requirements for both Supply-Side and Demand-Side. Those measures it selects are "cost effective". Longer answer: The measures are bundled into similar levelized costs and the optimization tool evaluates the measures in bundles rather than each individually, then the model determines which bundles are cost effective. See IRP Chapter 5 Figure 5-17 for the DSR bundles by cost group and Appendix N Figure 15 for the DSR supply curve. Out of an identified 1226 winter peak MW of achievable, technical potential in the PSE system (*1017 MW + 209 MW EISA), 1007 MW *were identified as cost effective.*

Q8. Do the growth projections account for increased electrical efficiency? What assumptions are made, and do these represent the low, high, or average model outputs?

- *Yes, the growth projections account for the cost effective efficiency measures.*
- *See answers to the preceding two questions.*
- *The forecast represents the base model.*

Q9. Concern expressed with PSE's forecast when considering energy efficiency, renewables, and Demand Response incentives.

- *Please see above discussion and answers.*

6.4. Major Loads

PSE adjusts its forecast to incorporate major load additions, also called block load additions. The adjustment is a temporary adjustment, as they assume that within a few years the growth built into the load forecast will "catch up" and include the block load additions.

[23] aMW - The average number of megawatt-hours (MWh) over a specified time period; for example, 295,650 MWh generated over the course of one year equals 810 aMW (295,650/8,760 hours). (Source: PSE's 2013 IRP Definitions)

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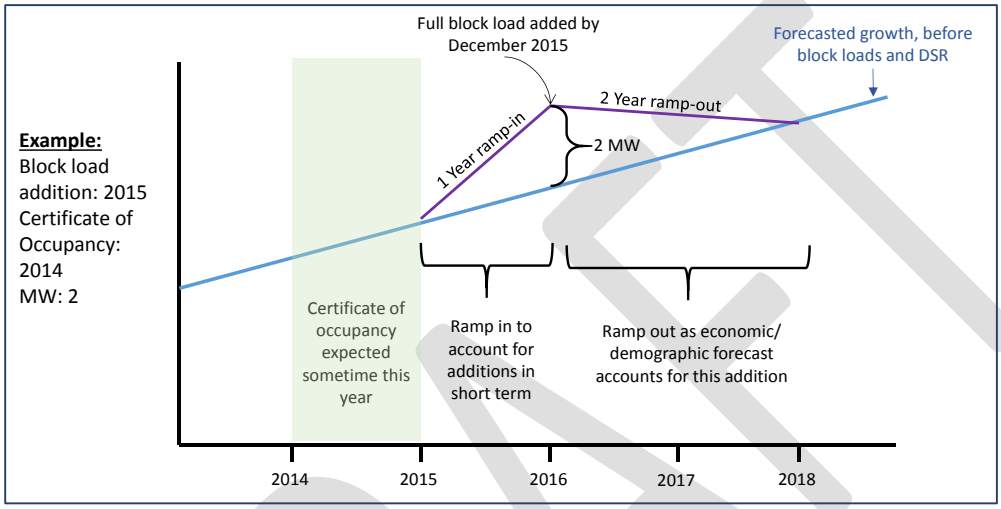
Example: A building has a certificate of occupancy in 2014, with an expected diversified load of 2 MW. PSE will assume it takes a year for the load to fully appear and will add it to the forecast using a one year ramp-in. PSE then ramps the adjustment out over two years, assuming that the growth built into the forecast will take two years to catch up to the block load addition. The block load additions are like bumps on the forecast; they don't change the overall trend, but do create short term changes. See the figure below.

Figure 6.16: Block Load Addition Methodology (from PSE)



PSE acquires data on major load additions from cities as well as directly from developers; some of this data is considered confidential and was not shared. PSE did provide a list of over fifty Eastside Block Load projects (unnamed) with estimated MW load and the expected year when the load would be fully realized. The table below provides a summary by year of this information. The square footage and number of units are reported where known. PSE's Planning group projects a probability of occurrence of 100% for loads anticipated through 2017, 50% for loads anticipated between 2018 and 2020, and 0% for projects after 2020. This probability is multiplied by the expected load before adding into the forecast. The probability factor is a way of addressing the increasing uncertainty of projects in future years.

Table 6.3 does include the City of Bellevue Projects (individually listed in Table 6.4). The Sound Transit East Link project is included in the forecast and accounts for a small portion of the load (approximately 3.5 MW) beginning in the year 2020. Although the East Link web site indicates a 2023 in-service date, PSE's initial expectation is that a small portion of the load will be needed in 2020 and as the project grows they anticipate that Sound Transit's impact on the peak demand will increase. This particular load may be forecasted in advance of need, but it would not impact the 2017/18 HW need for the Energize Eastside project.

Table 6.3: Eastside Total Block Loads by Year

Estimated Completion Year	Assigned Probability	# of Projects	Commercial Sq Footage	# of Multi-family units	MW fully energized this year	MW added to forecast
2014	100%	3	100,000	642	4.4	4.4
2015	100%	9	n/a	1231	5.3	5.3
2016	100%	6	263,000	493	7.0	7
2017	100%	7	2,157,000	1566	25.0	25
2018	50%	4	820,362	n/a	1.0	0.5
2019	50%	6	1,989,340	n/a	21.5	10.75
2020	50%	18	1,316,000	234	16.3	8.15
2021	0%	4	2,010,000	n/a	14.8	0
2022	0%	0	0	0	0.0	0
2023	0%	0	0	0	0.0	0
2024	0%	3	928,000	n/a	8.5	0
2025 and beyond	0%	9	602,000	150	17.8	0

* Square footage and number of units are reported where known.

Table 6.4 lists the thirty-nine major projects identified on the City of Bellevue's website, and is provided to show the significant growth expected in the City of Bellevue. Twelve of the Projects include data on the number of stories (building floors), and seven of these are planning fifteen stories or more.

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Table 6.4: City of Bellevue Major Projects (website)

#	Name
Downtown - In Review	
1	Bellevue Square SE Corner Expansion
2	Washington Square Hilton garden Inn
3	Goldsmith Plaza 305
4	Bellevue Center, Phase II
5	415 Office Building
6	Rockefeller Bellevue Tower Phase I
7	Marriott AC Hotel
8	AMCUT
Downtown - Under Construction	
1	Alamo Manhattan Main Street
2	Main Street Gateway / Bellevue Gateway, LLC
3	Marriott Hotel
4	Bellevue at Main / SRM
5	Bellevue Apartments / LIHI
6	Alley 111
7	Bellevue Office Tower
8	Bellevue Park II Apartments
9	Lincoln Square Expansion
10	SOMA Phase II
Downtown - Issued Land Use & Building	
1	The Summit Building C / Bentall
2	103rd Avenue Apartments / HSL Properties
3	Bellevue Center, Phase I
4	Pacific Regent of Bellevue, Phase II
Downtown - In the Pipeline	
1	Evergreen Development Bellevue Tower
2	EROS Properties
3	Fana CBD Master Development Plan
4	Metro 112 Apartment, Phase II
5	17-102nd Avenue NE
6	Eastlink Bellevue Transit Center Station
7	10625 Main Street
8	846 108th Avenue NE
9	Habib Properties
10	Bellevue Plaza
Bel-Red - In Review	
1	Spring District Residential (Land Use Approval)
2	Spring District Office, Bldgs. 16&24 (Building Permit)
3	East Link 130th Station
Bel-Red - Under Construction	
1	GRE Phase I and Phase II
Bel-Red - In the Pipeline	
1	Aegis at Overlake
2	Sherwood Center
3	East Link 120th Station

Projects can shift, developers can change their schedule, but PSE's projected timing of the block loads falls within a realistic range based on current construction schedules and plans, with the possible exception of the East Link project in 2020. However, the East Link timing wouldn't affect the EE timing. PSE's 1-year ramp-in is based on having certificates of occupancy; as long as certificates of occupancy and visual

DSD 002027

confirmation of both construction and occupancy rates are utilized, the forecast can be updated each time with the best available information. In addition, some of the block load project information is still limited and doesn't provide a complete picture of the electric load requirements, so assumptions must be made. These situations are also typical and another reason for the need to regularly update block load information which is a typical industry practice. In summary, PSE's block load data appears to fall within a realistic range. Construction is happening. Developers have indicated interest in future projects. Also, PSE applies a probability factor to the estimated loads to try to address the uncertainty of projects with later in-service dates, and all the forecasted impacts of the block loads on the forecast are only temporary bumps, and are ramped out of the forecast so that they don't affect the overall growth trend.

Stakeholder Questions on Major Projects

Q10. Is development like Bellevue's Spring District factored in? Are there numbers that account for the impact of individual projects in downtown Bellevue? What numbers are used to predict the load impact for these projects?

A *Yes. See Table 6.3 for the summary.*

Q11. A scenario was posed that data centers were consolidating and moving out of the Eastside area, and a question was asked whether PSE had accounted for that in their forecast.

A *PSE does account for large loads leaving the system or moving from one substation to another, but is not aware of any major changes in data centers. Data centers can be relatively small or quite large. Per PSE, the large data centers generally locate outside the PSE service area, where it is cheaper. PSE's planners have seen no indication of large data center changes. A short, independent web search did not turn up any large data center moves out of the Eastside area.*

6.5. PSE's Forecast

Figures 6.17 – 6.21 depict energy and demand (MWh and MW) forecasts, and growth rates. The peak forecast is affected by conservation programs, and all the graphs assume 100% conservation and a normal winter. PSE's conservation programs are heavily weighted toward the first 10 years of the forecast (2014-2023), with less aggressive conservation occurring in the second 10 years of the forecast (2024-2033). This can result in a slower growth rate in the load forecast for the first 10 years.

PSE reached several key conclusions in comparing the new 2014 forecast (F14) with the prior 2012 forecast (F12), which affects some of the information that PSE had publicly shared showing demand and need for the project. PSE's F14 system forecast assumed a more gradual recovery of the US economy from recession than the prior F12 forecast. The F14 system forecast also used an updated US population growth forecast from the US Bureau of Census which is lower than what was used in F12.

In addition, customer growth and customer counts in the F14 system forecast are lower than in F12 because of slower housing recovery. Finally, peak load growth and peak load levels at the system and King County level are also projected to be lower in F14 versus F12.

The Eastside area is where the load projections increased. Eastside peak loads in the new forecast, based on PSRC's population and employment growth forecasts, are

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projected to grow by 2.4% per year[24] in the next 10 years driven by growth in commercial sector and high density residential sector.

Although the F14 forecasted Eastside growth rate increased over the 2012 forecast (F12), the resultant F14 forecast for Eastside reduced the projected 2017/18 normal winter loading by 11 MW. The new F14 forecast, based on census tract level demographic data for the Eastside area, had normalized actual peak loads for winter 2012/13 and 2013/14 which were less than the forecasted peak loads from the F12 forecast, which in turn resulted in lower forecasted peaks for winter 2017/18. Section 8 of the report discusses the impact on the Energize Eastside project need.

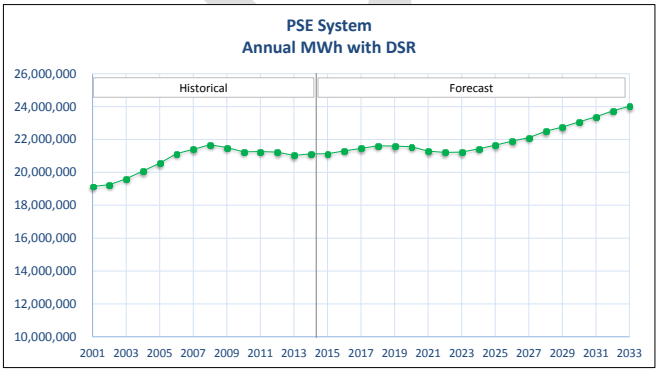
Table 6.5: PSE's Eastside 2017/18 Forecast Comparison

Forecast Development Year	2017/18 Winter Peak
2012	699 MW
2014	688 MW

Figures 6.17 – 6.20 show MWh and MW forecasts for the PSE system, King County, and the Eastside area. The EE project need is based on the MW graph for Eastside. The MWh forecasts do not drive the need, but are shown because of the number of Stakeholder questions received and the uncertainty and/or misconception of what MWh indicate. The MWh forecasts show *usage*, like the odometer, not *peak.* They reflect growth and conservation, but are not directly tied to the peak. The typical behavior or response of a household may be different on the one or two very cold days in a year, as one is getting ready in the morning or coming back from work to a cold house.

Figure 6.17 shows the energy forecast for the PSE system. The forecasted dip in energy is due in part to the aggressive conservation programs that are weighted toward the first 10 years of the forecast (2014-2023). In addition, the block loads are phased in and then phased out over time. Any block loads that come in after 2017 are only given half of the MWh since these projects are less certain to be completed. After 2020 no block loads would be phased in, with a few more years of earlier block loads phasing out.

Figure 6.17: PSE's Energy Forecast (MWh) – PSE System

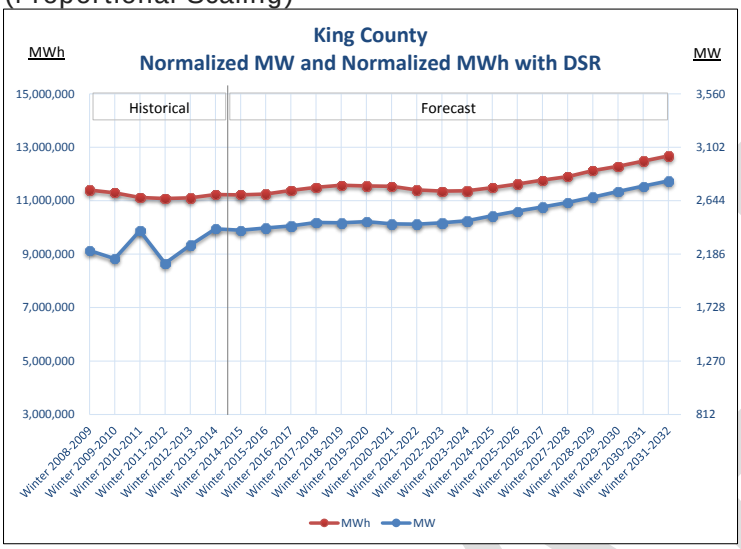


[24] The growth rate is a peak load growth rate and is developed through a regression analysis.

DSD 002029

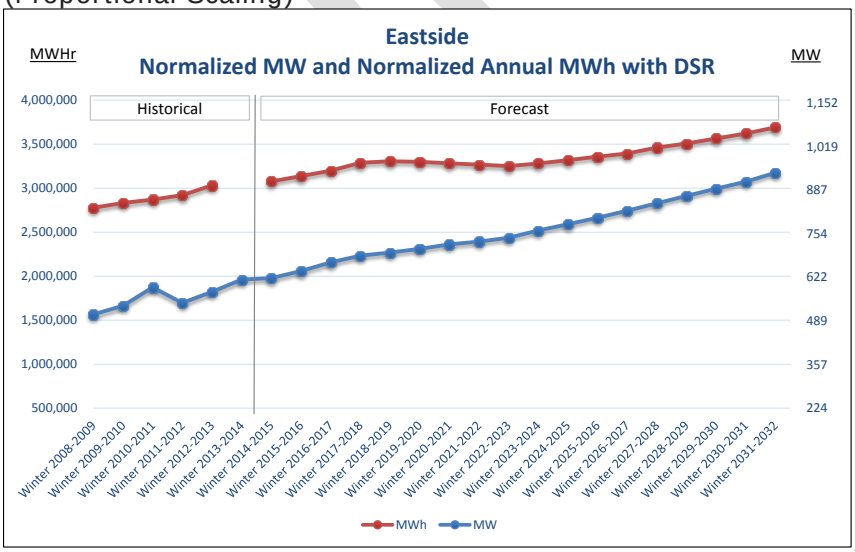
Figure 6.18 shows the energy forecast and demand forecast for King County. King County is forecasted to have a relatively flat energy and demand forecast until approximately winter 2023/2024, at which point both forecasts are increasing. The energy and demand forecasts track fairly closely in King County, but this doesn't mean the same response is expected in other areas.

Figure 6.18: PSE's Energy (MWh) and Demand (MW) Forecasts - King County
(Proportional Scaling)



In the Eastside area, the energy forecast appears to show a stronger impact from conservation compared to the demand forecast. As mentioned previously, the forecasted dip in energy is due in part to the aggressive conservation programs that are weighted toward the first 10 years of the forecast (2014-2023). It is also impacted by the block loads which are phased in and then phased out over time. After 2020 no block loads would be phased in, with a few more years of earlier block loads phasing out.

Figure 6.19: PSE's Winter Energy (MWh) and Demand (MW) Forecasts – Eastside
(Proportional Scaling)

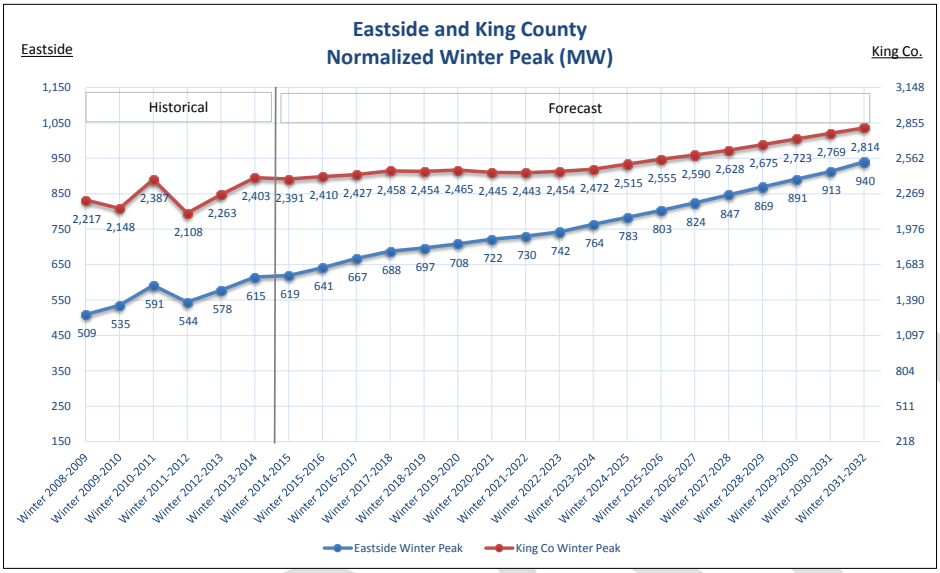


The dip is due to a cold snap that lasted several days. Per PSE their weather adjustment does not fully account for the lag effects of longer cold snaps.

DSD 002030

Figure 6.20 compares the Eastside and King County winter peak demand forecasts. The Eastside area is forecasted to grow at a faster rate than King County. This is in line with the Vision 2040 Regional Growth Strategy

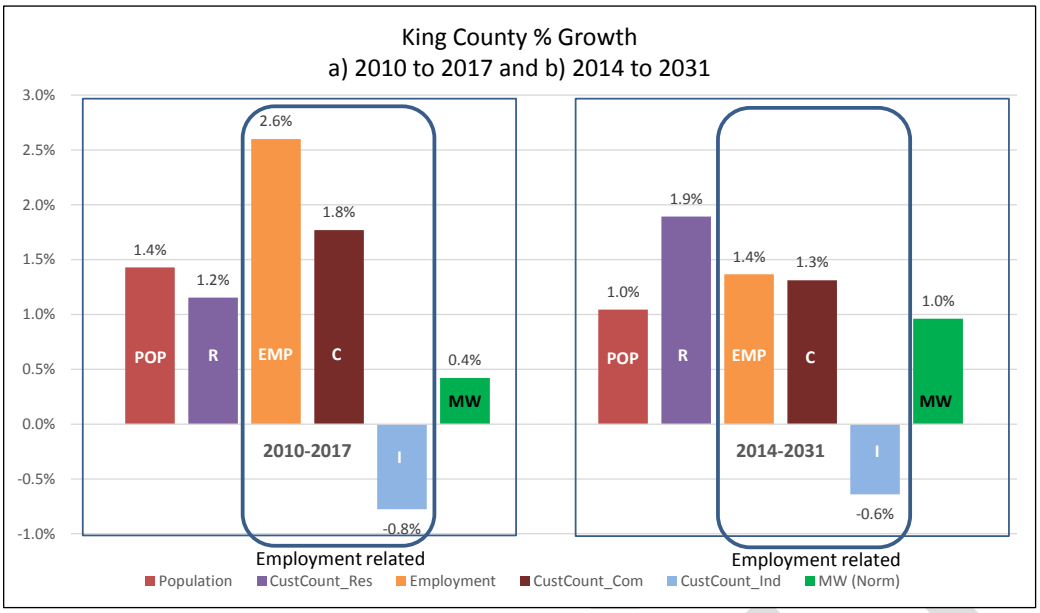
Figure 6.20: PSE's Winter Demand Forecasts – Eastside and King County, 100% Conservation
(Proportional Scaling)



The 2014 forecast shows a 2.4% growth rate for the Eastside area from 2014-2024 and a 2.5% growth for Eastside between 2014 and 2031. In comparison, the forecast shows a 1% growth rate for King County between 2014 and 2031. The Eastside area is projected to grow significantly faster than King County as a whole, which is in line with the Vision 2040 Regional Growth Strategy report. Whether this growth will be sustained through 2031 is unknown. Note: if the growth rate is calculated from the 2010 actuals through 2017, the growth rate is 2.2% for Eastside and 0.4% for King County. See Figure 6.21 and Figure 6.22.

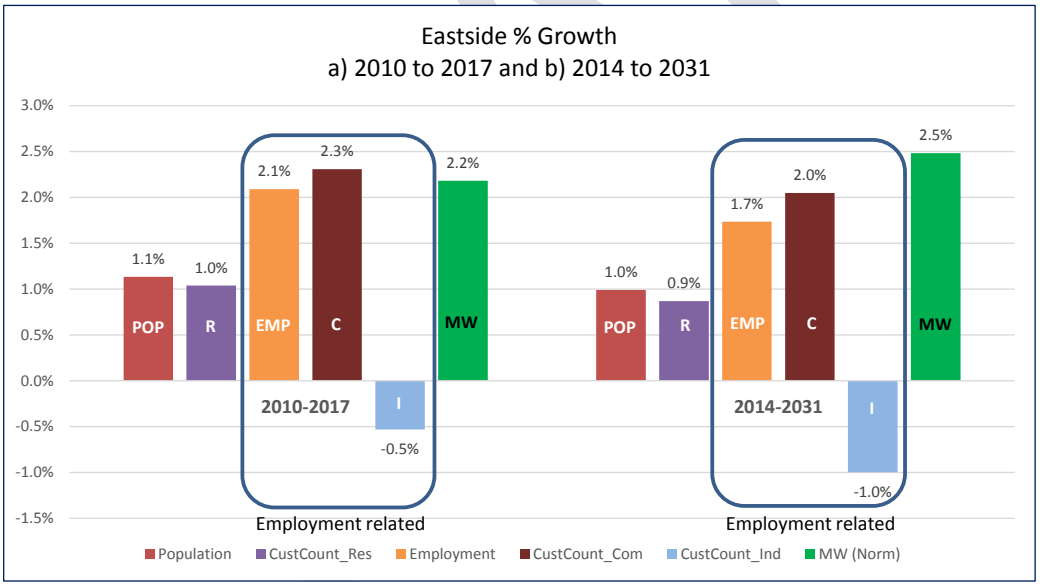
DSD 002031

Figure 6.21: Growth Rates – King County



See Table 6.1 for original data sources. Numbers provided by PSE.

Figure 6.22: Growth Rates – Eastside Area



See Table 6.1 for original data sources. Numbers provided by PSE.

Stakeholder Questions related to Actuals (Historical Data)

Q12. What are the ACTUAL numbers for 2012, 2013 and 2014?

A *Actual numbers for employment, population and customer count are shown in Section 6.2. Actual numbers (normalized) for MWh and MW are shown in Section 6.5.*

Q13. Please show historical loads.

A *See preceding question.*

Q14. What is the source of the actuals?

- A *See Table 6.1*

Q15. Would like graph showing load history (back to 2000) and forecast.

- A *See Section 6.5*

Q16. Please include 2014/15 winter peak data.

- A *The data is not yet available for the 2014/15 winter peak. See Figure 6.2 and the paragraph above it.*

Q17. Please provide the unadjusted and temperature adjusted historical peaks.

- A *Temperature adjusted historical peaks are shown in Section 6.5. See the beginning of Section 5 and Section 5.1 for why unadjusted peaks are not used.*

Q18. What have been the highest actual aggregate winter peak loads on Eastside feeders and distribution lines …? How would they relate to PSE's forecast of future loads?

- A *The aggregate peaks for the Eastside area are captured in the historical data shown in Figure 6.19.*
- A *The historic loads are included in the regression analysis which results in the forecast of future loads.*

6.6. Summary Analysis of PSE's Forecasting

PSE has followed industry practice in forecasting their demand load.

- PSE included the major components of a typical system forecast: weather normalizing, use of econometric data, incorporating end-use data (including conservation and DSR measures), and making adjustments for block (major) loads.
- The variables used in the weather normalizing process were typical based on industry practice.
- PSE used typical data set elements and multiple data sources for economic/demographic data as shown in Table 6.1, acquiring data at the county level, and for the Eastside area at the census track level, in order to differentiate growth rates within its service territory.
- PSE employed regression analysis at this step, an industry standard computer analysis technique, to determine the forecast before Demand Side Resources (DSR) and block load adjustments. (The computerized regression analysis was not analyzed as part of this study, but the technique is a computerize estimation of the best fit of the variables to the given data. The equations are considered proprietary by PSE.)
- PSE acquired/developed significant end-use data via their IRP process on over four thousand DSR measures, incorporated National and State requirements on conservation and RPS, and optimized the achievable, technical measures with a resultant 100% Conservation scenario which projects 135 MW of Eastside winter peak DSR by 2031.
- PSE gathered block load data (major projects) and utilized short-term forecast adjustments (1-year ramp in based on certificates of occupancy and 2-year ramp-out) to account for the impact. The block load impact was further adjusted by applying a probability factor based on the projected block load in-service date, with 100% through 2017, 50% from 2018 to 2020, and 0% after 2020. The in-service date accuracy and the ramp-in timing of one year is harder to evaluate. Projects can shift, developers can change their schedule, but PSE's projected timing of the block loads falls within a realistic range based

DSD 002033

on current construction schedules and plans, with the possible exception of the East Link project in 2020 which wouldn't affect the EE timing. PSE's 1-year ramp-in is based on having certificates of occupancy; as long as certificates of occupancy and visual confirmation of both construction and occupancy rates are utilized, the forecast can be updated each time with the best available information. In addition, some of the block load project information is still limited and doesn't provide a complete picture of the electric load requirements, so assumptions must be made. This is also typical and another reason for the need to regularly update block load information which is a typical industry practice. In summary, PSE's block load data appears to fall within a realistic range. Construction is happening. Developers have indicated interest in future projects. Also, PSE applies a probability factor to the estimated loads to try to address the uncertainty of projects with later in-service dates, and all the forecasted impacts of the block loads on the forecast are only temporary bumps, and are ramped out such that they don't affect the overall growth trend.

No forecast is perfect, but by following industry practice, PSE used reasonable methods to develop the forecast. PSE's resultant forecast shows the Eastside area growing at a higher level than at the county and system level, and that is based on the data PSE received.

Comments on weather adjustment:

PSE is applying the Northwest US practice (as does SCL) of basing projects on a normal 50/50 forecast, which by definition should be exceeded half the time, and using a 95/5 (1-in-20) extreme weather scenario for reference (but not for developing projects). Although a regional industry standard, many other US utilities base projects on an adverse weather scenario, such as a 90/10 or 80/20. Basing projects on an adverse weather scenario is more conservative, but seeks to ensure that the lights stay on given the adverse weather event. These statistically less frequent assumptions would result in a higher load forecast, and if adopted as a policy on which to base projects, would require the system to be designed to withstand it.

Based on historical temperature data, one could suggest that PSE's forecast use a normal temperature of 24°F rather than 23°F for winter normalizing (see Figure 6.1), but: a) the 24°F average is based on a relatively short span of time, and b) the forecast used to propose projects is a normal 50/50 forecast and is expected to be exceeded given an adverse weather event. If PSE were to adopt an adverse weather policy on which to base projects, then it could make sense to re-evaluate the "normal" winter peak temperature; however, since the system demand is based on the less conservative 50/50 load forecast, using 23°F for the normal temperature is a reasonable assumption because it results in a slightly higher system demand than using 24°F.

Stakeholder Questions related to Forecast Methodology

Q19. Questions on heat map. Request to create a more accurate map.

A *USE attempted to make a replacement heat map. One can obtain usage (kWh) data at a detailed level, but that doesn't show the peak demand which drives the project need - analogy of the odometer and speedometer. USE created a map of substation peak demand, using spatial interpolation*

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between the substations, but the accuracy wasn't sufficient for the granularity of detail that is desired. The substations aren't necessarily located right where the heaviest load is. USE didn't feel the result gave a sufficiently clear representation of the area load and so did not include it.

Q20. What are the industry standards for forecasting? Compare to PSE forecast.

A *See Sections 5 & 6 for standard industry practice.*

Q21. There appear to be no industry wide standards for the development of utility load forecasts, but there do appear to be standards for Integrated Resource Plans. RCW 19.280 State IRP, WAC 480-100-238. Clarify term "conservation" and why it is used for customer load reductions.

A *Yes, the industry standards have concentrated on the IRP process, but within that are requirements relating to some of the forecast elements. There are typical industry practices.*

A *100% Conservation is defined as the cost-effective, achievable, technical DSR measures. See the Section 5 introduction and Section 6.3.*

Q22. Is PSE using population growth as a parameter? If so, at what granularity are the growth projections made? In other words, are growth projections used for individual cities, or is the Eastside treated as a whole, with one forecast governing the whole area?

A *Population is used as a parameter.*

A *Forecasts were developed at the system level, at the county level, and for the Eastside area. The Eastside forecast was developed using census tract data.*

Q23. We would like to understand economic projections as well. Is economic growth projected for each city, or only for the whole Eastside? What numbers were used?

A *Economic projections were made at the system level, at the county level, and for the Eastside area. Graphs were provided for some of the major elements (Section 6.2 and 6.5).*

Q24. Does the load forecast anticipate changes in regional transmission flow, such as south-north transmissions to Canada?

A *The load forecast is based on load. Transmission flows are irrelevant to the forecast. The link between forecast and transmission flows comes from modeling the substation load data, which was correlated to the load forecast, into a powerflow case. The powerflow case is where regional flow scenarios can be modeled. (See Appendix B, Optional Technical Analysis for study results of this scenario. It showed that even with no power flowing to Canada on the Northern Intertie (which is an unrealistic hypothetical scenario but modeled to answer the local vs. regional question), there is still a project need.*

Q25. What other factors governing the regional grid is the load forecast taking into account?

A *See preceding answer.*

Q26. Is it possible that the industry-standard methodology which PSE uses to forecast load growth has not evolved to reflect the realities of the current electricity marketplace? Are there any newer methodologies, or modifications to existing methodologies, which better reflect the realities of the modern electricity marketplace?

A *This question is outside the scope of this study; however, the IRP process continues to get attention, and frequently includes input from stakeholders, which is where Demand-Side Resources are evaluated and feed into the forecast process.*

DSD 002035

Q27. Is PSE's load projection reasonable? Are they the needs of Eastside or the needs or BPA, etc.? Are the loads PSE is projecting based on a farfetched combination of circumstances that are unlikely to actually happen?

A *The load projections and need determination are based on a normal weather forecast with 100% conservation. The 2014 forecast methodology and inputs are reasonable. See Section 6.6. See Section 7 for discussion on standards.*

Q28. Is PSE's forecast based on good data, independently verified?

A *Yes, PSE has followed industry practice in forecasting their demand load. See section 6.6.*

Q29. Why is PSE projecting load growth when their public documents (e.g. 10k) show they are selling less electricity?

A *The referenced 10k report is based on energy, which like an odometer reading shows usage, not peak demand. As noted previously, average use behavior is not necessarily winter peak behavior; the trends don't have to match. In addition, the data in the report is not adjusted for weather. See figures in Section 6.5 for current forecasts.*

Q30. Provide justification/rational/definition for the System Capacity line on PSE's "Customer Demand Forecast".

A *System Capacity: Occurs when the load (Eastside Area) just hits the rating limit of the critical contingency condition(s). The System Capacity line can shift depending on where load grows (if not homogenous). The contingency analysis is dictated by national standards. Using the same methodology as the 2013 report, a winter Eastside system capacity range of 688-708 MW has been identified based on the 2014 load forecast powerflow results (see Figure 8.1).*

Q31. How does PSE justify an Eastside growth rate of 1.7% to 2%?

A *PSE used reasonable methods to develop the 2014 forecast by following industry practice (see Section 6.6). The forecast is built from the data inputs via regression analysis. The 2014 demand forecast shows a 2.4% growth rate for the Eastside area from 2014-2024 and a 2.5% growth for Eastside between 2014 and 2031. In comparison, the forecast shows a 1% growth rate for King County between 2014 and 2031. The Eastside area demand is projected to grow significantly faster than King County as a whole, which is in line with the land use* Vision 2040 Regional Growth Strategy *report. Whether the forecasted demand growth will be sustained through 2031 is unknown. Note: if the growth rate is calculated from the 2010 actuals through 2017, the growth rate is 2.2% for Eastside and 0.4% for King County. See Figure 6.18 and Figure 6.19.*

A *Note: SCL's "demand" forecast growth of 0.5% noted in their latest IRP update is actually an energy forecast. SCL's actual demand forecast from December 2013 to December 2034 has an estimated compound annual growth rate (CAGR) of 1.2%, based on an estimated 1180 MW in December 2013 and using their IRP demand graph as reference. PSE has a CAGR of 2.4% from winter 2013/14 to winter 2031/32 based on an estimated 615 MW in winter 2013/14.*

Q32. What is the magnitude and timing of the need for EE? An updated peak load forecast is needed to resolve serious questions about the load forecast used by PSE to justify the project as now proposed.

A *In early February, 2015, PSE completed their 2014 forecast which included historical data through 2014, and thus included the summer 2014 peak and the winter 2013/2014 peak. See the top of Section 6 for discussion on the new forecast methodology.*

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Q33. Please explain PSE's "Eastside Customer Demand Forecast" chart. A detailed quantitative analysis for the years is needed on this chart. There have been several credible articles stating electrical usage is not growing but is flat, even declining in the United States. This trend is apparent over several years and is due to conservation and technological changes in production, usage and storage. How does Energize Eastside explain this disparity? Also, solar energy has been increasing on the Eastside.

- A *Please see discussions in Section 6.2 on the economic and demographic data sources, the Vision 2040 Regional Growth Strategy, and Section 6.4 on Major Loads. Please see Section 4 on Energy vs. Demand and Q4 on potential impact of solar on a winter peak.*

Q34. PSE's energy use (MWh) trend and # of customer trend is similar to SCL, yet PSE's load forecast (MW) shows a significantly higher growth % than SCL. Explain. National electricity use is declining as is regional (Pacific Northwest Utilities Conference Committee (PNUCC)). Why is PSE's forecast increasing? Explain why electricity use in Bellevue is so different from other cities.

- A *Please see Q31 and Q33 answers.*

Q35. Please explain PSE's "Eastside Customer Demand Forecast" chart. Show peak demand for Bellevue. Show retail sales to customers, off-system sales and electricity delivered to transmission only customers. Concern over accuracy of trend.

- A *See preceding answer. See Figures in Section 6.5.*
- A *There are no off-system sales within the Eastside area; this would not affect the Eastside forecast. There are transmission only customers in King County outside of the Eastside area, but since the off-system sales customers are not PSE's customers, they wouldn't affect that forecast either.*

Q36. Is it true that PSE's "Eastside Customer Demand Forecast" graph is based on a hypothetical "grid-flow modeling scenario" … rare winter peak …

- A *No. It is based on normal winter weather. The hypothetical outage scenarios are part of the industry mandated contingency analysis. Please see the weather normalizing discussion in Section 5 and see Section 7 on Standards, regarding the required contingency analysis.*

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7. Electric Utility Reliability Standards

7.1. EPAct 2005

On August 14, 2003, large portions of the Midwest and Northeast United States and Ontario, Canada, experienced an electric power blackout. The outage affected an area with an estimated 50 million people and 61,800 megawatts (MW) of electric load in the states of Ohio, Michigan, Pennsylvania, New York, Vermont, Massachusetts, Connecticut, New Jersey and the Canadian province of Ontario. The blackout began a few minutes after 4:00 pm Eastern Daylight Time (16:00 EDT), and power was not restored for 4 days in some parts of the United States. Parts of Ontario suffered rolling blackouts for more than a week before full power was restored. Estimates of total costs in the United States range between $4 billion and $10 billion (U.S. dollars). In Canada, gross domestic product was down 0.7% that August, there was a net loss of 18.9 million work hours, and manufacturing shipments in Ontario were down $2.3 billion (Canadian dollars).[25]

Partially in response to this blackout, Section 1211 was added to the Energy Policy Act of 2005 (EPAct 2005). EPAct 2005 became law on August 8, 2005. Section 1211 of the EPAct 2005 requires that the Federal Energy Regulatory Commission (FERC) certify an Electric Reliability Organization (ERO) to establish and enforce reliability standards for the bulk-power system[26], subject to FERC review. On July 20, 2006, FERC certified the North American Electric Reliability Corporation (NERC) as the ERO for the continental U.S. under the Federal Power Act Section 215.

From the NERC website (www.nerc.com):

> "NERC is a not-for-profit international regulatory authority whose mission is to assure the reliability of the bulk power system in North America. NERC develops and enforces Reliability Standards; annually assesses seasonal and long-term reliability; monitors the bulk power system through system awareness; and educates, trains, and certifies industry personnel. NERC's area of responsibility spans the continental United States, Canada, and the northern portion of Baja California, Mexico. NERC is the electric reliability organization for North America, subject to oversight by the Federal Energy Regulatory Commission and governmental authorities in Canada. NERC's jurisdiction includes users, owners, and operators of the bulk power system, which serves more than 334 million people."

Because of changes brought about by EPAct 2005, the NERC standards that were previously voluntary are now mandatory and all users of the Bulk Power System (BPS) must comply with these standards. There are currently 1426 requirements in 143 reliability standards either subject to enforcement or subject to future enforcement.

[25] http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/BlackoutFinal-Web.pdf, pg. 1

[26] In this report, the terms Bulk Power System (BPS) and Bulk Electric System (BES) will be used interchangeably. While the definitions are slightly different, for the purposes of this report and for determining the need for the Energize Eastside Project, these two terms can be treated as the same.

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7.2. Reliability Standards Applicable to Energize Eastside[27]

NERC Reliability Standard TPL-001-4[28] (Transmission System Planning Performance Requirements) is the Reliability Standard most relevant to the need for the Energize Eastside Project. TPL-001-4 Requirement 1 and Requirement 7 are currently subject to enforcement. Requirements 2-6 and 8 are not currently subject to enforcement but will be subject to enforcement on January 1, 2016. The enforcement date for Requirements 2-6 and 8 is before the planned in-service date of the Energize Eastside Project. Therefore, the Energize Eastside Project will be subject to the newer requirements before the project goes into service. In addition, the newer requirements are in many cases more stringent than the existing requirements. For the above reasons, this report will limit its discussion to the newer TPL-00104 Requirements and will not discuss the currently enforceable requirements of TPL-001-0.1, TPL-002-0b, TPL-003-0b, and TPL-004-0a[29].

Another Reliability Standard that can have an impact on the need for the Energize Eastside Project is FAC-008-3[30] (Facility Ratings). TPL-001-4 and FAC-008-3 are discussed in more detail below.

TPL-001-4 requires that each Planning Coordinator and Transmission Planner[31] perform an annual transmission assessment of its portion of the Bulk Electric System[32] (BES). This assessment must model, among other things, system peak load, known commitments for Firm Transmission Service and Interchange, and the planning events (contingencies) listed in Table 1 of TPL-001-4[33].

TPL-001-4 requires the development of a Corrective Action Plan (CAP)[34] whenever the transmission assessment determines that the system cannot meet the performance requirements listed in Table 1. In other words, once a performance requirement specified in TPL-001-4 cannot be met (e.g., an overload is found), a need has been determined.

FAC-008-3 is applicable to both Transmission Owners and Generation Owners[35]. FAC-008-3 requires each Transmission Owner and Generation Owner to have a facility[36]

[27] capitalized terms in this section refer to terms that are defined in the NERC Glossary
[28] http://www.nerc.com/files/TPL-001-4.pdf
[29] Reliability Standards TPL-001-0.1, TPL-002-0b, TPL-003-0b, and TPL-004-0a are being replaced by TPL-001-4.
[30] http://www.nerc.com/files/FAC-008-3.pdf
[31] Puget Sound Energy is registered with NERC as both a Planning Coordinator and a Transmission Planner.
[32] The Bulk Electric System (BES) definition is fairly long and involved (see http://www.nerc.com/pa/RAPA/BES%20DL/BES%20Definition%20Approved%20by%20FERC%203-20-14.pdf), but for the purposes of this report, the BES can be considered to be all networked transmission elements with an operating voltage of 100 kV or higher. Radial facilities are generally not considered to be part of the BES even if they are operated at voltages of 100 kV or higher.
[33] Table 1 is provided in Appendix RPM-1 of this report.
[34] Corrective Action Plans as used in the TPL-001-4 Reliability Standard are not the same as the Corrective Action Plans described by PSE in the Eastside Needs Assessment Report (October 2013). In TPL-001-4, a Corrective Action Plan may include operational measures (such as switching existing facilities in or out) and/or the addition of new facilities. In the Eastside Needs Assessment Report, Corrective Action Plans only refer to operational measures.
[35] Puget Sound Energy is registered with NERC as both a Transmission Owner and a Generation Owner.
[36] A facility is a set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.)

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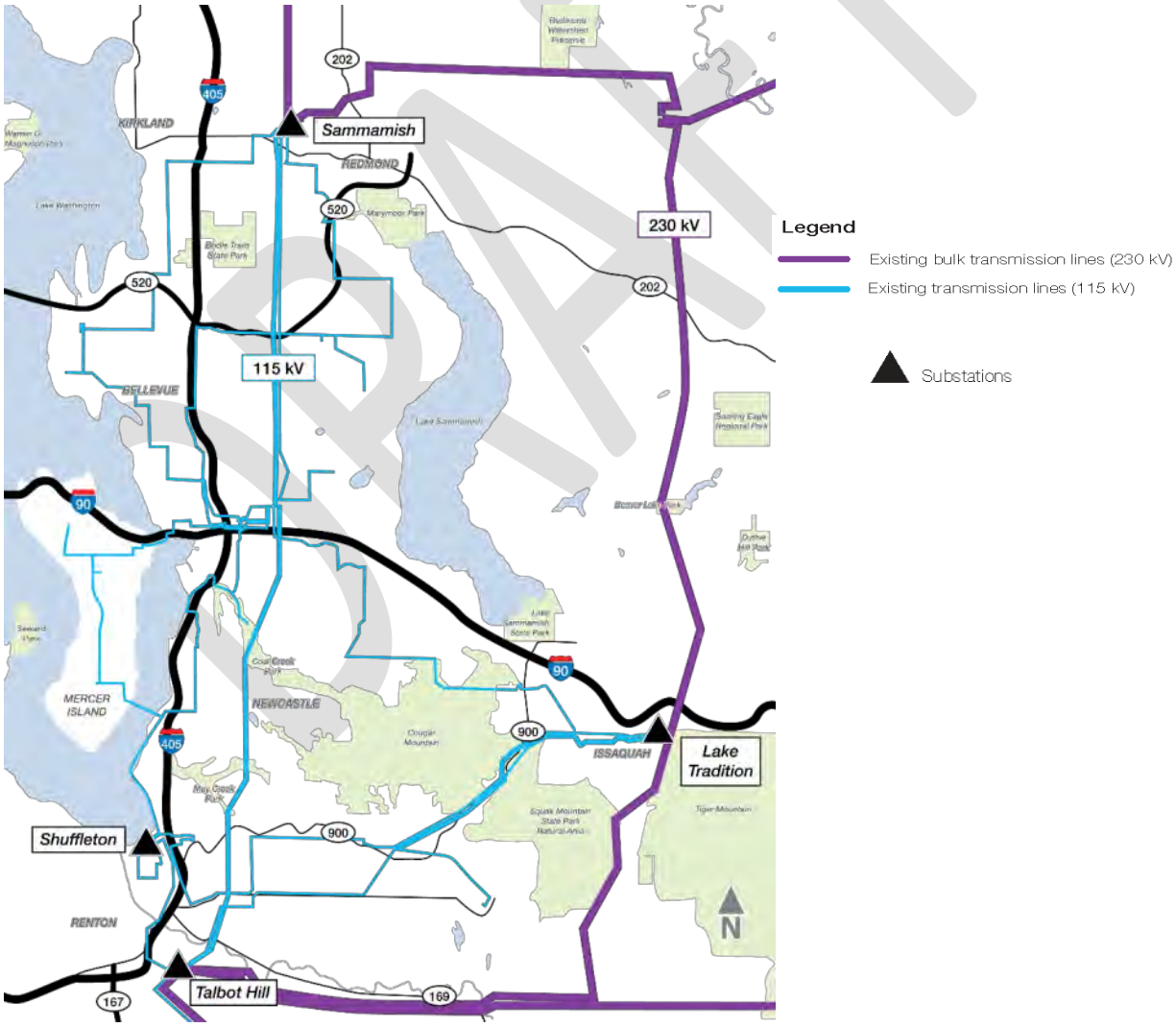
rating[37] methodology[38] that is consistent with manufacturer ratings, standards developed through an open process, or a practice that has been verified by testing, performance history, or engineering analysis. The intent of this Reliability Standard is to ensure that facility ratings are based upon sound engineering practices and are consistent across a utility's service area.

7.3. Critical Contingencies for the Energize Eastside Project

Figure 7.1 below is a sketch of the Eastside area transmission network[39]. The area between Sammamish and Talbot Hill is the area of where a number of overloads have been seen in planning studies.

Figure 7.1: Eastside Area Transmission Sketch



[37] A facility rating is the maximum or minimum voltage, current, frequency, or power flow through a facility that does not violate the applicable equipment rating of any equipment comprising the facility.
[38] A facility rating methodology is a procedure that is used to establish the facility ratings for all of a utilities facilities.
[39] From the Energize Eastside website: energizeeastside.com

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The specific contingencies that cause facility rating violations on specific elements of the power system are CEII[40] and cannot be disclosed in a public document. However, the general types of contingencies that cause overloads on various facilities can be disclosed. Below is a list of the general types of contingencies that are causing overloads on the PSE eastside transmission system.

- Overlapping outages of two transformers (N-1-1) (P6),
- Overlapping outages of two transmission lines (N-1-1) (P6),
- Overlapping outages of one transmission line and one transformer (N-1-1) (P6), and
- Simultaneous outage of two transmission lines (N-2) (P7).

As discussed above, the NERC TPL-001-4 Reliability Standard requires that a Corrective Action Plan (CAP) be developed whenever the system does not meet the performance requirements specified in the standard. A CAP can include: new facilities such as transmission lines; adjustments to operating procedures (such as opening a switch at the end of a transmission line); or a combination of both new facilities and operating procedures.

7.4. Normal vs. Emergency Ratings

A "*normal rating"* is the limit at which a transmission facility can operate indefinitely (i.e., 24/7/365 for the life of the project, which in some cases could be over 50 years). An "*emergency rating"* is only available for use for a short period of time and using an emergency rating usually involves a loss of usable life for the facility. This loss of usable life is caused by the increased temperatures that the facility is subject to when loaded to its emergency limit. The higher temperatures can cause insulation in transformer banks to degrade or overhead conductors to weaken and/or sag. In some cases an emergency rating may have a lifetime limit on the number of hours it can be used (e.g., 100 hours). Once that lifetime limit is reached, a facility will not be able to exceed its normal rating or it may need to be replaced. An emergency rating cannot be used for normal overloads that might occur due to load growth or a sudden increase in load due to extreme weather. Given a typical lifetime limit of 100 hours, an emergency rating would only be good for a little over 4 days under normal (non-contingency) conditions. Therefore, an emergency rating can only be used under contingency (outage/equipment failure) conditions.

In addition to the differences between normal and emergency ratings, there are typically different ratings for summer and winter conditions. Because equipment ratings are based in part on thermal limits of the equipment (as noted above) and the ambient temperatures expected during winter are less than the ambient temperatures seen during summer, normal and emergency winter ratings are almost always higher than the respective normal and emergency ratings for summer.

PSE utilizes different normal and emergency facility ratings for summer and winter conditions, consistent with industry practice.

[40] CEII - Critical Energy Infrastructure Information CEII is protected information whose release could compromise the reliability of the BES. Each individual utility decides what information they deem to be CEII. The specific contingencies that cause overloads on the elements documented in the public Energize Eastside study reports are considered to be CEII by PSE. Other utilities also consider information such as this to be CEII.

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7.5. Transmission Reliability vs. Distribution Reliability

Transmission outages currently cause about 5% of the customer outage duration on PSE's system in the Energize Eastside area. The remaining 95% of the customer outage duration are caused by distribution outages (see Table 7.1) below[41]. As can be seen from Table 7.1, the City of Bellevue's transmission related customer outage performance is much better than the rest of the Energize Eastside area (less than 1% of the customer outage minutes were due to transmission outages).

Table 7.1: Transmission and Distribution Outage Data (from PSE)

2014 Total Outages					
Energize Eastside Area (includes City of Bellevue)					
	# of Outages	# of Customers Impacted	Total Customer Minutes	Customers Impacted Per Outage	Outage Minutes Per Customer Per Outage
Transmission outages	6	35,614	2,521,995	5936	11
All other outages	1182	120,074	47,481,181	102	0.33
Total outages for EE	1188	155,688	50,003,176		
Transmission outage percentage of total	0.5%	22.9%	5.0%		
City of Bellevue					
	# of Outages	# of Customers Impacted	Total Customer Minutes	Customers Impacted Per Outage	Outage Minutes Per Customer Per Outage
Transmission outages	3	18,939	224,327	6313	4
All other outages	745	61,963	29,964,379	83	0.65
Total outages for COB	748	80,902	30,188,706		
Transmission outage percentage of total	0.4%	23.4%	0.7%		

Table 7.1 also shows some additional pertinent information regarding the relative severity of transmission outages versus distribution outages. The number of customers affected by a transmission outage in this example is over 50 times greater than the number affected by a distribution outage. In addition, the outage duration per customer per outage is much longer for transmission outages than for distribution outages. This difference is one reason why transmission reliability is required to be so high. While the risk of an outage is low, the consequences of that outage can be quite large.

[41] This data from PSE indicates that the Energize Eastside area has fewer customer outage minutes due to transmission outages (as a fraction of the total outage minutes) than other utilities in the U.S.

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The reason mentioned above is the same reason why the nuclear industry designs back-up systems for the reactor core cooling system with multiple layers of redundancy. Nuclear plants are typically designed with two sources of off-site (grid) power. If one source fails, the other can be used to supply the plant cooling load. In addition, just in case both off-site power sources are out, the plant has backup diesel generators that are capable of supplying the cooling system load. Just in case the primary diesel generators fail, there is a redundant set of diesel generators to step in if necessary. Then for additional protection, battery backup is provided in case the offsite grid power and both sets of diesel generators fail. The reason for this extreme level of redundancy is because even though the risk of a failure of four levels of cooling system power supply is incredibly small, the consequence of a failure is extremely large.

In addition to the Northeast blackout discussed above, two other major blackouts have occurred in the Western Interconnection in the last two decades. These two blackouts are discussed below.

On July 2, 1996 at 1424 MDT a disturbance occurred that ultimately resulted in the Western Systems Coordinating Council (WSCC) system (the Western Interconnection) separating into five unconnected load and generation subsystems. This disturbance resulted in the loss of 11,850 MW of load and affected 2 million people in the West. Customers were affected in Arizona, California, Colorado, Idaho, Montana, Nebraska, Nevada, New Mexico, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming in the United States; Alberta and British Columbia in Canada; and Baja California Norte in Mexico. Outages lasted from a few minutes to several hours. Electric service was restored to most customers within 30 minutes, except on the Idaho Power Company (IPC) system, a portion of the Public Service Company of Colorado (PSC), and the Platte River Power Authority (PRPA) systems in Colorado, where some customers were out of service for up to six hours. On portions of the Sierra Pacific Power Company (SPP) system in northern Nevada, service restoration required up to three hours.

On August 10, 1996 a major disturbance occurred in the Western Interconnection (Western Systems Coordinating Council, WSCC) at 1548 PDT resulting in the Interconnection separating into four unconnected load and generation subsystems. Conditions prior to the disturbance were marked by high summer temperatures (near or above 100 degrees Fahrenheit) in most of the Region, by heavy exports (well within known limits) from the Pacific Northwest into California and from Canada into the Pacific Northwest, and by the loss of several 500 kV lines in Oregon. The California−Oregon Intertie (COI) (Pacific Northwest to California) north to south electricity flow was within parameters established by recent studies initiated as a result of the July 2-3, 1996 disturbance (see above). The flow on the AC system between the Pacific Northwest and California was about 4,350 MW and the flow on the Pacific DC Intertie (PDCI) (a DC system) was 2,848 MW. This disturbance resulted in the loss of over 28,000 MW of load and affected 7.5 million people in the West. Customers were affected in Arizona, California, Colorado, Idaho, Montana, Nebraska, Nevada, New Mexico, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming in the United States; Alberta and British Columbia in Canada; and Baja California Norte in Mexico. Outages lasted from a few minutes to as long as nine hours.

Both of the above outages occurred prior to the implementation of mandatory Reliability Standards. The purpose of the mandatory Reliability Standards is to maintain the reliability of the BES and to help prevent major outages like these from

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happening again. As previously noted, even though the probability of outages like these is very small, the consequences of this type of outage are very large. Therefore, the Reliability Standards require the examination of contingencies that to a lay person seem to be highly unlikely.

In general, the probability of a single contingency (N-1) is at least once every three years. The probability of multiple contingencies such as N-1-1 or N-2 is somewhere between once every three years and once every 30 years. (See Section 8 and Appendix B for analysis of this subject.)

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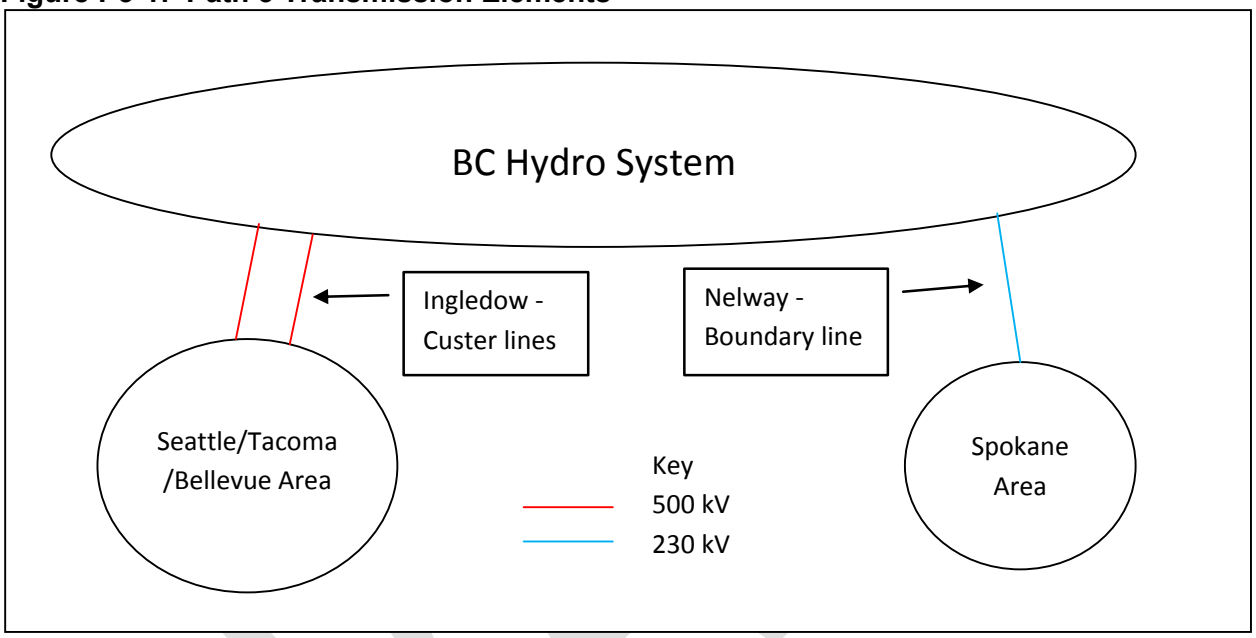
7.6. Path 3 Issues

Path 3 is the transmission interconnection between Washington and British Columbia. Path 3 consists of three transmission circuits (see Figure P3-1):

1. Ingledow - Custer 500 kV #1,
2. Ingledow - Custer 500 kV #2, and
3. Nelway - Boundary 230 kV #1.

Figure P3-1: Path 3 Transmission Elements



It should be noted when discussing Path 3 that sometimes the Nelway - Boundary 230 kV line is referred to as the Path 3 eastside intertie. This term should not be confused with eastside as it is used in the context of the Energize Eastside project. The Path 3 eastside intertie is located near Spokane, WA and is over 250 miles away from the area under consideration for the Energize Eastside project.

Path 3 has a non-simultaneous rating of 3150 MW north to south and 3000 MW south to north. Known commitments for Firm Transmission Service and Interchange on Path 3 are 2300 MW north to south and 1500 MW south to north.

The planning cases PSE used to study the need for the Energize Eastside project had Path 3 flow at 3150 MW north to south in the summer base cases and 1500 MW south to north in the winter base cases.

<u>Stakeholder Questions related to Standards and Reliability</u>

Q37. 2013 Needs Assessment report, page 43. The "3d" sensitivity, modeling 2021-2022 extreme Weather with 100% conservation. Explain why this scenario, which had 845 MW predicted Eastside load, showed no overload for N-0 yet 845 MW is above PSE's "current system capacity" line in their 2013 report. Clarify what PSE's capacity line represents.

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A *PSE's capacity line is the load level at which overloads will just begin to occur under contingency situations. Because the scenario being referred to in this question is "N-0" (or no contingency), there are no overloads. The reason for there being no overloads is that up to two additional pieces of equipment are in service to carry power to the load.*

Q38. Too much transmission reliability?

A *The requirement for transmission reliability is discussed in the section on NERC Reliability Standards. Because the Reliability Standards are mandatory, meeting these standards provides just adequate reliability.*

Q39. How are EE "need" and "reliability" related? How many outages in the next 10 years (2017-2027) are anticipated to be avoided by implementation of EE, due to transformer limitations or otherwise stressing system capacity due to local Eastside growth (excluding unpredictable weather events)?

A *EE need is related to reliability by the requirement that when overloads occur during a planning assessment under the contingencies that are required to be run (see the discussion of TPL-001-4 in the Independent Technical Analysis), there is by definition a need. This need is not necessarily EE, but something must be done to mitigate the overloads seen in the planning assessment. The question of how many outages may be avoided by implementation of EE is not relevant to the question of need. The Reliability Standards require that a defined set of contingencies be run on the system model. If overloads or other violations are found, then a Corrective Action Plan must be produced. The fact that a Corrective Action Plan is needed demonstrates that there is a need.*

Q40. What is the probability of an N-1-1?

A *The probability of an N-1-1 is not a factor that is considered in determining if there is a need for a project. However, typically the probability of an N-1-1 is between 0.33 and 0.033 outages per year or once in 3 years to once in 30 years.*

Q41. One of the rationales advanced by PSE for the new transmission lines was to increase the 'reliability' of PSE's transmission system and/or the reliability of PSE's "system" that supplies electricity to Bellevue and other east side communities.

A *Energize Eastside is a project designed to mitigate overloads found in planning studies that used projected future load growth. Therefore, a better way to look at EE is that it will maintain the current reliability that exists today and prevent it from getting worse.*

Q42. Task 8 of USE's 'scope of services' states that USE will develop a formal, written evaluation of the need for PSE's Energize Eastside (EE) project, including an assessment of the " … impacts to electrical system reliability …" Please describe (or provide in the report) a schematic/line-diagram of the "electrical system" that USE evaluated to assess the "reliability" of the "electrical system"; and describe the quantitative reliability measures/metrics that were used in performing the evaluation of the impact of PSE's EE project on the "electrical system" reliability.

A *The electrical system modeled was the entire Western Interconnection that extends from the Pacific Ocean on the west east to Colorado and from British Columbia and Alberta in the north south to Arizona and a portion of northern Mexico. The studies concentrated on the Puget Sound area, but included all facilities in the entire Western Interconnection. USE did not assess the impacts of PSE's EE project on electric system reliability. Our work scope was limited to investigating the need for EE. Therefore, we investigated the accuracy of PSE's latest load forecast (2014) and ran studies using the system model without EE in it to see if problems occurred that would require a project like EE to solve. In performing this*

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investigation, we addressed the impacts of PSE's assumptions regarding load growth and regional transfers on the system without EE to determine if there was a need for a project like EE. The Optional Technical Assessment (OTA) (Appendix B) looked at the sensitivity of modified assumptions regarding load growth, westside generation levels, and regional transfers on the need for a project like EE. Determining the preferred project to mitigate the problems found in the studies of the system without EE is one of the purposes of the EIS process, but this determination is beyond the scope of the ITA and the OTA.

Q43. Why is an N-1-1 outage scenario (rare) used to determine need?

A *Because N-1-1 contingencies must be simulated in the planning assessments required by the mandatory NERC TPL-001-4 Reliability Standard.*

Q44. Questions about reliability, outages, contingency analysis.

A *As noted in responses to other questions, probability of an outage is not considered in determining need using the NERC TPL-001-4 Reliability Standard. When performing a planning assessment all outages need to be simulated and if there are any overloads or other violations, then a Corrective Action Plan must be developed. What is included in this Corrective Action Plan will vary depending on the type of outage and what sort of mitigation is allowed for that outage in the TPL-001-4 Reliability Standard. However, need is established as soon as a Corrective Action Plan needs to be developed.*

Q45. We ask the consultant to forecast how many outages in the next five years (2016 – 2020) would be avoided by implementation of Energize Eastside.

A *Please see the responses above.*

Q46. Is it true that PSE's "Eastside Customer Demand Forecast" graph is based on a hypothetical "grid-flow modelling scenario" in which a rare winter peak electricity demand event occurs on the Eastside at exactly the same time that there are two major and simultaneous equipment outages on nearby transmission lines?

A *The demand forecast is independent of any equipment outages. The current system capacity line is determined by studies of system performance under multiple contingency scenarios with models that incorporated forecasted peak load. These studies are required to be run in this manner by the Requirements in the NERC TPL-001-4 Reliability Standard.*

Q47. Are PSE's conclusions reasonable?

A *See the conclusions section of the Independent Technical Analysis and the Executive Summary of the OTA (Appendix B).*

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8. Assessment of PSE's Identified Drivers for the Eastside Project (PSE's Results)

This section addresses PSE's findings based on their new 2014 normal winter forecast, with 100% conservation.

Table 8.1 shows the new forecasted loads for Eastside that were utilized in the powerflow cases; three normal winter and three normal summer cases were studied by PSE. The winter forecasts between 2017/18 and 2023/24 show Eastside growing, while King County otherwise declines. The ITA confirmed that the load values in Table 1 matched the new forecast and were modeled[42] in the cases.

Table 8.1: PSE's King County and Eastside Forecasted Loads in Studied Years

Forecast Development Year	King County (excluding Eastside)	Eastside
Normal Winter		
2017/18	1881	688
2019/20	1867	708
2023/24	1817	764
Normal Summer		
2018	1379	538
2020	1385	561
2024	1399	618

The ITA also confirmed the Northern Intertie (Path 3) transfers matched PSE's modeling plan (Table 8.2), and that PSE's winter generation dispatch scenario of "no PSE and SCL generation west of the Cascades" was modeled in the winter cases, as per Table 4.4 in the October 2013 Eastside Needs Assessment Report.

Table 8.2: Northern Intertie Flows

Northern Intertie	Flow Direction
Normal Winter	
3150 MW	South to North
Normal Summer	
1500 MW	North to South

Source: PSE. Verified by ITA.

Tables 8.3 and 8.4 list the overloaded elements that PSE identified based on the new 2014 forecast. The ITA confirmed these overloaded elements drive the need for an Eastside project by simulating the contingencies (outages) in the powerflow cases provided by PSE.

[42] The aggregate Eastside load matched the numbers in Table 8.1.

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Table 8.3: PSE Projected Normal Winter, 100% Conservation – Overloaded Elements

South to North Flow	Type of Contingency and Season								
	2017/18 Winter (23°F) 100% Conservation			2019/20 Winter (23°F) 100% Conservation			2023/24 Winter (23°F) 100% Conservation		
Transmission Line or Transformer	N-1	N-1-1	N-2	N-1	N-1-1	N-2	N-1	N-1-1	N-2
Talbot Hill - Lakeside #1 115 kV line		OL			OL			OL	
Talbot Hill - Lakeside #2 115 kV line		OL			OL			OL	
Talbot Hill 230-115 kV transformer #1		OL			OL			OL	
Talbot Hill 230-115 kV transformer #2		OL			OL			OL	
Talbot Hill-Boeing Renton-Shuffleton 115 kV line		OL			OL			OL	

OL= Overload of Emergency Rating. Source: PSE Results. ITA verified overloaded elements driving project need.

Table 8.4: PSE Projected Normal Summer, 100% Conservation - Overloaded Elements

North to South Flow	Type of Contingency and Season								
	2018 Summer (86°F) 100% Conservation			2020 Summer (86° F) 100% Conservation			2024 Summer (86° F) 100% Conservation		
Transmission Line or Transformer	N-1	N-1-1	N-2	N-1	N-1-1	N-2	N-1	N-1-1	N-2
Sammamish 230/115 kV Xfmr[43] #1		OL			OL			OL	
Sammamish 230/115 kV Xfmr #2		OL			OL			OL	
Novelty Hill 230/115 kV Xfmr #2		OL			OL			OL	
BPA Monroe – Novelty Hill 230 kV	OL		OL	OL		OL	OL		OL
Beverly Park - Cottage Brook 115 kV line		OL			OL			OL	
Sammamish – BPA Maple Valley 230 kV line				OL			OL		

OL= Overload of Emergency Rating. Source: PSE Results. ITA verified overloaded elements driving project need.

Figure 8.1 utilizes the 2014 load forecast and was supplied by PSE. Two system capacity lines for the Eastside area reflect where the powerflow results indicated violations of the mandatory performance requirements that put customer's reliability at risk. The powerflow results show a range of need for the Eastside area between 688 MW in winter 2017/18 and 708 MW in winter 2019/20. These levels were chosen by PSE because at 688 MW system elements are overloaded, and by 708 MW they are not only overloaded but 63,200 customers are at risk of losing power, which is a more severe situation. Further detail is noted below.

- In winter 2017/18 system elements would be overloaded requiring Corrective Action Plans (CAPs) for the Category C overloads. Zero customers are at risk of losing power by the CAPs[44].

[43] Xfmr = Transformer

[44] CAPs are implemented to protect system equipment from overload and resulting loss of equipment life or damage. CAPs can result in the forced reduction of load (intentionally causing customer outages) to bring

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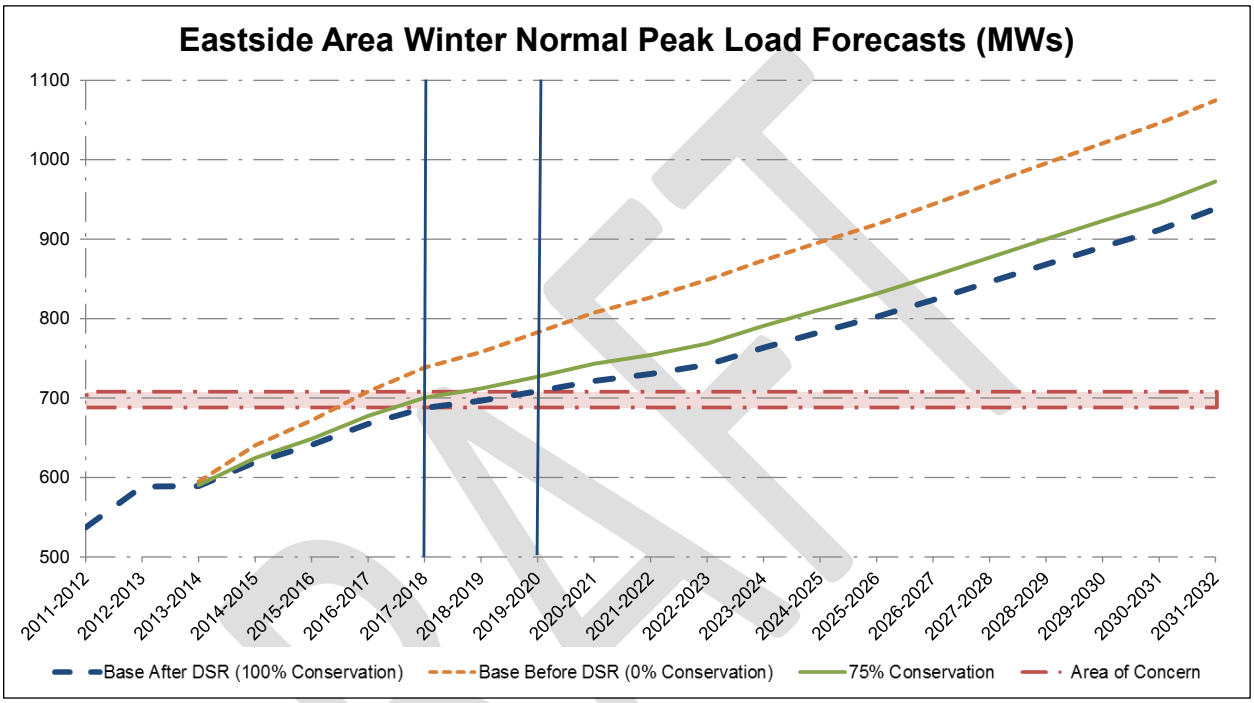
- By winter 2019/20, the CAPs radialize[45] existing loop service such that approximately 63,200 customers are at risk of losing power.
- By winter 2023/24, 16,800 customers are at risk from load shedding (intentional outage to customers to protect the system equipment), with another 52,000 customers at risk of losing power.

Figure 8.1: PSE's Graph of System Capacity, 2014 Forecast, 100% Conservation



In sum, PSE's need date for the Energize Eastside project remains as winter 2017/18. The following issues were identified by PSE and forecast levels and overloads were confirmed by the ITA:

- Transmission system elements will be over their capacity, and will require the use of CAPS to mitigate transmission overloads.
- Although the CAPS do not drop customer load in winter 2017/18, by winter 2019/20 approximately 63,200 customers are at risk of losing power. Intentionally dropping firm load for an N-1-1 or N-2 contingency to meet its federal planning requirements is not a practice that PSE endorses. This view is not unique amongst utilities. The CAISO Planning Standards states that "Increased reliance on load shedding … would run counter to historical and current practices, resulting in general deterioration of service levels."
- The forecast uses a 1 in 2 year weather forecast. Colder weather will result in higher load levels in winter 2017/18.
- 100% conservation may not be achieved which would result in a higher load level in winter 2017/18. Even if 100% conservation is achieved, it may not be in the appropriate locations and correct magnitudes.

the equipment loading below the emergency rating. This would only be used as a stopgap measure until system reinforcements (new equipment, etc.) are completed. CAPs as used here is a subset of CAPs defined in the NERC Reliability Standards. See Section 7 on Standards.

[45] Radialize: Convert from loop service to radial service (only one source).

- By the summer of 2018, studies show that customers will be at risk of outages and load shedding using CAPS to mitigate transmission overloads.

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9. Regional Issues related to EE

Note: All ColumbiaGrid regional documentation of Energize Eastside refers to the project by its terminals: Sammamish-Lakeside-Talbot. The following text refers to Energize Eastside as the Project.

Background

ColumbiaGrid is a regional transmission planning organization with a footprint encompassing Oregon, Washington, parts of Idaho and Montana. A planning team was formed with all Puget Sound area transmission owners and operators as planning participants within a year after the creation of ColumbiaGrid in 2007 to address the beginning curtailments of firm service in the Puget Sound area. Since 1997 and prior to the formation of this team, BPA had been planning to address these needs with a major 500kV line project from Monroe to Echo Lake, but construction had not started. The study team was able to identify a collection of projects to achieve the planning objectives with a cumulative scope less than the 500kV project.

The ColumbiaGrid Puget Sound Area transmission planning activity created 150 document postings on the team website that provide a detailed history of the work that led up to the regional plan. Of the 150 postings, three postings provide the information sufficient to describe the Project's role in regional objectives. The three postings are final reports and are all publicly available. These documents are:

- Transmission Expansion Plan for the Puget Sound Area (October 20,2010)
- Updated Recommended Transmission Expansion Plan for the Puget Sound Area to Support Winter South-to-North Transfers (October 28, 2011)
- Updated Transmission Expansion Plan for the Puget Sound Area to Support Summer North-to-South Transfers (February 21, 2013)

Project Specific Information

The following Project specific regional information was obtained from the above documentation.

1. Either the Project or reconductoring BPA's and SCL's Maple Valley-SnoKing 230kV lines is needed, but not both.
2. The Project or rebuilding SCL's Bothell-SnoKing 230kV lines is needed, but not both. The Bothell-SnoKing lines still need to be reconductored with the Project, but rebuilding is avoided.
3. If the Project voltage level is 115kV, the Project does not achieve the regional objectives. With that scenario, the regional objectives will be achieved by reconductoring the Maple Valley-SnoKing 230kV lines and the Bothell-SnoKing 230kV lines will need to be rebuilt.
4. The Project at 230kV is identified as the preferred alternative because of its dual purpose for regional objectives and local load service. If the Maple Valley-SnoKing 230kV lines had been reconductored prior to development of the Project, there would have been unnecessary redundancy developed in the transmission infrastructure, assuming that the Project voltage level needed to be 230kV.

ColumbiaGrid determined that the Energize Eastside project at 230 kV is the preferred alternative of all the options studied because of its dual purpose for regional objectives and local load service.

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Stakeholder Questions related to Regional vs. Local Need

Q49. What is the connection between the need for EE and Columbia Grid (CG) technical objectives?

A *The CG technical objective is to identify effects of multiple systems that prevent fulfillment of firm transmission commitments. Mitigating transmission effects that do not involve multiple systems is not within the CG mandate. After the effects are identified, the multiple system owners are convened as a team facilitated by CG to identify mitigating alternatives and select the preferred alternative. The proposed 230kV scope of EE is identified by the CG facilitated team as a preferred alternative to reconductoring SCL's Maple Valley-SnoKing 230kV lines. EE at 230kV also changes the SCL scope of rebuilding the Bothell-SnoKing 230kV lines to reconductoring these lines.*

Q50. How are the technical needs of Columbia Grid prioritized and what criteria are used for evaluation and prioritization?

A *CG performs system assessments to determine forecasted transmission constraints to serving firm transmission commitments. A constraint that affects more than one member is the criteria for creating a study team, facilitated by CG, composed of the affected members. The study team mandate is to determine the mitigating alternatives and select the preferred alternative. Each study team determines their own evaluation and prioritization criteria. In the Puget Sound Area Study Team (PSAST), the criteria is a qualitative combination of cost and a planning metric (i.e. Transmission Curtailment Risk Measure or TCRM).*

Q51. Who has regulatory oversight of Columbia Grid?

A *There is no government regulatory oversight of CG. The oversight is by CG members, who have their own government regulatory oversight at state and federal levels. CG has no construction authority. The only CG authority is determining cost allocation, but this authority is only used if members do not agree on the cost allocation for a project they agree to implement.*

Q52. Is EE an "OPEN ACCESS" project?

A *No. An "Open Access" project provides new requested transmission service. This project provides service for existing firm obligations. (The longer answer is as follows: This answer assumes that "Open Access" refers to a transmission service request under a transmission provider's Open Access Transmission Tariff (OATT). These transmission service requests are for new transmission service that involve study requirements, facility addition determinations, and FERC pricing policies. Since EE is for load growth that falls under existing transmission service, it isn't "open access" because it is not new transmission service. .*

Q53. How are the merits of each need evaluated independently and which need takes priority?

A *The CG PSAST team evaluated the regional, multi-system needs for bulk power transfers independent of local load service needs. The local load service need is evaluated by the single systems. If a single system project (e.g. EE at 230kV) affects multi-system power transfer needs, then it is included in the multi-system evaluation. Firm commitments, regardless of bulk power transfers or local load service, are equal priority to be addressed and issues mitigated.*

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Q54. Please describe how the need for EE and Power Wheeling are connected. What are PSE's power wheeling objectives for EE, and how much of the EE need is based on the ability to participate in additional power wheeling?

- A *Wheeling is the transportation of electric power over transmission lines by an entity that does not own or directly use the power it is transmitting.*
- A *(from PSE's Energize Eastside website, based on 2012 forecast) "PSE makes no profit on wheeling power. All revenue obtained from wheeling contracts is passed directly back to our customers in the form of lower rates. PSE does have contracts to wheel power across the region; those contracts bring in revenue of roughly $28 million a year. One hundred percent of this revenue is returned to our customers in the form of a rate reduction. As we stated in our presentation, 92-97% of the power flows on the Energize Eastside line will deliver electricity to local Eastside customers. The power flow studies show that the power used for regional purposes on the Energize Eastside project is 3 to 8% - not 38% (as was incorrectly stated at the meeting). This is the natural consequence of connecting a transmission line into an interconnected system."* June, 2014 http://energizeeastside.com/Media/Default/CAG/Meeting3/2014_0609_CAGLetter_SCL.pdf

Q55. Is any of the capacity of the planned EE 230 kV line, or the existing 115 kV lines between Sammamish and Talbot Hill, allocated for transmission contracts to BC Hydro or CA? If so, what %? What are PSE's power wheeling objectives for Energize Eastside? Does existing or planned/potential wheeling affect the Project capacity?

- A *No/None. PSE makes no profit from wheeling contracts. See Q56.*
- A *Per PSE, Project capacity is not affected by existing or planned/potential wheeling.*

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10. Conclusion

The independent technical analysis (ITA) determined that PSE used reasonable methods to develop the 2014 forecast by following industry practice (See section 6.6.). The ITA reviewed PSE's powerflow cases and verified PSE's modeling of the updated load forecast, the Northern Intertie transfers, and the identified winter generation dispatch.

The ITA verified the following key result:
Although the new 2014 forecast resulted in an 11 MW decrease in the Eastside area's 2017/18 winter forecast, the reduced loading still resulted in overloaded transmission elements that drive the project need to address Eastside system reliability issues.

Although the CAP required in the 2017/18 winter to avoid facility overload doesn't drop load, by winter 2019/20 approximately 63,200 customers are at risk of losing power. In addition, by summer 2018, studies show that customers will be at risk of outages and load shedding due to CAPs used to mitigate transmission overloads. One might argue to delay the Energize Eastside project six months until summer 2018 when PSE studies show that customers will be at risk of outages and load shedding. However, balancing a six month delay in a complex and multi-year EIS process, which can have its own delays, against the risk of an adverse winter or less realized conservation (which could increase 2017/18 winter loading to a point where customers are at risk of load shedding) suggests it is reasonable to maintain the schedule for the existing project in-service date.

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Appendix A – Glossary

AC	Alternating Current
aMW	aMW - The average number of megawatt-hours (MWh) over a specified time period; for example, 295,650 MWh generated over the course of one year equals 810 aMW (295,650/8,760 hours). (Source: PSE's 2013 IRP Definitions)
Balancing Authority (BA)	Balancing Authority (BA) -- an entity that manages generation, transmission, and load; it maintains load-interchange-generation balance within a geographic or electrically interconnected Balancing Authority area, and it supports frequency in real time. The responsibility of the PSE Balancing Authority is to maintain frequency on its system and support frequency on the greater interconnection. To accomplish this, the PSE BA must balance load with generation on the system at all times. When load is greater than generation, a negative frequency error occurs. When generation is greater than load, a positive frequency error occurs. Small positive or negative frequency deviations are acceptable and occur commonly during the course of normal operations, but moderate to high deviations require corrective action by the BA. Large frequency deviations can severely damage electrical generating equipment and ultimately result in large-scale cascading power outages. Therefore, the primary responsibility of the BA is to do everything it can to maintain frequency so that load will be served reliably. (Source: PSE 2013 IRP)
BES	BES - Bulk Electric System - Unless modified by the inclusion and exclusion lists in the full definition that is available in the NERC Glossary of Terms (http://www.nerc.com/files/glossary_of_terms.pdf), all Transmission Elements operated at 100 kV or higher and resources connected at 100 kV or higher. The BES does not include facilities used in the local distribution of electric energy. (Source: NERC Glossary of Terms)
BPS	BPS - Bulk Power System - A) facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof); and (B) electric energy from generation facilities needed to maintain transmission system reliability. The term does not include facilities used in the local distribution of electric energy. (Source: NERC Glossary of Terms)
CAP	CAP - Corrective Action Plan - A list of actions and an associated timetable for implementation to remedy a specific problem. (Source: NERC Glossary of Terms)
COI	COI - California–Oregon Intertie - The three 500 kV AC electric transmission lines between southern Oregon and northern California.
CPI	Consumer Price Index (CPI) – A measure that examines the weighted average of prices of a basket of consumer goods and services, such as transportation, food and medical care. The CPI is calculated by taking price changes for each item in the predetermined basket of goods and averaging them; the goods are weighted according to their importance. (Source: Investopedia)
Critical Energy Infrastructure Information (CEII)	Critical Energy Infrastructure Information (CEII) Regulations –- Established by the Federal Energy Regulatory Commission (FERC). "CEII is specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure (physical or virtual) that: Relates details about the production, generation, transmission, or distribution of energy; Could be useful to a person planning an attack on critical infrastructure; Is

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	exempt from mandatory disclosure under the Freedom of Information Act; and Gives strategic information beyond the location of the critical infrastructure." (Source: FERC)
DC	Direct Current
Demand (Utility)	Demand (Utility) – The level at which electricity or natural gas is delivered to users at a given point in time. Electric demand is expressed in kilowatts. (Source: CEC Glossary)
Demand-Side Resources (DSR)	Demand-Side Resources (DSR) - Resources that reduce the demand. (As opposed to Supply-Side Resources)
Demographic	Demographics - Studies of a population based on factors such as age, race, sex, economic status, level of education, income level and employment, among others. Demographics are used by governments, corporations and non-government organizations to learn more about a population's characteristics for many purposes, including policy development and economic market research. (Source: Investopedia.com)
Direct Control Load Management (DCLM)	Direct Control Load Management (DCLM) - Demand-Side Management that is under the direct control of the system operator. DCLM may control the electric supply to individual appliances or equipment on customer premises. DCLM as defined here does not include Interruptible Demand. (Source: NERC Glossary)
Distribution System	Distribution System - An electric power distribution system is the final stage in the delivery of electric power; it carries electricity from the transmission system to individual consumers. (Source: Wikipedia)
Econometric Data	Econometric Data – Data sets to which econometric analyses are applied.
Econometrics	Econometrics – The application of mathematics and statistical methods to economics. Econometrics tests hypotheses and forecasts future trends by applying statistical and mathematical theories to economics. It's concerned with setting up mathematical models and testing the validity of economic relationships to measure the strengths of various influences.
EPAct 2005	EPAct 2005 – The federal Energy Policy Act of 2005
ERO	ERO - Electric Reliability Organization
Firm Transmission Service	Firm Transmission Service – 1) Transmission service available at all times during a period covered by an agreement. 2) The highest quality (priority) service offered to customers under a filed rate schedule that anticipates no planned interruption. (Source: NERC)
GO	GO - Generator Owner
Interruptible Load or Interruptible Demand	Interruptible Load or Interruptible Demand - Demand that the end-use customer makes available to its Load-Serving Entity via contract or agreement for curtailment. (Source: NERC Glossary)
IRP	Integrated Resource Plan - A comprehensive and long-range road map for meeting the utility's objective of providing reliable and least-cost electric service to its customers while addressing applicable environmental, conservation and renewable energy requirements. A process used by utility companies to determine the mix of Supply-Side Resources and Demand-Side Resources that will meet electricity demand at the lowest cost. The IRP is often developed with input from various stakeholder groups. Also Integrated Resource Planning.

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Levelized Cost	Levelized Cost - An economic assessment of the cost to build and operate a power-generating asset over its lifetime divided by the total power output of the asset over that lifetime. It is also used to compare different methods of electricity generation in cost terms on a comparable basis.
MW	MW - Megawatt - A unit of power equal to one million watts or one thousand kilowatts.
N-1	N-1 - Loss of a single element such as a generator, a transmission line, or a transformer (P2)
N-2	N-2 - Simultaneous loss of two elements due to a single event. For example, loss of two transmission lines on a common tower due to failure of the tower (P6)
N-1-1	N-1-1 - Loss of a single element such as a generator, a transmission line, or a transformer followed by a system readjustment such as generation redispatch, then loss of a second element such as a generator, a transmission line, or a transformer (P7)
Native load	Native load – 1. The cumulative load (power requirement) of a utility's retail customer base. 2. The end-use customers that the Load-Serving Entity is obligated to serve. (NERC Glossary) http://www.energy.ca.gov/glossary/glossary-d.html
NAICS	NAICS - The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy (Source: Census.gov)
NERC	NERC - North American Electric Reliability Corporation
Northern Intertie	Northern Intertie - transmission interconnection between Washington and British Columbia (Also called Path 3.)
Off-system sales	Off-system sales – Sales by a utility to a customer outside of its current traditional market.
PC	PC - Planning Coordinator
PDCI	PDCI - Pacific Direct Current Intertie
PJM	PJM – PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.
Personal Consumption Expenditure Deflator (PCE Deflator)	Personal Consumption Expenditure Deflator (PCE Deflator) - Measures the average change over time in the price paid for all consumer purchases, thus measures changes in the cost of living. (Source: Investopedia)
Powerflow	Powerflow - a numerical analysis of the flow of electric power in an interconnected system. It can refer to the analysis program, or to a simulation
RE	RE - Regional Entity.
Regression Analysis	Regression analysis is a statistical process for estimating the relationships among variables. It seeks to determine the strength of the relationship between one dependent variable (usually denoted by Y) and a series of other changing variables (known as independent variables). It is also known also as curve fitting or line fitting because a regression analysis equation can be used in fitting a curve or line to data points. It includes many techniques for modeling and analyzing variables.

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Renewable energy credits (RECs)	Renewable energy credits (RECs) - A REC represents the property rights to the non-power qualities of renewable electricity generation, such as environmental and social qualities. A REC, and its associated attributes and benefits, can be sold separately from the underlying physical electricity associated with a renewable-based generation source. At the point of generation, both product components can be sold together or separately, as a bundled or unbundled product. (Source: US EPA)
Renewable Portfolio Standard (RPS)	Renewable Portfolio Standard (RPS) − A regulatory mandate to increase production of energy from renewable sources such as wind, solar, biomass and other alternatives to fossil and nuclear electric generation. It's also known as a renewable electricity standard. (Source: National Renewable Energy Laboratory - NREL)
Substation	Substation − Substations transform voltage from high to low or from low to high. They also perform other functions, such as limiting outages, protecting equipment, et cetera.
Supply-Side Resources	Supply-Side Resources − Conventional generation plants, renewable generation, etc. (as opposed to Demand-Side Resources).
TO	TO - Transmission Owner
TP	TP - Transmission Planner
Weather Normalizing	Weather normalization is a process that adjusts actual energy or peak outcomes to what would have happened under normal weather conditions. Normal weather conditions are expected on a 50 percent probability basis, also known as a 50/50 forecast (i.e., there is a 50 percent probability that the actual peak realized will be either under or over the projected peak).
WECC	WECC - Western Electricity Coordinating Council. WECC has been approved by the Federal Energy Regulatory Commission (FERC) as the Regional Entity for the Western Interconnection. The North American Electric Reliability Corporation (NERC) delegated some of its authority to create, monitor, and enforce reliability standards to WECC through a Delegation Agreement.
Western Interconnection	Western Interconnection - North America is comprised of two major and three minor alternating current (AC) power grids, also called "interconnections." The Western Interconnection stretches from the Pacific Ocean eastward over the Rockies to the Great Plains, and from Baja California, Mexico in the South into Western Canada. (Source: Energy.gov)
Wheeling	Wheeling -- The transmission of electricity by an entity that does not own or directly use the power it is transmitting. Wholesale wheeling is used to indicate bulk transactions in the wholesale market, whereas retail wheeling allows power producers direct access to retail customers. This term is often used colloquially as meaning transmission.
WSCC	WSCC - Western Systems Coordinating Council. The predecessor to WECC.

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Appendix B – Optional Technical Analysis

Executive Summary

Utility System Efficiencies, Inc. (USE) was engaged by the City of Bellevue in February, 2014 to conduct an Optional Technical Analysis (OTA) of the purpose, need, and timing of the Energize Eastside project. Energize Eastside (EE) is Puget Sound Energy's (PSE's) proposed project to build a new electric substation and new higher–capacity (230 kilovolt) electric transmission lines in the East King County area, which encompasses Bellevue, Clyde Hill, Medina, Mercer Island, Newcastle, the towns of Yarrow Point, Hunts Point, and Beaux Arts, and portions of Kirkland, Redmond, and Renton (the Eastside). The transmission lines would extend from an existing substation in Redmond to one in Renton (See Figure 3.1).

The scope of the OTA was to perform an analysis on PSE's study cases to determine the impact of potential forecast variability on the timing of improvements, and was later expanded to evaluate whether regional requirements rather than local requirements might be driving the project need. The OTA examined several hypothetical scenarios by conducting analysis on PSE's study cases. It looked at the effect of a) reducing load growth in the *Eastside* area to 1.5%, b) reducing load growth in *PSE's portion of King County* to 0.25% while keeping the Eastside growth the same, c) increasing power output of existing Puget Sound area generation, and d) reducing the Northern Intertie[46] flow to zero (no transfers to Canada). Although d) is not actually possible due to extant treaties, it was modeled to examine if regional requirements might be driving the need. In the winter cases, the OTA also combined scenarios c) and d). Finally, the OTA looked at the impact of an Extreme Winter forecast.

IF THE LOAD GROWTH RATE WAS REDUCED, WOULD THE PROJECT STILL BE NEEDED? YES

The OTA results showed that reducing the Eastside average load growth from an average of 2.4%/year to an average of 1.5%/year from winter 2013/14 to winter 2017/18 did not eliminate any overloaded elements; there is still project need. Similarly, reducing PSE's *King County growth rate* (less Eastside) from an average of 0.5 %/year to an average of 0.25%/year from winter 2013/14 to winter 2017/18 did not eliminate any overloaded elements; there is still project need.

IF GENERATION WAS INCREASED IN THE PUGET SOUND AREA, WOULD THE PROJECT STILL BE NEEDED? YES

Results showed that increasing the power output of existing Puget Sound area generation to the levels specified in ColumbiaGrid's July 2010 "Puget Sound Area Generation Modeling Guideline" eliminated one of five overloads in the 2017/18 normal winter, but did not eliminate project need. (This study increased the amount of PSE and SCL generation west of the Cascades from zero to the level identified in the above document. Since the document is confidential (CEII) the generation output is not provided in this report.)

[46] Northern Intertie - transmission interconnection between Washington and British Columbia (Also called Path 3.)

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IS THERE A NEED FOR THE PROJECT TO ADDRESS REGIONAL FLOWS, WITH IMPORTS/EXPORTS TO CANADA (COLUMBIAGRID[47])? Modeling zero flow to Canada, the project is still necessary to address local need.

The Optional Technical Analysis examined this issue by analyzing a reduction in the Northern Intertie flow to zero (no transfers to Canada). Although this scenario is not actually possible due to extant treaties, it was modeled to provide data on the drivers for the EE project, to examine if regional requirements might be driving the need. The results showed that in winter 2017/18, even with the Northern Intertie adjusted to zero flow, the Talbot Hill 230/115 kV transformer #2 is still overloaded by several contingencies. This indicates there is a project need at the local level.

The OTA results showed that all studied scenarios resulted in at least one equipment overload in normal winter 2017/18 with 100% conservation, indicating project need.

Analysis and Findings

The OTA studied five normal winter scenarios and three extreme winter scenarios for winter 2017/18 and winter 2019/20. The OTA also studied five normal summer scenarios for 2018 and 2020. The scenarios were modeled in the powerflow cases. Details on the modeling are not provided due to Critical Energy Infrastructure Information (CEII) restrictions.

Table B.1 lists the overloaded elements for winter 2017/18 for each studied scenario. The scenarios are listed in the second blue row in Table B.1 (the vertically oriented text). The normal winter scenarios are numbered 1-6 (with #1 representing the original PSE case). The extreme weather scenarios are numbered E1-E3.

Normal winter results showed:

- Reducing the Eastside average load growth to 1.5% did not eliminate any overloaded elements; there is still project need.
- Reducing PSE's King County growth rate (less Eastside) to 0.25% did not eliminate any overloaded elements; there is still project need.
- Increasing the power output of existing Puget Sound area generation to the levels specified in ColumbiaGrid's July 2010 "Puget Sound Area Generation Modeling Guideline"[48] eliminated one of five overloads, but did not eliminate project need.
- Reducing the Northern Intertie flow to zero (no transfers to Canada) eliminated all but one overload; there is still local project need.
- Reducing the Northern Intertie flow to zero (no transfers to Canada) AND Increasing the Puget Sound area generation to ColumbiaGrid's July 2010 "Puget Sound Area Generation Modeling Guideline" eliminated all but one overload; there is still project need.

Extreme winter results increased the overload levels and/or caused overloads on additional elements. Although the normal winter results showed only one overload when the Northern Intertie flow was reduced to zero, the extreme winter case showed four overloads.

[47] ColumbiaGrid (single word) is a regional transmission planning organization with a footprint encompassing Oregon, Washington, parts of Idaho and Montana.
[48] Confidential (CEII) document that provides modeling values (MW levels of generation) for applicable generators.

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Table B.1: Winter 2017/18, 100% Conservation - Overloaded Elements

Northern Intertie: South to North Overloaded Element (Transmission Line or Transformer)	2017/18 Normal Winter 100% Conservation						2017/18 Extreme Winter, 100% Cons.		
	1) Original PSE Case	2) Reduce Eastside load growth to 1.5%	3) Reduce PSE's King County growth to 0.25%[49]	4) Increase Puget Sound area generation	5) Set Load transfers to Canada = 0 (North. Intertie = 0)	6) Combination of Scenario 4 and & 5	E1) Original PSE Case adjusted for extreme weather	E2) Set Load transfers to Canada = 0 (North. Intertie = 0)	E3) Scenario E2 + Increase Puget Sound area generation
Talbot Hill - Lakeside #1 115 kV line	OL	OL	OL	OL			OL		
Talbot Hill - Lakeside #2 115 kV line	OL	OL	OL	OL			OL		
Talbot Hill 230-115 kV transformer #1	OL	OL	OL	OL			OL	OL	OL
Talbot Hill 230-115 kV transformer #2	OL	OL	OL	OL	OL	OL	OL	OL	OL
Talbot Hill-Boeing Renton-Shuffleton 115 kV line	OL	OL	OL				OL		
Sammamish 230/115 kV transformer #1								OL	OL
Sammamish 230/115 kV transformer #2								OL	OL

OL = Overload of Emergency Rating. Source: OTA Results

Table B.2 lists the overloaded elements for winter 2019/20 for each studied scenario. The scenarios are listed in the second blue row (the vertically oriented text).

The 2019/20 winter results showed the same overloaded elements as 2017/18. The overloads in the base cases and in the load reduction cases were more severe in 2019/20. The overload levels in the generation dispatch and Northern Intertie=0 scenarios were mixed; some overloads were more severe in 2019/20, but some were slightly less. Nevertheless, project need was shown in all cases. Extreme winter results increased the overload levels over normal winter and/or caused overloads on additional elements.

Table B.2: Winter 2019/20, 100% Conservation - Overloaded Elements

Northern Intertie: South to North Overloaded Element (Transmission Line or Transformer)	2019/20 Normal Winter 100% Conservation						2019/20 Extreme Winter, 100% Cons.		
	1) Original PSE Case	2) Reduce Eastside load growth to 1.5%	3) Reduce PSE's King County growth to 0.25%[50]	4) Increase Puget Sound area generation	5) Set Load transfers to Canada = 0 (North. Intertie = 0)	6) Combination of Scenario 4 and & 5	E1) Original PSE Case adjusted for extreme weather	E2) Set Load transfers to Canada = 0 (North. Intertie = 0)	E3) Scenario E2 + Increase Puget Sound area generation
Talbot Hill - Lakeside #1 115 kV line	OL	OL	OL	OL			OL		
Talbot Hill - Lakeside #2 115 kV line	OL	OL	OL	OL			OL		
Talbot Hill 230-115 kV transformer #1	OL	OL	OL				OL	OL	OL
Talbot Hill 230-115 kV transformer #2	OL	OL	OL	OL	OL	OL	OL	OL	OL
Talbot Hill-Boeing Renton-Shuffleton 115 kV line	OL	OL	OL				OL		
Sammamish 230/115 kV transformer #1									OL
Sammamish 230/115 kV transformer #2								OL	OL

OL = Overload of Emergency Rating. Source: OTA Results

[49] Excluding Eastside load
[50] Excluding Eastside load

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Table B.3 lists the overloaded elements for summer 2018 for each studied scenario. The scenarios are listed in the second green row. The normal summer scenarios are numbered 1-5 (with #1 representing the original PSE case). There is no extreme weather summer forecast.

The 2018 normal summer results showed:

- Reducing the Eastside average load growth did not eliminate any overloaded elements; there is still project need.
- Reducing PSE's King County growth rate (less Eastside) did not eliminate any overloaded elements; there is still project need.
- Increasing the Puget Sound area generation to ColumbiaGrid's July 2010 "Puget Sound Area Generation Modeling Guideline" eliminated one of six overloads, but did not eliminate project need.
- Reducing the Northern Intertie flow to zero (no transfers to Canada) eliminated all the summer overloads; however, there is still a winter overload which means there is still local project need.

Table B.3: Summer 2018, 100% Conservation - Overloaded Elements

Northern Intertie: North to South Overloaded Element (Transmission Line or Transformer)	2018 Summer (86°F) 100% Conservation				
	1) Original PSE Case	2) Reduce Eastside load growth	3) Reduce PSE's King County growth	4) Increase Puget Sound area generation	5) Set Load transfers to Canada = 0 (Northern Intertie = 0)
Sammamish 230/115 kV Xfmr #1	OL	OL	OL	OL	
Sammamish 230/115 kV Xfmr #2	OL	OL	OL	OL	
Novelty Hill 230/115 kV Xfmr #2	OL	OL	OL		
BPA Monroe – Novelty Hill 230 kV	OL	OL	OL	OL	
Beverly Park - Cottage Brook 115 kV line	OL	OL	OL	OL	
Sammamish – BPA Maple Valley 230 kV line	OL	OL	OL	OL	

OL = Overload of Emergency Rating. Source: OTA Results

The 2020 summer results (Table B.4) showed the same overloaded elements as 2018. The overloads were more severe in 2020, with the exception of the Beverly Park – Cottage Brook 115 kV line which was either unchanged or reduced by less than 0.1%.

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Table B.4: Summer 2020, 100% Conservation - Overloaded Elements

Northern Intertie: North to South Overloaded Element (Transmission Line or Transformer)	2020 Summer (86°F) 100% Conservation				
	1) Original PSE Case	2) Reduce Eastside load growth	3) Reduce PSE's King County growth	4) Increase Puget Sound area generation	5) Set Load transfers to Canada = 0 (Northern Intertie = 0)
Sammamish 230/115 kV Xfmr #1	OL	OL	OL	OL	
Sammamish 230/115 kV Xfmr #2	OL	OL	OL	OL	
Novelty Hill 230/115 kV Xfmr #2	OL	OL	OL		
BPA Monroe – Novelty Hill 230 kV	OL	OL	OL	OL	
Beverly Park - Cottage Brook 115 kV line	OL	OL	OL	OL	
Sammamish – BPA Maple Valley 230 kV line	OL	OL	OL	OL	

OL = Overload of Emergency Rating. Source: OTA Results

Stakeholder Questions related to the OTA

Q56. The study must as clearly, but non-technically as possible, define will happens regarding power flow to and from Canada.

A *See the OTA in Appendix B. Sensitivities were performed where power flow to and from Canada were reduced to zero. These cases still showed overloads so there is clearly a local need. Some overloads were eliminated when flows were reduced to zero, which indicates that flows to and from Canada also have an impact on the need.*

Q57. Clarify Eastside vs. regional needs. What load is causing the problem? Local or regional?

A *Local. The Optional Technical Analysis results showed that in winter 2017/18, even with the Northern Intertie adjusted to zero flow, the Talbot Hill 230/115 kV transformer #2 is still overloaded by several contingencies. This indicates there is a project need at the local level. See the full Appendix B for further detail.*

Q58. I am concerned that the need is not just for Bellevue and the Eastside but more for Bonneville Power, Snohomish Power, Seattle City Light -- the Columbia Grid. I would ask the consultants to provide a simple quantitative and pie chart breakout of the need that each stakeholder has in "Energize Eastside".

A *See Q56.*

Q59. Provide a quantitative analysis and pie charts (both historical and futuristic) showing a breakout of the need (demand and reliability) for each of the members of the Columbia Grid.

A *The Optional Technical Analysis results showed that in winter 2017/18, even with the Northern Intertie adjusted to zero flow, the Talbot Hill 230/115 kV transformer #2 is still overloaded by several contingencies. These results indicate there is a project need at the local level.*

Q60. Given the scenario and contingency driving the EE project, how much regional load will flow through the line?

A *See Q61 below.*

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Q61. What percentage of North-South flow-through load (to Canada/California) will be carried on EE during an N-1-1 event (failure of BPA bulk main PLUS a second transmission line failure?

A *The OTA studied a scenario with flows to Canada at 1500 MW and a scenario with flows to Canada set to 0 MW. Under the worst contingency condition (N-1-1), the reduction in flow on the Talbot Hill - Lakeside lines was 22.5%. Under the worst contingency condition (again N-1-1), the reduction in flow on the Talbot Hill 230/115 kV transformer was 2.6%. These results are before EE and reflect the effects on the current transmission system serving the EE area. As you can see from these results, the impact of flows to Canada on the Talbot Hill 230/115 kV transformer (the main driver of the need for EE) is almost insignificant.*

Q62. Was the system studied with generation on the west side?

A *Yes, the OTA studied a scenario with generation on the west side.*

Q63. Is EE a "BLENDED PROJECT" to satisfy the needs of Columbia Grid, BPA grid reinforcement (Monroe-Echo Lake bottleneck), Columbia River treaty "Canadian Entitlement" curtailments, Seattle City Light load needs, as well as PSE load growth?

A *The term "Blended Project" is not clear. However, the OTA results do show that there is a need for a project to satisfy local needs. A review of ColumbiaGrid documentation indicates that EE will also help satisfy a regional need which is why EE was included in the recommended transmission solution from ColumbiaGrid Puget Sound Area transmission planning activity.*

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Appendix C – End-Use Data and IRP

End-use data is evaluated in Integrated Resource Planning, where a utility examines both Supply-Side and Demand-Side options with the objective of providing reliable and least-cost electric service to its customers while addressing applicable environmental, conservation and renewable energy requirements. Because energy efficiency is generally a low-cost resource, the IRP tends to incorporate energy efficiency as a utility system resource and reduce the need for additional Supply-Side resources.

PSE commissioned The Cadmus Group, Inc. (Cadmus) to conduct an independent study of Demand-Side Resources (DSR) in the PSE service territory as part of its biennial integrated resource planning (IRP) process. The study considered energy efficiency, fuel conversion, Demand Response, and distributed generation. PSE also considered distribution efficiency.

Energy efficiency looked at naturally occurring conservation, which occurs due to normal market forces such as technological change, energy prices, improved energy codes and standards, and efforts to change or transform the market. This includes gradual efficiency increases due to replacing or retiring old equipment in existing buildings and replacing it with units that meet minimum standards at that time. It also includes new construction which reflects current state specific building codes, and improvements to equipment efficiency standards that are pending and will take effect during the planning horizon.

Fuel Conversion considered opportunities to substitute natural gas for electricity through replacements of space heating systems, water heating equipment, and appliances.

Demand Response options seek to reduce peak demand during system emergencies or conditions of extreme market prices. It may also be used to improve system reliability and could potentially help to balance variable-load resources such as wind energy.

Washington State's Renewable Portfolio Standard (RPS) law requires conservation potential be developed using Northwest Power & Conservation Council (NWPCC) methodology, and conservation targets are based on IRP with penalties for not achieving them. It requires PSE to meet specific percentages of its load with renewable resources or renewable energy credits (RECs) by specific dates.

The Energy Independence and Security Act (EISA, 2007) provides for minimum federal standards for lighting and other appliances beginning in 2012. It also sets standards for increasing the production of clean renewable fuels, increasing the efficiency of buildings and vehicles, and more.

Cadmus compiled technical, economic, and market data from the following sources:

- PSE Internal Data: Historical and projected sales and customers, historic and projected DSR accomplishments, and hourly load profiles
- 2010 Residential Characteristic Survey (PSE Service Territory)
- 2008 Fuel Conversion Survey (PSE Service Territory)

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- 2007 Puget Sound-Area Regional Compact Fluorescent Light (CFL) Saturation Study
- NEEA's 2009 Commercial Building Stock Assessment (CBSA)
- Building Simulations for the residential sector, employing separate models for customer segments and construction vintage
- Pacific Northwest Sources. Technical information included on hourly end-use load shapes (to supplement building simulations), commercial building and energy characteristics. Information on measure savings, costs, and lives
    - The Northwest Power and Conservation Council (Council)
    - The Regional Technical Forum (RTF)
    - The Northwest Energy Efficiency Alliance (NEEA)
- Sources to characterize measures, assess baseline conditions, and benchmark results against other utilities' experiences
    - The California Energy Commission's Database of Energy Efficiency Resources (DEER)
    - ENERGY STAR
    - The Energy Information Administration
    - Annual and evaluation reports on energy-efficiency and Demand Response programs from various utilities

Only new opportunities for conservation are captured in the DSR value and thousands of measures were evaluated. Conservation programs included Energy Efficiency, Fuel Conversion, Distributed Generation, Demand Response and Distribution Efficiency (voltage reduction and phase balancing[51]). Lighting savings in the 2013 IRP assume the availability of a technology meeting the minimum requirements of EISA, and that savings from Compact Fluorescent Lamp (CFL) installations will remain available[52]. (Cadmus estimated that 33% of sockets have CFLs before the 2013 IRP measures are selected.) EISA accounts for 31% of residential DSR and 26% of commercial DSR. DSR targets are reviewed by the Conservation Resource Advisory Group and the Integrated Resource Plan Advisory Group.

The 2013 IRP identified market achievable, technically feasible Demand-Side measures. These measures (over four thousand) were combined into bundles[53] based on levelized cost[54] for inclusion in the generation optimization analysis. The effect of the bundles is to reduce load, so the costs to achieve the savings must be added to the cost of the electric portfolios.

The optimization analysis identifies the economic potential (cost-effective level) of DSR bundles that would work well in planning for generation requirements. (For example, solar energy has a different impact on the summer peak than on a winter peak.) The optimization model developed and tested different portfolios, combining Supply-Side Resources with Demand-Side bundles, to find the lowest cost combination of resources that a) met capacity need b) met renewable resources/RECs need, and c) included as much conservation as was cost effective. (Once the capacity and renewable resources/RECs needs are met, the decision to include additional

[51] Phase balancing: Balancing the single-phase load among the three phases so that unbalanced load isn't driving the peak load value.
[52] LED lighting: The LED programs were not specifically identified in the 2013 IRP. The LED technology and availability is different today than it was when the 2013 IRP study began. PSE is planning on including LED lighting in the 2015 IRP.
[53] An example bundle is the set of measures that cost between $28/MWh and $55/MWh.
[54] Levelized Cost - An economic assessment of the cost to build and operate a power-generating asset over its lifetime divided by the total power output of the asset over that lifetime. It is also used to compare different methods of electricity generation in cost terms on a comparable basis.

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conservation bundles is simply whether that next bundle of measures increases the cost or decreases it.)

The optimization analysis results in the final set of cost effective measures, which are identified as the "100% conservation" set.

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Appendix D – Ask the Consultant

A key purpose of the ITA and the OTA was to provide an increased level of understanding of the purpose, need and timing of the EE project to the City Council and to community stakeholders. Over the course of the project, dozens of questions were received from various stakeholders. The City engaged such comments through an online outreach feature called 'Ask the Consultant.' In addition to this outreach the City initiated separate interviews with key stakeholders and USE staff. City staff filtered all Ask the Consultant stakeholder comment through the various Tasks in the Scope of Services and submitted the need-related comments to USE for report inclusion. Other comments were directed as appropriate to other comment venues including for example to the scoping process for the Environmental Impact Statement (EIS) the Integrated Resource Plan (IRP) process. That filtering is documented in the chart below.

A Q&A discussion is documented at the end of each section of the ITA.

See Attached Table 1.

Date	Name	Question or Comment	Directed to:
1/27	Plummer	Industry standards, IRP, average yearly loads	Extensive reference to lack of industry wide standards; paragraph 4 and 5 to ITA
1/22	Marsh	Questions for ITA consultant: Overview, Real need, distribution of peak use, Eastside vs regional needs, reliability	Skype session
1/28	Marsh	Questions for ITA consultant: extreme winter study case, other adjustments modeled, System Cap.	Role of Case Study Assumption, clarify reference to Needs Assessment Section 6, connection between CSA and CDF to ITA
1/30	Sweet	Data center consolidation comment	ITA
2/6	Plummer	Quantitative reliability metrics	ITA
2/9	Lander	Choice of USE and communications	Communications response
1/15	Osterberg/ Laughlin	E3 and Cadmus Study, declining revenue, blended project	EIS
2/3	Borgmann	12 questions: forecast, growth rates, Columbia Grid role, used and useful comparison, alternatives	1, 2, 7, 8, 12 to ITA 3 ? to ITA, comments to EIS 5 ? to ITA, comments to EIS 6 ? to ITA, comments to EIS 7- 2nd set? to EIS 4, 9, 10, 11 to EIS
2/9	Kim	2 comments on tech study and CDF chart; 2 questions on growth forecast disparity, show project stakeholder pie chart	1 and 2 to EIS 3 and 4 to ITA

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2/10	McCray	4 questions: Load projection, options, trend down, Chang proposal	1 and 3 to ITA 2 and 4 (Chang) to EIS
2/10	Marsh	Circumstances of all-time peak usage occurrence	EIS
2/10	Marsh	PSE and SCL electricity trends	EIS
2/11	Alford	comment on tech study and CDF chart; questions on growth forecast disparity, show project stakeholder pie chart	See Kim comment
2/11	Mozer	Magnitude and timing of EE, alternatives, Canada powerflow	ITA (1) and EIS (2)
2/12	Andersen	4 questions: SCL capacity, Peak load information, use of temperature in modelling, distributed generation, use of peaking turbine generation	New Q1 to EIS Add 1 Q4 not in ITA scope Add 2 Q7 not in ITA scope Add 3 Q15 DSR and DG in ITA modelling, cost info not in scope Add 4 Q19 to EIS
2/12	Merrill	7 questions: Reasonableness of PSE conclusions, rational look, Eastside Customer demand, use of actual data, replacement, outages	1, 3, 5, 6 to ITA 2, 4, 7 to EIS
2/12	Hansen	Bridle Trails Subarea infrastructure reliability	EIS or ERS implementation
2/12	Halvorson	Customer Demand Forecast and Columbia Grid need pie chart	ITA
2/12	Marsh	7 questions: Top assumptions and parameters of the load forecast, economic projections, Spring District, increased efficiency, local government actions, regional transmission flow, regional grid	ITA

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Appendix E – Transmission Planning Standards TPL-001-4

See attached Table 1.

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Appendix F – Utility System Efficiency, Inc. (USE) Qualifications

R. Peter Mackin, P.E.
Vice President of Analytical Services

ACADEMIC BACKGROUND
M.S., Electrical Engineering, Montana State University, 1982
B.S., Civil Engineering, Montana State University, 1981

PROFESSIONAL EXPERIENCE
Peter Mackin has over 33 years of power system planning and computer application development experience and has been involved in WSCC/WECC planning and operating activities since 1985. In April of 2006, Mr. Mackin joined Utility System Efficiencies, Inc. (USE) as Vice President of Analytical Services. At USE, among other duties, Mr. Mackin has directed and performed system studies to meet the requirements of the WECC Project Rating Review Process, assisted developer clients with interconnection applications, and supervised a wind integration study for FERC.

While employed at Navigant Consulting, Inc., Mr. Mackin performed several transmission and resource integration studies for the Alberta Electric System Operator (AESO) as well as generation interconnection studies and transmission feasibility analyses for other clients. Mr. Mackin was a member of the NERC Version 0 and Phase III/IV Standards drafting teams. In addition, Mr. Mackin provided expert witness testimony at FERC in Docket No. ER01-1639-006.

While employed by the California Independent System Operator (CAISO), Mr. Mackin performed or reviewed system planning studies for Reliability Must Run generation requirements, new generator interconnection studies, as well as Participating Transmission Owner annual Transmission Assessments. In addition, Mr. Mackin helped develop the CAISO's New Facility Interconnection Policy and Long-Term Grid Planning Policy. Mr. Mackin provided expert witness testimony regarding six new generation projects before the California Energy Commission.

While employed by Pacific Gas and Electric Company (PG&E), Mr. Mackin was the lead transmission planning engineer performing transient stability simulations for the 500 kV California – Oregon Transmission Project. In addition, Mr. Mackin performed, supervised or reviewed studies to determine simultaneous import capabilities into California from the Pacific Northwest and the Desert Southwest. For two years, he served as chairman of the work group that undertook these studies. This work group was comprised of utilities from California, the Northwest, and the Desert Southwest.

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Jennifer Geer, P.E.
Principal Power Systems Engineer

ACADEMIC BACKGROUND
B.S., Electrical Engineering, University of New Mexico, 1985

PROFESSIONAL EXPERIENCE
Ms. Geer has over 25 years of electric utility industry experience and has extensive background in the transmission and distribution areas, including transmission planning and generation interconnection studies, distribution planning and forecast development and approval, outage analysis, reliability analysis, project development, and project management. Ms. Geer has also provided training in many of these areas. Ms. Geer joined Utility System Efficiencies, Inc. (USE) in 2009. At USE, Ms. Geer's focus has been on generation interconnection studies, transmission planning and project development.

Prior to joining USE, Ms. Geer was a member of San Diego Gas and Electric's Transmission Planning Department. Though part of their generation interconnection team, she was also involved in studies to determine the need and benefit of new transmission projects on the existing system, examining different route and voltage options.

While running Geer and Geer Engineering, Ms. Geer developed a procedure to determine if a new substation was needed; part of this procedure involved developing long term forecasts for the relevant areas. She also led teams to optimize substation site selection based on both engineering and non-engineering issues, and provided project management for a long term transmission study that was used to determine client company strategy. In addition, Ms. Geer developed or reviewed many distribution projects, trained engineers and leads on distribution planning, developed a training manual, conducted process mapping of distribution functions, and analyzed visibility and accuracy of distribution accounting.

While employed by San Diego Gas & Electric (SDG&E), Ms. Geer forecasted distribution loads, identified issues and alternatives, and developed circuit and substation projects. Ms. Geer also conducted distribution reliability studies to improve performance indices and developed training documents on multiple topics. She reviewed the entire set of distribution circuit forecasts and proposed distribution capital projects for San Diego Gas & Electric in later years, and provided feedback and/or modification as needed. Ms. Geer also developed checklists and forms to assist in forecasting, project development and new business engineering review, and trained engineering personnel on distribution planning procedures.

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City of Bellevue

DATE: 07/31/2015

TO: Energize Eastside EIS File – 14-139122-LE

FROM: David Pyle, Senior Environmental Planner – 425-452-2973

SUBJECT: Energize Eastside EIS Team Review of Project Need

PSE has represented that there is a need to construct a new 230 kV bulk electrical transmission corridor and associated electrical substations on the eastside of Lake Washington to supply future electrical capacity and improve eastside electrical grid reliability. Preliminary discussion between potentially affected jurisdictions and PSE indicated that the proposal is likely to have probable significant adverse environmental impacts, and issuance of a Washington State Environmental Policy Act (State Environmental Policy Act (SEPA) Threshold Determination of Significance was deemed appropriate as outlined in Chapter 197-11-360 WAC.

Following PSE's identification of this essential electrical infrastructure link, and to address the potential for significant environmental impacts, the utility submitted application for processing of an Environmental Impact Statement (EIS) with the City of Bellevue, who assumed the role of lead agency. Subsequent to this initiating action, several steps have been taken to begin processing the required EIS. The EIS is now underway and the EIS project team has been in review of information provided by PSE and collected during the process.

To better understand PSE's project proposal, the EIS project team has obtained clearance to access un-redacted sensitive (protected in accordance with industry security protocol) utility planning and operations information used by PSE in developing the Energize Eastside project proposal. The EIS project team, represented by Stantec (electrical system planning and engineering sub-consultant working in support of the Energize Eastside EIS effort), has reviewed this background information and studied the process used by PSE to establish a need for the proposed Energize Eastside project. A report from Stantec summarizing the findings is attached.

Although validation of the need for the proposed Energize Eastside project is not considered as a component of the EIS process under the requirements of SEPA, review of the need for the project is important in developing a thorough understanding of the project objectives and technical requirements to accurately identify feasible and reasonable project alternatives[1]. The EIS process is not to be used to reject or validate the need for a proposal. Rather, the EIS process is intended to identify and disclose potential significant adverse environmental impacts associated with a specific proposal.

[1] WAC 197-11-786 - Reasonable alternative.
"Reasonable alternative" means an action that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation. Reasonable alternatives may be those over which an agency with jurisdiction has authority to control impacts, either directly, or indirectly through requirement of mitigation measures.

Stantec

Memo

To:	Mark Johnson Program Manager ESA | NW Community Development Director	From:	Keith DeClerck Tucson, ArizonaTucson, Arizona
File:	Energize Eastside	Date:	July 31, 2015

Reference: Energize Eastside Project

The purpose of this memorandum is to summarize my findings regarding Puget Sound Energy's (PSE) electrical system needs that support the purpose and need for PSE's proposed Energize Eastside project. It memorializes the issues we have discussed in depth with the principal jurisdictions reviewing the project (the Cities) as we examined PSE's project criteria and possible alternatives to the 230 kV transmission system improvements that PSE has proposed for consideration in the Phase 1 Draft Environmental Impact Statement (EIS). I have prepared this memo at ESA's request to support a plain-language description of the purpose and need for the Energize Eastside project that can be used in the EIS that ESA is preparing. I understand that ESA and the Cities also want to understand the purpose and need for the project and the constraints PSE is working with so that you can make informed choices about what alternatives to evaluate in the EIS.

My Background

As an electrical engineer with more than 25 years of experience in both Industrial and utility environments, I understand the concerns on both sides of the meter. Specific to this project I have over 14 years of experience in transmission and distribution power flow simulations and have conducted and published extensive power flow studies in several of the states included in the Western Electricity Coordinating Council (WECC) region. I have critical infrastructure security clearance for viewing FERC data, and have experience reviewing such data. In addition, I have conducted transmission adequacy studies and renewable generation interconnection studies in several other North American Electric Reliability Corporation (NERC) regions across the United States. My experience in load forecasting and transmission planning, coupled with the fact that I have never worked for or have been under contract to PSE, allows me to provide a knowledgeable, independent view of the project purpose and need.

Documents Reviewed

In preparing this memo, I reviewed the unredacted versions of the following documents prepared by PSE and Quanta Technology (Quanta):

- *Eastside Needs Assessment Report, Transmission System, King County,* dated October 2013;
- *Supplemental Eastside Needs Assessment Report, Transmission System, King County,* dated April 2015;
- *Eastside Transmission Solutions Report, King County Area,* dated October 2013; and
- *Supplemental Eastside Transmission Solutions Report, King County Area,* dated April 2015.

I also reviewed the *Independent Technical Analysis of Energize Eastside for the City of Bellevue, WA (Version 1.3)* dated April 28, 2015 by Utility System Efficiencies, Inc. (USE). Although PSE's findings are the focus of this assessment, I found the USE report to be helpful in exploring other facets of the proposed need and verifying my own conclusions.

Reference: Energize Eastside Project

In the process of reviewing these documents I also referred to many other documents prepared by federal and regional agencies and by PSE.

Findings

Based on my expertise, I found that the PSE needs assessment was overall very thorough and applied methods considered to be the industry standard for planning of this nature. Based on the information that the needs assessment contains, I concur with the conclusion that there is a transmission capacity deficiency in PSE's system on the Eastside that requires attention in the near future. For purposes of this memo, "Eastside" refers to the central portion of King County roughly located between the cities of Redmond to the north and Renton to the south.

The transmission capacity deficiency is complex. It arises from growing population and employment, changing consumption patterns, and a changing regulatory structure that requires a higher level of reliability than what was required in the past. PSE has concluded that the only effective and cost-efficient solution is to site a new 230 kV transformer in the center of the Eastside, fed by new 230 kV transmission lines from the north and south. While that conclusion seems simple and straightforward, it is the product of an analysis that considered dozens of options and thousands of potential scenarios that the power system could encounter.

The population of the Eastside is expected to grow at a rate of approximately 1.2% annually over the next decade, and employment is expected to grow at an annual rate of approximately 2.1%. Because of the nature of expected development, PSE projects that electrical demand will grow at a rate of 2.4% annually. Without adding at least 74 MW of transmission capacity or local peak period generation to the Eastside, a deficiency could develop as early as winter of 2017 - 2018 or summer of 2018, putting customers at risk of load shedding (power outages). It is impossible to place a single number on the projected deficiency because it varies by season (winter vs. summer) and by other assumptions that are made in the planning process. However, as the load continues to grow, the risk and extent of the load shedding required increases.

Four components must be understood in order to have a basic understanding of the nature of this expected capacity deficiency:

- Study Parameters
- Load Forecast
- Corrective Action Plans
- Regional Compliance

Study Parameters

PSE started with the WECC database model for load forecasting, distribution, and transmission. The model encompasses all utilities in the western United States, western Canada, and northern Mexico. This model is updated yearly by all entities in the WECC region and reflects the overall system configuration and load forecasts for each utility. This overall model does not always reflect the specific details of a utility's transmission and distribution system. Therefore, PSE added specific details about its system configuration on the Eastside to enhance the accuracy of the results. This includes PSE's 115 kV substations and transmission lines, and other equipment operating at lower voltage. In the model, forecasted electrical load is distributed by substation, based on historical load data for those locations. This model was used for most of the study results.

In addition, system sensitivity cases (i.e. scenarios) were conducted using various levels of energy conservation, extreme weather temperatures, power generation patterns, and expected "intertie" flows between PSE and its interconnected neighbors. These scenarios were used to evaluate stresses on the system that can reasonably be expected. The scenarios generally involve trying to operate the system during these extreme weather periods with one or two system components taken offline either because of planned maintenance, or because of an emergency such as damage caused by a storm or vandalism. Scenarios provide insight as to the strengths and weaknesses of the system. Because weaknesses represent vulnerable aspects of the system, specific information about them is not released to the general public.

This procedure is a typical method of study and consistent with standard accepted practice for the industry. Extreme weather conditions examined are relatively high likelihood events, that is, conditions expected in one out of every two years.

Results from both summer and winter conditions were reported. This is because although the Eastside has historically had its highest electrical demand during the winter, recent trends show that summer usage is growing rapidly and will eventually lead to similar or even greater levels of demand as peak winter days. This is discussed further under Load Forecast.

Load Forecast

The load forecast is central to determining the need for the project. The primary contributing factors to the growth in load are as follows:

- Local residential consumption due to population growth; and
- Local growth in commercial and industrial electrical consumption due to both the quantity and types of local businesses that are growing.

PSE prepared a Needs Assessment in 2013 and a Supplemental Needs Assessment in 2015. The methodology used in the Supplemental Needs Assessment increased the accuracy of the results by breaking down the systemwide forecast into county-by-county forecasts and a sub-county area forecast for the Eastside. Both the 2013 and the 2015 reports show that Eastside growth is expected to be relatively strong, with peak loads projected to grow by approximately 2.4% per year over the next 10 years (2014 - 2024) driven mainly by new development in the commercial and high-density residential sectors.

Table 2-2 in the Supplemental Needs Assessment compares the load growth forecast from the 2013 assessment and the 2015 assessment. The 2015 supplemental forecast showed a slight reduction in PSE's overall peak load projections for winter 2017 - 2018 of 46 MW (0.9% of total) as compared to the 2013 projections, which is due to a slower than expected recovery in the housing sector. Similarly, Eastside load projections for winter 2017 - 2018 decreased by 11 MW (1.6% of total) as compared to the previous forecast. Although the new forecast slightly extends the time before system components on the Eastside will have reached capacity, the conclusion regarding the need in the long run has not changed.

PSE has traditionally been a winter-peaking utility, meaning that the highest demand periods typically have occurred in winter when cold weather drives the demand for heating. Both Needs Assessment reports indicate that, in addition to growing winter peak load demand, summer loads

on the Eastside are growing even more rapidly, to a point where they also pose transmission capacity deficiency issues.

In the 2015 Supplemental Needs Assessment report, the 2018 summer load projections for the Eastside were 12 MW (2.2% of total) lower than the previous forecast. However, by 2018 the supplemental assessment shows that approximately 74 MW of customer load is at risk of load shedding (shutting off or limiting power to customers) in order to maintain a reliable and secure transmission system. Ultimately, the result of having both a winter and summer peak deficiency leads to more hours of the year when the system is vulnerable to excess loading.

As with the previous forecast, PSE's supplemental forecast was based on historical data that were modified for such variables as energy conservation programs, economic data, population growth trends, and population and employment growth forecasts from the Puget Sound Regional Council (PSRC). Also included into the final shape of the forecast were any expected community development increases in load that have been identified by PSE customer relations and/or PSE local area distribution planning staff as being of significant size. These would be considered block loads and their addition is a typical practice in utility forecasting. In the model, block loads were added to the forecast for the substation that would serve those loads at 100% for the first three years, 50% for the next three years, and 0% after six years. Even though there are no standards for adding block loads of this type, this staged approach allows the forecast to capture any immediate sizable increases while tapering off and allowing the data available on employment and population provided by the other forecasting agencies to shape the outer years. This approach is a reasonable way to capture any significant near-term load increases without skewing the entire forecast.

In my opinion, the one area where PSE used an approach to load growth that was not typical of most utilities was in looking at the effect of its conservation programs. PSE used a conservation level of 100% in its load forecast, which assumes PSE will be able to achieve all of its planned conservation goals. Although PSE has a highly successful conservation program at present, this is more optimistic than most utilities are when making load forecasts, since conservation programs are typically voluntary. Using this as an expectation, anything short of that level of conservation would increase load levels and accelerate the timeframe for the deficiency to develop. The demand-side reduction program is described in PSE's *Integrated Resource Plan* (2013) including the methods used in determining the achievable levels of conservation. My review did not include a review of the methodology or results used in that analysis, although it appears to consider a wide range of factors that should be considered when establishing conservation goals.

In summary, PSE's load forecasting analysis applied methods and assumptions that are standard practice for the utility industry. My only concern is that the approach taken on conservation could result in understating the potential capacity deficiency if PSE were to fall short of its conservation goals.

Corrective Action Plans (CAPs)

An unwanted side effect from transforming power or transmitting power across power lines is the effect of thermal heating. Similar to water encountering friction in a hose, electrons face resistance in the conductor or transformer. Many individuals have felt this phenomenon when attempting to change a light bulb after it has been on for a period of time. Electrical transformation and delivery

can cause extreme heat. As electrical system components heat up due to these thermal stresses, they reach a point where physical damage can occur if the temperatures are too high.

System operators monitor the load, which is in direct correlation to the heating of equipment. If the load gets too high, operators must reduce (shed) load, either automatically or manually, from the equipment. This reduces the loading and allows the destructive temperatures to decrease to a safe level. This heating can occur in any system component (transformers, conductors, generators etc.). If the operator does not shed load the equipment will eventually fail due to the excess heat, and no load will be able to be served by that system component until it is replaced. For some components this could take weeks or months to accomplish due to equipment availability, shipment requirements and the time it takes to install and test the component.

Corrective action plans (CAPs) are instructions to PSE transmission operators to take particular actions during certain events to prevent destruction of system components and maintain appropriate voltage levels to all customers. Equipment overheating mainly triggers those actions. Overheating is typically due to high "steady state" load levels during peak load times (i.e., running the system near full capacity for several hours or days, such as during a cold snap or hot spell), or increases in load on a particular piece of equipment due to an outage of another transmission system component. Outages can occur due to unforeseen events such as storms, or during routine maintenance, when pieces of equipment need to be isolated from the system for personnel safety. CAPs are used by all electrical utilities as temporary fixes that can be implemented for short periods in lieu of increasing the capacity of the system.

The electrical transmission system is basically a link between generation (supply of electrical power) and load (demand for electricity). Unless the load is turned off or generation is unavailable, the transmission system will continue to try to deliver electricity to the load even if certain parts of the system are overheating. Operators must be constantly aware of system loading parameters to prevent components of the system from being destroyed by overheating. Once destroyed, the component may be out of service for weeks or months while being repaired, and customers may be adversely affected for the duration. CAPs are sometimes administered manually by the operator, or automatically by control systems in more critical cases where immediate action is deemed appropriate.

CAPs limit the adverse effects to equipment, but during the period that a CAP is being implemented, the electrical supply system is left in a more vulnerable state with fewer components to carry the load. Regardless of whether a CAP has been initiated by normal load levels, an unexpected outage, or a maintenance outage, there is a higher probability during a CAP that any further system upset could leave large areas of the Eastside and thousands of customers without power. As the load for the Eastside increases, and as the problem becomes not only a winter but summer peak issue, the number of hours per year when CAPs must be implemented will increase, meaning the length of time that the system is vulnerable also increases. Therefore, from a functional standpoint the system becomes less reliable in regard to normal load and unexpected system outages. From a maintenance standpoint the system becomes harder to operate and maintain its components in good condition. For example, PSE currently uses CAPs at the Talbot Hill substation to avoid load shedding in winter months.

Reference: Energize Eastside Project

PSE considered CAPs in its Needs Assessment for the Energize Eastside project, recognizing that with growing demand CAPs alone would not be a sustainable solution. CAPs allow PSE transmission operators to temporarily mitigate system problems on the Eastside in order to keep the system operational during certain outages and maintenance procedures. However, each CAP increases the exposure to more widespread customer power outages if any further system upset occurs while the CAP is implemented. As load increases over time, more CAPs are needed for more hours of the year and system reliability decreases. Therefore, CAPs should not be regarded as a long-term solution.

Regional Compliance

Like all major electrical utilities, PSE's electrical supply system does not operate independently of other power providers in the region. The interconnected power system, or bulk electric system (BES) as it is commonly referred to, is intended to be cost and resource effective by allowing excess power generation in one part of the region to supply load in another. In addition, because of the characteristics of electricity, increased system reliability, voltage stability, and performance are achieved by employing an interconnected system.

Several regional agencies in the Northwest oversee the operation of the BES to ensure that it is capable of delivering electricity. These regional agencies are ultimately responsible on a national level to the Federal Energy Regulatory Commission (FERC) and NERC. Among other duties, these regional entities identify additions to the transmission system needed to ensure service to load and meet firm transmission service commitments into the future, while complying with national reliability standards. In order to participate in the benefits of the regional grid, PSE must adhere to these transmission reliability standards.

These standards have become more stringent in recent years, after lessons learned in the cascading blackout that struck the northeastern portion of North America in 2003. Particularly relevant to planning for the Energize Eastside project, the current standards require that the system must be capable of operating safely and reliably with two components being disabled (referred to as N-2 and N-1-1 scenarios), whereas past standards only required that the system operate reliably with one component disabled (referred to as N-1 scenarios).

The Eastside Needs Assessment Report and the Supplemental Eastside Needs Assessment Report mention several other reports prepared by regional agencies, or that PSE prepared in order to comply with these agencies' standards. Each of these reports investigated a range of solutions to meet a particular regional electric system need. Being regional, these studies often encompass several utilities in order to address a particular issue or range of issues.

The Energize Eastside project was discussed as one of the possible solutions in some reports, and it was found to help address regional transmission issues. This should not lead to the conclusion that Energize Eastside was conceived as a means to address these regional needs. It only means that PSE's proposed Energize Eastside 230 kV transmission line would benefit the reliability of the regional grid in addition to addressing the local capacity deficiency on the Eastside. Conversely, other regional solutions these reports investigated would address the regional issue but would not be effective for solving the local transmission capacity deficiency on the Eastside. This is because they were designed only to address the regional issue. Providing support for the electrical needs of the region should not be equated with support for the need identified for the Energize Eastside project.

Reference: Energize Eastside Project

For instance, in the past PSE has utilized various CAPs as mentioned above to meet some of its regional compliance issues for reliability. Yet, as was also indicated above, the enforcement of a CAP is a temporary solution that puts large numbers of Eastside customers at higher risk of a power failure, and the hours of exposure per year continue to increase.

Regional compliance is part of operating an electric utility. There is a tension between what is best for the region and what is best for the local utility.

Summary

Due to increasing load demand, the Eastside is quickly approaching a transmission capacity deficiency. If and when this deficiency develops, PSE's electrical supply system will reach a point where it cannot ensure the level of reliability that it is mandated to provide. Assuming projected growth occurs, the Supplemental Needs Assessment indicates this capacity will be reached as early as winter 2017 - 2018. This is not a prediction that weather conditions and load demand will converge in this time period and require load shedding. Rather, it is a projection that load demand will increase to a point where, if adverse weather conditions occur and one or more components of the system is not operating for any reason, load shedding would be required. Once the threshold is crossed, the physical limitations of the system are such that even the slightest overload will produce overheating that can damage equipment, and larger overloads will produce overheating more quickly. Once equipment is in an overload condition, the options are to let it fail or take it out of service. Both conditions leave the Eastside in a vulnerable state where the system is incapable of reliably serving customer load. At that point further actions may be needed such as load shedding in order to keep the system intact. By the end of the 10-year forecast period, a large number of customers would be at risk, and the load shedding requirement could be as high as 133 MW.

The deficiency is caused by load growth, which is a byproduct of economic growth and population increases in the Eastside area. Addressing the deficiency is difficult because the needed generation to supply this load growth is outside the service area and the available existing pathways to bring that power to the load have reached capacity. The load area in question is situated between two sources: Sammamish substation on the north end (Redmond/Kirkland area) and Talbot Hill substation on the south end (Renton area). These are the only two sites that effectively support this geographical area. Increases or decreases in load that are not directly supplied by these two substations, or power flow to other parts of the system outside the service area, have minimal effect on the ability of these substations to supply load. Only a direct interruption of supply power to or power fed from these two substations will affect the Eastside area. Once the higher voltage (230 kV) is transformed down to a lower voltage (115 kV) at these two substations, the system is limited by the physical capacity of the conductors and transformers that connect those two sources to the load and feed the area.

A simple analogy for the transmission problem on the Eastside would be the water pressure at a residence with a vegetable garden located at the back of the property. In the summer months the vegetable garden needs more water but there isn't enough pressure to deliver an adequate supply. Even if the homeowner increases the size of the hoses or adds more sprinklers, the pressure is divided among them and the flow at each sprinkler reduces to a trickle. To solve the problem the

homeowner must either increase the pressure at the main, or develop another water source (such as a well) near the garden.

For the Eastside the highest load densities are north of I-90 and west of Lake Sammamish. In electrical systems, voltage is the pressure. As with the hoses and sprinklers, the physical limitations of the transformers and conductors dictate that the transformation sites closest to the load center will have best performance. Bringing a higher voltage source into the area and making the transformation to a lower voltage closer to the load increases the pressure at the source (comparable to the analogy of bringing a larger water main with plenty of pressure) and adequate power can flow to all parts of the area. The other solution is to produce a new source of power close to the load center. This would be some type of electrical generation (similar to adding a new well in the garden hose analogy). Other solutions would be less effective.

Energy conservation, technological advancements, and system operational improvements can and will slow the need for these infrastructure improvements. In its planning for Energize Eastside, PSE has assumed that a relatively high level of voluntary energy efficiency measures will be adopted within the Eastside over the coming decade, approximately 110 MW by 2024. The analysis PSE provided shows that even with these measures, the economic and population growth expected by planning agencies and businesses on the Eastside equates to the need for either more energy infrastructure, or at least 163 MW of additional conservation, over and above conservation already planned for the Eastside.

Energy conservation is one way of reducing load. But when increasing load has eclipsed increases in energy conservation and the electrical system is reaching capacity, the only other method is to open transmission lines. That is the purpose of CAPs: to reduce load, and therefore heating, by opening transmission lines. CAPs are temporary measures to help the system supply load. However, CAPs do not solve the long-term capacity issue, and when implemented they leave the system vulnerable to increased outages.

To understand this, the garden example can again be used. The homeowner has two sources of water to the garden, one from a faucet on the north side and one from the south much as Sammamish and Talbot Hill substations feed the Eastside load. It is a particularly hot mid-summer day, and the garden needs extra water. The homeowner connects more hoses to each faucet but realizes that even with the additional hoses and the faucets wide open, there is not enough water pressure to effectively water the garden. The only option is to disconnect a hose or two so that the others will have enough pressure to operate the sprinklers. Only now some of the garden is going without water (similar to load shedding in an electrical system). Also, depending on what is disconnected, large portions of the garden would be vulnerable to losing their water supply if the remaining hoses were damaged. In a garden, it may be possible to keep plants alive by rotating areas where the water is turned off, but in an electrical system, instead of plants it is people who will not have the electricity they need for a period of the day.

This is a simple analogy, but the situation with the Eastside power system is similar, except that instead of sprinklers that won't operate, an overloaded electrical system overheats. During peak load periods, operators use CAPs to turn off (referred to as opening) lines from either Sammamish or Talbot Hill substation to reduce heating on certain system transformers and lines so that they will not be destroyed. They may be able to keep the Eastside area supplied with electricity, but in doing so

large areas of the Eastside may only be fed from one source. If something happens to that source, such as a tree falling into a line, or a car accidentally taking out a pole, or a piece of equipment fails due to fatigue, at that moment the last viable connection to a power source is gone and the lights go out. Even worse, as load continues to grow, or the area hits the coldest winter or hottest summer on record, the operator will be left with a decision: who will have power and who will not. Until the peak period is over, in order to reduce overloads to an acceptable level, large portions of the Eastside area could be left without power. A further possible consequence would be that hospitals, nursing homes, fire departments, police stations and other critical support services must run on emergency power or are without power. In this situation the event has become not just an inconvenience but a hazard.

There are a lot of questions surrounding the probability of these events occurring on the Eastside. Most people are likely unaware of how many times an outage is imminent or narrowly avoided. Attempting to specifically predict these events is nearly impossible because of the number of potential scenarios and permutations. Is it an extreme peak? Are 100% conservation levels being met? Is there a system component out for repair? Has an accident removed a piece of equipment from service? Has a natural or man-made disaster occurred that no one thought would ever happen? Was the forecast wrong and loads grew faster than expected? The permutations are endless.

Regional electrical reliability is important to local communities. Without a reliable regional backbone, energy generated by a wide variety of sources could not be efficiently delivered to the population areas that need it. All the utilities in the Northwest bear some responsibility to keep the transmission system in working order. However, a local utility's main role is its customers and each has a legal duty to provide electricity to customers in its service area.

The local utility has two roles to play. On the community level, it needs to provide an adequate infrastructure of facilities and equipment that can reliably deliver energy to its local customers. As a regional player, the utility provides its customers access to the larger interconnected system while making sure its system is as reliable as its regional neighbors' systems and not a detriment to the whole.

The Energize Eastside project is designed to bring the needed infrastructure to supply the local need. Any regional benefits that it provides would be added benefits of a stronger regional source, but these are not the primary reasons why the project has been proposed. The transmission capacity deficiency is driven primarily by local rather than regional growth. If the entire region surrounding the Eastside was eliminated or disconnected from Sammamish and Talbot Hill substations, and replaced with an independent 230 kV source of power at both ends, the result would be the same. The Eastside 230 -115 kV system as it exists cannot supply the projected load under all circumstances, with the required levels of reliability that the community and neighboring utilities expect.

STANTEC CONSULTING SERVICES INC.STANTEC CONSULTING SERVICES INC.

Reference: Energize Eastside Project

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DSD 002084

ATTACHMENT D
Community Advisory Group Report

PUGET SOUND ENERGY

energize**EASTSIDE**

community advisory group
FINAL REPORT

January 2015

prepared by: ei enviroissues

DSD 002086

Community Advisory Group Final Report

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The Community Advisory Group reviewed and provided feedback on this report.

Executive summary

The Energize Eastside project will build a new electric substation and higher capacity (230 kV) transmission lines on the Eastside. In order to provide a forum that would generate robust input from diverse community stakeholders, Puget Sound Energy (PSE) convened a Community Advisory Group comprised of 24 representatives from various interests across the Eastside.

The Community Advisory Group's goals were to help identify and assess community values in the context of evaluating which route the new transmission lines should follow, and to develop a route recommendation for PSE's consideration.

Meeting schedule

The Community Advisory Group met eight times between Jan. 22 and Dec. 10, 2014. The advisory group discussed the following topics at each meeting:

- **Jan. 22:** Role of the advisory group and introduction to the project
- **Feb. 12:** Solution selection process and project routing
- **June 4:** Review key findings from the sub-area workshops and Sub-Area Committee meetings
- **June 25:** Review potential route options
- **July 9:** Narrow potential route options and finalize evaluation factors
- **Oct. 1:** Review key findings from the open houses and prepare for route evaluation
- **Oct. 8:** Develop a preliminary route recommendation
- **Dec. 10:** Finalize a route recommendation for PSE's consideration

Additional meeting details are included in section IV (Community Advisory Group activities).

Community outreach

The Community Advisory Group process was supplemented by broad and ongoing community outreach, including public events at key milestones. At outreach events, the community learned about outcomes of the advisory group process to date and submitted feedback that the advisory group considered in their discussions. Key outreach events included:

- **Jan. 29 and 30:** Open House #1
- **March - May:** Six sub-area workshops and three Sub-Area Committee meetings
- **April 21:** Question and Answer Meeting #1
- **July 7:** Question and Answer Meeting #2
- **Sept. 10 and 11:** Open House #2
- **Nov. 12 and 13:** Open House #3

Along with feedback collected at these outreach events, members of the public could also submit input and ask questions via email, voicemail and an online comment form on the project website. To help inform their discussion, the advisory group received monthly public comment summaries of more than 2,300 comments and questions received from the public, as well as summaries of comments received at open houses. Additional activities are detailed in section V (Community involvement).

Recommendation

On Dec. 10, the Energize Eastside Community Advisory Group selected route options Oak and Willow as their final route recommendation for PSE's consideration. Of the 22 advisory group members and four residential association alternates participating in the recommendation discussion, 20 supported the final recommendation.[1]

1 The above count includes the advisory group members and residential association alternates present at the Dec. 10, 2014 meeting, as well as six members and residential association alternates who did not attend the meeting but later provided feedback on the recommendation.

The final recommendation was based on the advisory group's work throughout 2014, including discussion of community feedback collected throughout the year. Six advisory group members and residential association alternates dissented from the recommendation and supported none of the routes.

Next steps

Following the completion of the Community Advisory Group's process, PSE's next steps in 2015 are to:

- Take the Community Advisory Group's recommendation under consideration and make an announcement about routing that balances the needs of customers, the local community, property owners and PSE
- Work directly with property owners and tenants to begin detailed fieldwork to inform environmental review, design and permitting
- Ask for community input on project design, which may include pole height, finish and other design considerations
- Work with the City of Bellevue and other affected jurisdictions and agencies on the project's Environmental Impact Statement (EIS) process

Once these steps are complete, PSE will apply for necessary permits from appropriate agencies and jurisdictions. The project design and permitting phase is expected to run through early 2017. Once fully designed and permitted, project construction is expected to begin in 2017, with project completion planned for 2018.

COMMUNITY ADVISORY GROUP FINAL ROUTE RECOMMENDATION

DSD 002089

I. Introduction

Growth studies presented by Puget Sound Energy (PSE) and third-party experts project that demand for reliable power on the Eastside will exceed capacity as early as the winter of 2017/2018.[1] These studies indicate that without substantial electrical infrastructure upgrades and aggressive conservation efforts, the Eastside's power system will lose redundancy, increasing the risk of more disruptive and longer outages for as many as 60,000 customers.

The Energize Eastside project will build a new electric substation and higher capacity (230 kV) transmission lines on the Eastside. The new 230 kV transmission lines will extend from the existing Sammamish substation in Redmond to the existing Talbot Hill substation in Renton, connecting with a new substation site in between. These upgrades will provide dependable power for Eastside communities for many years to come.

In January 2014, PSE convened a Community Advisory Group comprised of 24 representatives[2] from various interests across the Eastside. The purpose of the advisory group was to provide a forum that would generate robust input from diverse community stakeholders in compliance with comprehensive plan goals and policies, which promote public participation and/or coordinated utility siting. The Community Advisory Group's goals were to help identify and assess community values in the context of evaluating which route the new transmission lines should follow and to develop a final route recommendation for PSE's consideration.

1 Quanta Technology and Puget Sound Energy, *Eastside Needs Assessment Report*, 2013.

2 The Community Advisory Group consisted of 24 members at the beginning of the process; however, two member organizations (King County and Renton Technical College) withdrew without replacement.

Project Manager Jens Nedrud leads Community Advisory Group members on a tour of the project area.

Purpose of report

The purpose of this report is to document the work and summarize the recommendations of the Community Advisory Group convened by PSE to explore community preferences, priorities and concerns and to assess segments that could be combined to form a final route for the Energize Eastside 230kV transmission lines.

II. Project background

PSE's existing Eastside electric system had its last major upgrade in the 1960s. The electric system serves communities between Redmond to the north, Renton to the south, Lake Washington to the west and Lake Sammamish to the east. Power is currently delivered throughout the Eastside region using 115 kV transmission lines that run between two 230 kV substations – one in Redmond and one in Renton (see Figure 1).

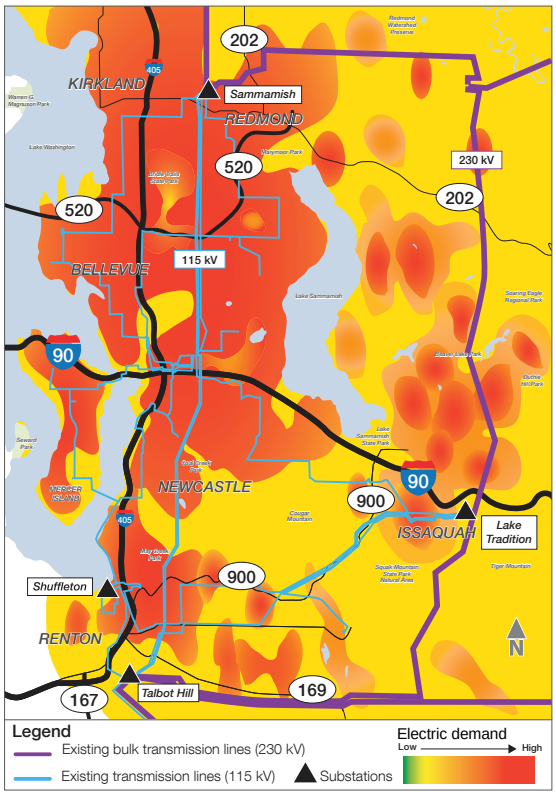
Since the system's last upgrade, the Eastside population has grown from approximately 50,000 to nearly 400,000 people, and this growth trend is expected to continue. Puget Sound Regional Council projections indicate that the Eastside population will grow by more than a third between 2010 and 2040.[1] Not only have Eastside communities grown and prospered, but the way Eastside residents use electricity has changed. Home square footage has increased, requiring more energy for lighting, heating and air conditioning. Additionally, most devices and appliances plugged in today did not exist years ago. Despite improvements in energy efficiency and aggressive conservation efforts, demand for electricity has grown dramatically.

Federal standards require PSE to plan for future forecasted loads and upgrade the system accordingly. Forecasted loads for transmission purposes are based on historical load data as well as a variety of other inputs, including information about weather, regional and national economic growth, demographic changes, conservation, and other customer usage and behavior factors. In 2013, PSE published the *Eastside Needs Assessment*. Prepared with assistance from independent experts, the study demonstrated that the increased demand is already placing a strain on the electric system. As growth continues, the existing system will only become more stressed, increasing the possibility of widespread outages, especially during peak winter loads when customer electricity use is greatest.

To determine a solution, PSE and independent experts conducted multiple independent analyses of the existing system and studied a variety of options to address the growing need on the Eastside, including further reducing demand through conservation, increasing the capacity of existing electric transmission lines, generating energy locally, and building new infrastructure.

After a comprehensive review, PSE determined that a combination of continued conservation and infrastructure upgrades – a new substation and higher capacity 230 kV transmission lines – will meet growing demand on the Eastside and ensure reliable electricity for years to come. [2,3]

Figure 1. The Eastside's electric system and demand



1 Puget Sound Regional Council 2013 Land Use Baseline: Maintenance Release 1 (MR1), update April 2014.

2 Energy + Environmental Economics, *Non-wire Solutions Analysis*, 2014.

3 Quanta Technology and Puget Sound Energy, *Eastside Transmission Solutions Report*, 2013.

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III. About the Community Advisory Group

Purpose

The purpose of the Community Advisory Group was to evaluate the potential route options identified by PSE and independent experts, help PSE better understand community and property owner values and concerns, and determine a route recommendation for PSE's consideration. The Community Advisory Group process and final route recommendation will help PSE evaluate and consider routes that balance the needs of its customers, the local community, property owners and PSE.

Throughout the community outreach process, the Community Advisory Group:

- Developed an understanding of the Energize Eastside project and project need
- Reported back to the constituents they represented on project details, gathered feedback from the interests they represented, and provided ongoing communication between PSE and their constituents throughout the process
- As community representatives, provided advice on ways to address community concerns
- Participated in geographic Sub-Area Committee meetings to identify local concerns and values
- Worked collaboratively and constructively to help consider community and property owner values
- Engaged in a process to evaluate route options
- Determined a final route recommendation for PSE's consideration

The Community Advisory Group codified its purpose, process and guidelines in its Charter (Appendix A), agreed upon by consensus.

Membership

The Community Advisory Group was made up of representatives from various interests, including neighborhood organizations, cities, schools, social service organizations, major commercial users, economic development groups, an environmental organization and a property developer. See Table 1 for members, including which interests each member represented and their specific organization or affiliation.

Learning about the project need and advisory group process at Community Advisory Group Meeting #1 in Bellevue.

Table 1: Community Advisory Group members

Interest	Organization or affiliation	Name
City	City of Bellevue	Nicholas Matz
	City of Kirkland	Rob Jammerman
	City of Newcastle	Tim McHarg
	City of Redmond[1]	Pete Sullivan (primary) Lori Peckol (alternate) Cathy Beam (alternate)
	City of Renton	Gregg Zimmerman
Economic development organization	OneRedmond	Bart Phillips
	Renton Chamber of Commerce	Brent Camann
Environmental organization	Mountains to Sound Greenway	Floyd Rogers
Jurisdiction	King County[2]	David St. John (primary) Mary Bourguignon (alternate)
Major commercial/ industrial user	Overlake Hospital Medical Center	Sam Baxter (primary) Jeff Fleming (alternate)
	Renton Technical College[3]	Steve Hanson
Property developer	Master Builders Association	David Hoffman
Puget Sound Energy	Puget Sound Energy	Andy Swayne
Residential organization (Bellevue)	Somerset Community Association	Steve O'Donnell
	Wilburton Community Association	Robert Shay
	Bridle Trails Community Club	Norm Hansen
Residential organization (Kirkland)	South Rose Hill/Bridle Trails Neighborhood Association	Deirdre Johnson (primary) Jim McElwee (alternate)
Residential organization (Newcastle)	Olympus Neighborhood Association	David Edmonds (primary) Sean McNamara (alternate) Sue Stronk (alternate)
Residential organization (Redmond)	Redmond Neighborhoods	David Chicks
Residential organization (Renton)	Kennydale Neighborhood Association	Darius Richards
School district	Bellevue School District	Jack McLeod (primary) Kyle McLeod (alternate)
	Lake Washington School District	Brian Buck
Social service organization	Coal Creek Family YMCA	Marcia Isenberger (primary) Paul Lwali (alternate)
	Hopelink	Nicola Barnes

1 In October 2014, Pete Sullivan relocated and was unable to attend meetings thereafter, but remained involved in the process.

2 King County was invited to have a staff representative serve on the advisory group. King County staff attended two introductory meetings but then withdrew from the process.

3 In October 2014, Steve Hanson of the Renton Technical College resigned due to lack of availability to participate fully in the process.

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Residential association alternates

To provide an opportunity for additional input and representation from the residential community, four residential association alternates were appointed. These alternates were appointed from different neighborhood associations than the advisory group members representing residential interests. The four residential association alternates included:

- **Scott Kaseburg**, Lake Lanes Community Association (Bellevue)
- **Bill Taylor**, Liberty Ridge Homeowners Association (Renton)
- **Lindy Bruce**, Sunset Community Association (Bellevue)
- **Barbara Sauerbrey**, Woodridge Community Association (Bellevue)

Past members and residential association alternates

Over the course of the advisory group's work, the following membership changed due to varying circumstances:

- **Mark Rigos**, City of Newcastle (replaced by Tim McHarg)
- **Jules Dickerson**, Lake Lanes Community Association (replaced by Scott Kaseburg)
- **Lynn Wallace**, Renton Chamber of Commerce (replaced by Brent Camann)
- **Debra Grant**, Hopelink (replaced by Nicola Barnes)

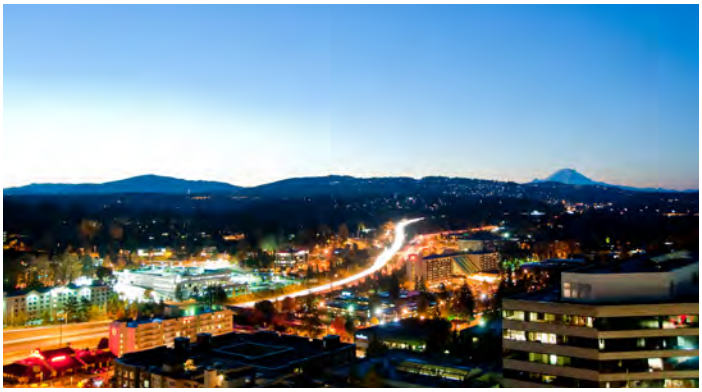
Invited

The following entities were invited and chose not to participate in the Community Advisory Group process, but were informed of project milestones and meetings through postcards and newsletters:

- Muckleshoot Tribe
- Yakama Nation

Aerial view of downtown Renton

Construction in Redmond



Downtown Bellevue at night

IV. Community Advisory Group activities

Meeting schedule

The Community Advisory Group met eight times from January to December 2014. All Community Advisory Group meetings were open to the public and included a period for public comment. For links to advisory group meeting materials, presentations and summaries, see Appendix C.

During this process, PSE hosted three series of public open houses, during which the public could learn about major advisory group milestones and consult with PSE and advisory group representatives. The advisory group used community input from these open houses as well as from sub-area workshops and Sub-Area Committee meetings, community surveys, public comment periods, monthly public comment summaries, and personal communications with constituents to inform their discussions. See Table 2 for a list of advisory group and community meetings held in 2014.

Table 2: 2014 Community Advisory Group and public outreach meeting schedule

Date	Meeting type	Purpose
Jan. 22	Community Advisory Group meeting	Learned about project need and Community Advisory Group process
Jan. 29 & 30	Open House	Broader community learned about the project need, the Community Advisory Group process, and opportunities to get involved
Feb. 12	Community Advisory Group meeting	Learned about PSE's solution selection process and project routing
February – May	Project area tours and sub-area process	Learned about the potential route segments via project area tours provided by PSE; attended sub-area workshops to identify local community values and concerns; determined key findings from sub-areas (See Table 3 for more details)
June 4	Community Advisory Group meeting	Reviewed key findings about the segments gathered at sub-area workshops and Sub-Area Committee meetings; developed community values-based evaluation factors to be used to evaluate the route options
June 25	Community Advisory Group meeting	Reviewed qualitative and quantitative information about the 18 potential route options made by combining route segments
July 9	Community Advisory Group meeting	Narrowed potential route options and finalized evaluation factors
Sept. 10 & 11	Open House	Broader community provided feedback on narrowed route options and weighting of evaluation factors via survey
Oct. 1	Community Advisory Group meeting	Reviewed key findings from September open houses and prepared for a Multi-Objective Decision Analysis evaluation of the routes
Oct. 8	Community Advisory Group meeting	Determined preliminary route recommendation for public review at November open houses
Nov. 12 & 13	Open House	Broader community provided feedback on advisory group's preliminary route recommendation
Dec. 10	Community Advisory Group meeting	Reviewed key findings from the November open houses; finalized route recommendation for PSE's consideration

Key Community Advisory Group discussion topics

The Community Advisory Group discussed many topics over the course of the process. The following topics were most commonly addressed. Descriptions include the advisory group's expressed concerns and PSE's response shared over the course of the advisory group process.

Scope confined to an overhead solution

Some members of the advisory group asked whether PSE would consider other alternatives besides an overhead solution. Those members also asked if considering other alternatives could fall under the advisory group's purview. Before launching the Energize Eastside, PSE studied several different solutions in addition to building the new overhead transmission lines. Those alternatives included reducing demand through conservation, increasing the capacity of PSE's existing electric transmission lines, generating energy locally, and building new infrastructure. However, PSE concluded other solutions were inadequate to solve the problem, and the advisory group was formed to gather feedback on an overhead transmission line solution.

Underground transmission lines

Among the most discussed alternatives to an overhead solution was underground transmission lines. PSE explained that overhead transmission lines are PSE's first option for service due to reliability and affordability. The biggest challenge to underground transmission lines is cost. The construction costs for an overhead transmission line are about $3 million to $4 million per mile, versus $20 million to $28 million per mile to construct the line underground. Per state-approved tariff schedule 80, section 34, the local jurisdiction or customer group requesting underground transmission lines must pay the difference between overhead and underground costs. PSE explained they are willing to sit down with interested communities to discuss undergrounding as an option; however, those communities must decide how to pay for the difference in costs, which must be provided up front.

Submarine cables

Some advisory group members expressed interest in PSE pursuing transmission lines submerged under Lake Washington, and pointed to other submerged transmission projects, such as one in San Francisco. PSE presented research on that project, and noted that it costs an average of $56.2 million per mile, compared to the $3 million to $4 million per mile of overhead transmission. As with undergrounding, according to tariff schedule 80, section 34, the local jurisdiction or customer group requesting submerged transmission lines must pay the difference between overhead and submarine costs.

Batteries

Some advisory group members were interested in learning more about battery technology and local energy storage as an alternative to the project. PSE explained that using batteries instead of building a new substation was considered during the solutions identification process, but the technology has not been used for the type and scale of problem facing the Eastside. Additionally, new transmission lines would still be required to distribute electricity from the battery site to PSE's customers.

Seattle City Light corridor

Some advisory group members also asked PSE about using the Seattle City Light (SCL) utility corridor as an alternative to site the new transmission lines. Early on in the solution identification process, PSE identified the SCL transmission corridor as a potential solution to meet the Eastside's energy needs. PSE asked SCL for permission to use their transmission corridor. However, SCL has told PSE that their corridor is a key component of Seattle City Light's transmission system and not available for PSE's use. A letter from SCL articulating this position is available on the Energize Eastside project website. See Appendix D.

Olympic Pipeline safety

Some advisory group members expressed concern over the safety of building the project near the Olympic Pipeline. PSE explained that building 230 kV lines along the Olympic Pipeline

(owned and operated by British Petroleum (BP)) would be safe. The Olympic Pipeline has coexisted with PSE transmission lines in the Eastside corridor for over fifty years. PSE also has a long history of working closely with BP and is a natural gas pipeline operator itself. PSE and its contractors are very familiar with concerns regarding pipeline safety and employ safe construction practices when performing work in the vicinity of pipelines. If a selected route is comprised of segments that include the Olympic Pipeline, PSE will continue to work with BP to ensure safety during and after construction.

Property values

Some advisory group members expressed concern about the effects on property values as a result of the Energize Eastside project and asked whether property values could be considered as a factor for evaluating route options. Property values are comprised of many factors, including economic outlook and location, as well as proximity to jobs, schools, transportation, parks and other amenities. PSE explained that it does not use property values as a factor when selecting routes out of fairness to and in consideration for customers of all income levels, noting that it is socially inequitable to site infrastructure based on income-related considerations. Similarly, a project's potential effects on surrounding property values are excluded from consideration of impacts to the environment under Washington's State Environmental Policy Act (SEPA).

Electric and magnetic fields

Several advisory group members asked whether exposure to electric and magnetic fields (EMF) had any effect on health. A third-party, board-certified health physicist explained that over the past 45 years, there have been many scientific studies conducted to determine whether EMF from transmission lines (called "power frequency EMF") has any effect on human health. To date, this large body of research does not show that exposure to power frequency EMF causes adverse health effects.

January-February 2014: Learned about the electric system, project need and routing

The Community Advisory Group began their process by learning about the current electrical system, the need for the project and the solution selection process. During this learning period, the advisory group asked PSE questions on a variety of topics, including transmission line siting, other options considered for the project (e.g., battery technology and conservation), and how a solution was determined. PSE's real estate, engineering and system planning staff provided detailed responses to these questions.

Communications Manager Gretchen Aliabadi explains the undergrounding tariff at Community Advisory Group Meeting #3 in Redmond.

PSE explained in detail its process to identify a solution and route options, which included the following steps:

1. **Determine the potential approaches to meet the Eastside's electricity needs:** PSE evaluated the potential of several approaches – conservation, local generation and new infrastructure – to meet the Eastside's electricity needs.
2. **Review approaches to provide enough electricity to meet the Eastside's needs:** Engineers reviewed alternatives to each approach, and found that only new generation on the Eastside or new infrastructure located near the center of high electricity demand could meet the Eastside's needs. Additionally, aggressive conservation goals would need to continue.
3. **Review solutions that best deliver electricity to the Eastside:** Engineers reviewed different generation and electric infrastructure alternatives based on system performance, flexibility and longevity. A new generation facility on the Eastside was eliminated from consideration due to difficulties related to siting and operational limitations. It was determined that the best solution to meet the Eastside's electricity needs was to 1) construct a new 230 kV substation and 2) construct new 230 kV transmission lines connecting the new substation with the two existing substations in Redmond and Renton.
4. **Determine which solutions PSE can move forward with:** PSE eliminated the Seattle City Light Corridor and one of the potential Bellevue substation sites as possible new infrastructure locations. Neither the corridor nor the proposed substation property is owned by PSE and other viable sites for new infrastructure were available.
5. **Review where PSE could build a solution:** Engineers used a computer-based modeling tool to analyze key criteria like geographic barriers, land uses and impacts to the environment. Based on this analysis, route segments were identified that could be combined into various complete route options that connect to potential substations (see Figure 2).[1]
6. **Ask what the public thinks:** PSE asked the public to provide input on the combination of route segments that best serves the Eastside's needs. The Community Advisory Group process was part of a larger public outreach process that also included neighborhood briefings, community meetings at key milestones, question and answer sessions, and an interactive project website.

1 TetraTech, *Eastside 230 kV Project Opportunity and Constraints Study for Linear Site Selection*, 2013.

Figure 2. Potential route segments

March-May 2014: Sub-area process and route segment input

In spring 2014, members of the Community Advisory Group participated in one or more of three Sub-Area Committees focused on the following geographic areas:

- North: Kirkland, Redmond and North Bellevue
- Central: Bellevue
- South: Newcastle and Renton

Sub-Area Committee membership included advisory group members and residential association alternates from the geographic

sub-areas. Invitations to serve on the committees were also extended to a representative from each potentially affected neighborhood association (i.e., those who lived near a potential segment) that did not have a member or residential association alternate on the advisory group.

PSE hosted six sub-area workshops and three Sub-Area Committee meetings across the project area. The three Sub-Area Committees developed findings on specific sub-area values, concerns and considerations about route segments from the workshops conducted in each of the sub-areas. The committees' findings served as a source of information that the Community Advisory Group considered in developing evaluation factors and narrowing the route options. See Table 3 for details on schedule and objectives of the sub-area workshops and Sub-Area Committees.

Discussion about route segments at a Central sub-area workshop in Bellevue.

Discussion about route segments at a South sub-area workshop in Renton.

Table 3: Sub-area workshops schedule and objectives

Dates	Meeting type	Purpose
North: March 19, 2014 Central: March 26, 2014 South: March 27, 2014	Sub-Area Workshop #1	Community members: • Identified key issues and considerations for segments in the sub-area • Brainstormed community values • Requested data that would be helpful to compare segments
North: April 16, 2014 Central: April 23, 2014 South: April 24, 2014	Sub-Area Workshop #2	Community members: • Reviewed data and photo simulations PSE prepared based on requests from Workshop #1 • Used data to score all the route segments individually and as a group • As a group, wrote key messages to the Sub-Area Committee
North: May 7, 2014 Central: May 14, 2014 South: May 15, 2014	Sub-Area Committee meeting	Sub-Area Committees determined key findings from sub-areas to share with the Community Advisory Group

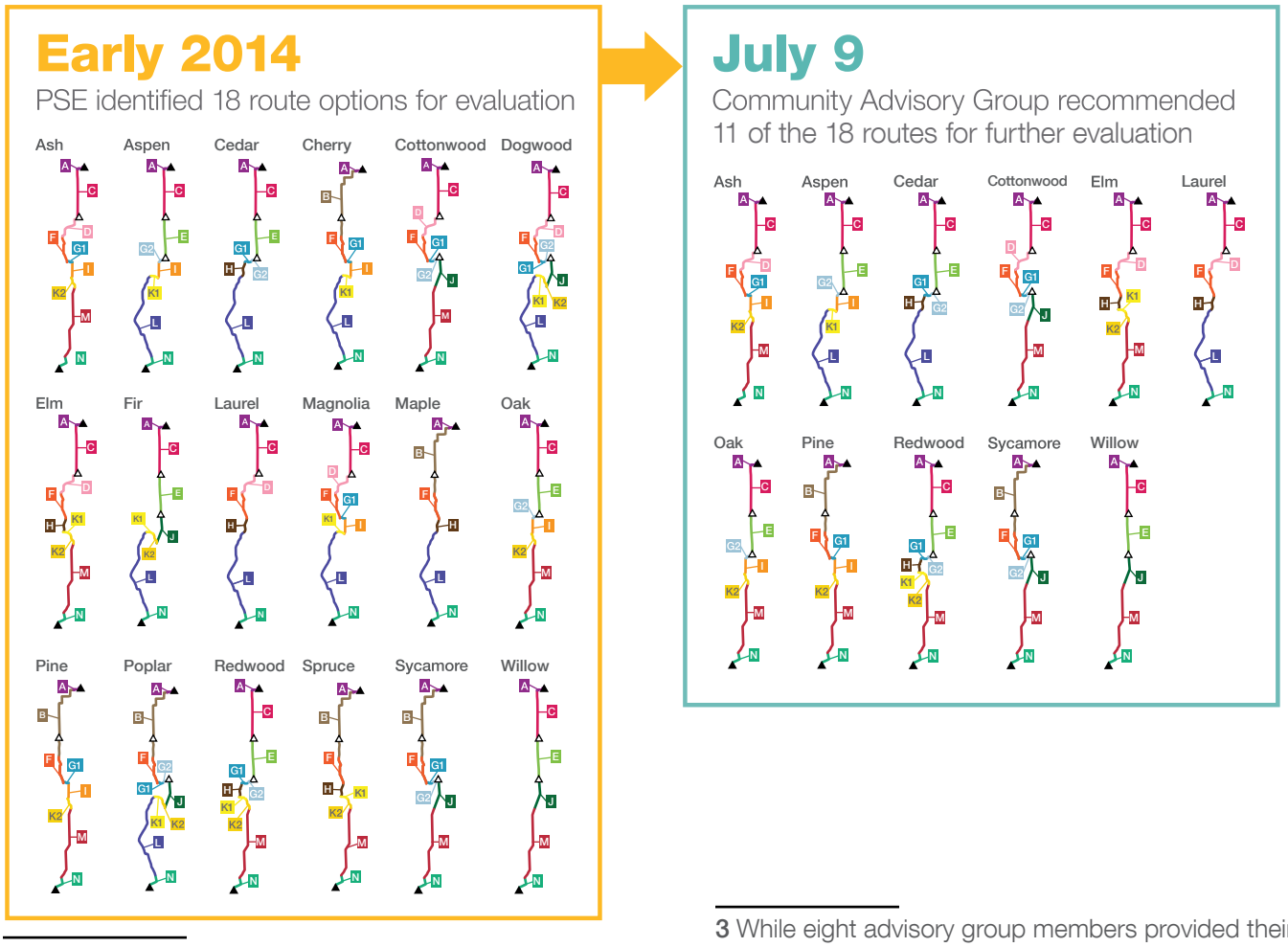
June-July 2014: Narrowed the route options

After segment-specific input was collected through the sub-area process, the Community Advisory Group considered 18 route options made from combining the route segments. (These route options were assigned tree names, such as "Ash," "Aspen," and "Cedar," for easier reference.) The advisory group also identified community values-based evaluation factors.

At their meeting on July 9, the advisory group reviewed the 18 route options and recommended 11 route options for further evaluation.[2] (See Figure 3.) Information that aided their discussion included:

- Feedback from sub-area workshops and Sub-Area Committee meetings, as well as other community input
- Quantifiable data on route options, photo simulations, and information from PSE on route cost, constructability and maintainability
- Results from a blind evaluation of the 18 route options completed by 23 advisory group members
- Initial recommendations submitted before the meeting by eight advisory group members on which route options to remove from further evaluation[3]
- Discussion of route segments and the 18 route options at advisory group meetings

Figure 3: Narrowed route options in July 2014



2 Four advisory group members initially recommended that all or a majority of the 18 routes should move forward for further evaluation.

3 While eight advisory group members provided their initial input before the meeting, all members present at the meeting on July 9 discussed what route options to remove from further evaluation.

October 2014: Evaluated the narrowed route options

The Community Advisory Group used nine evaluation factors (see Table 4), as well as specific route option data, to evaluate the narrowed route options through a process called Multi-Objective Decision Analysis (MODA). MODA is a process for making decisions when there are complex issues involving multiple criteria and multiple parties who may have an interest in the outcome.

Using MODA allows individuals to consider and weight factors and trade-offs while evaluating each alternative (in this case, each route option). Evaluation factors were weighted to reflect the relative importance ascribed to each factor. After scoring each route option for each evaluation factor, the advisory group then discussed the combined group results to help decide on a recommendation. See Figure 4 for a description of the MODA steps and how the advisory group used MODA.

Between Oct. 2 and Oct. 6, 2014, 19 of 24 advisory group members completed individual evaluations of the 11 route options recommended for further evaluation as part of the MODA process. Using online software called Transparent Choice, advisory group members individually scored each route option using each of the nine evaluation factors on a five-point scale. The software then applied two sets of weightings – one determined by the advisory group and another determined by community members who participated in a summer 2014 feedback survey – to the group's averaged scores. See Table 4 for descriptions of the evaluation factors and the two weighting schemes.

Figure 4: Multi-Objective Decision Analysis (MODA)

MODA steps

1. **Factors** - Discuss and agree on evaluation factors
2. **Weighting** - Determine relative importance of each factor and assign corresponding weights
3. **Route options** - Determine route options to evaluate
4. **Scoring** - Score each route option for each weighted factor
5. **Decision** - Discuss results and determine decision

How the Community Advisory Group used MODA

1. **Selected nine evaluation factors** based on community values
2. **Used two sets of weightings** - one determined by the advisory group and a second determined by a community survey
3. **Selected 11 route options** out of 18 to include in the evaluation
4. **Scored** the 11 route options for how well they each met the nine evaluation factors using an online software called Transparent Choice
5. **Considered MODA results** along with community feedback and other sources of information to select four routes as their preliminary route recommendation

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Table 4: Evaluation factors and their weightings determined by the advisory group and a community survey

Evaluation factor	Advisory group weighting	Community survey weighting
Avoids impacts to aesthetics (Pole design and views)	5%	14%
Avoids residential areas (Number of residences)	24%	31%
Avoids sensitive community land uses (Parks and other recreational areas, schools, religious institutions, etc.)	13%	10%
Avoids sensitive environmental areas (Wetlands, wildlife habitat, steep slopes, fault lines, etc.)	7%	12.5%
Least cost to the rate payer (Estimated monthly increase to average residential customer; calculation based on total cost)	14%	7%
Maximizes longevity (When in the future additional 230 kV infrastructure is anticipated based on current technology and growth projections)	9%	4%
Maximizes opportunity areas (Runs along existing utility corridors, railroad right of way, public right of way, etc.)	15%	6%
Protects health and safety (Electric and magnetic fields, Olympic Pipeline, etc.)	9%	9%
Protects mature vegetation (Number of trees greater than four inches impacted)	4%	6.5%
Total	100%	100%

On the following page, Figures 5 and 6 present the MODA results for each route option, first using the advisory group weighting and second the community survey weighting. Within the results bar for each route option, colors represent the evaluation factors and show the advisory group's averaged and weighted score for each factor. A higher number equals a better score. Weighting percentages are shown in the weighting keys.

Figure 5: MODA results - Advisory group weighting

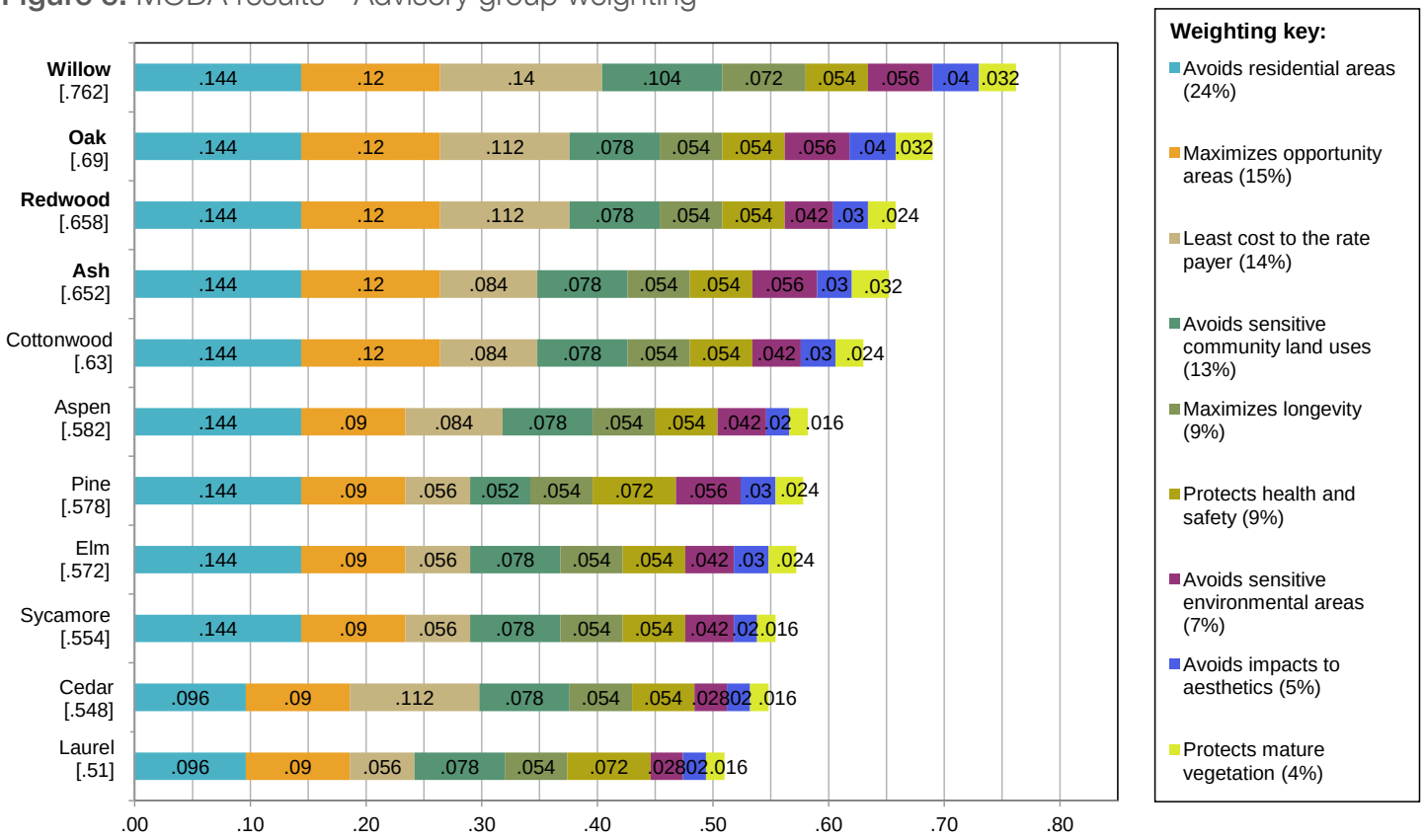
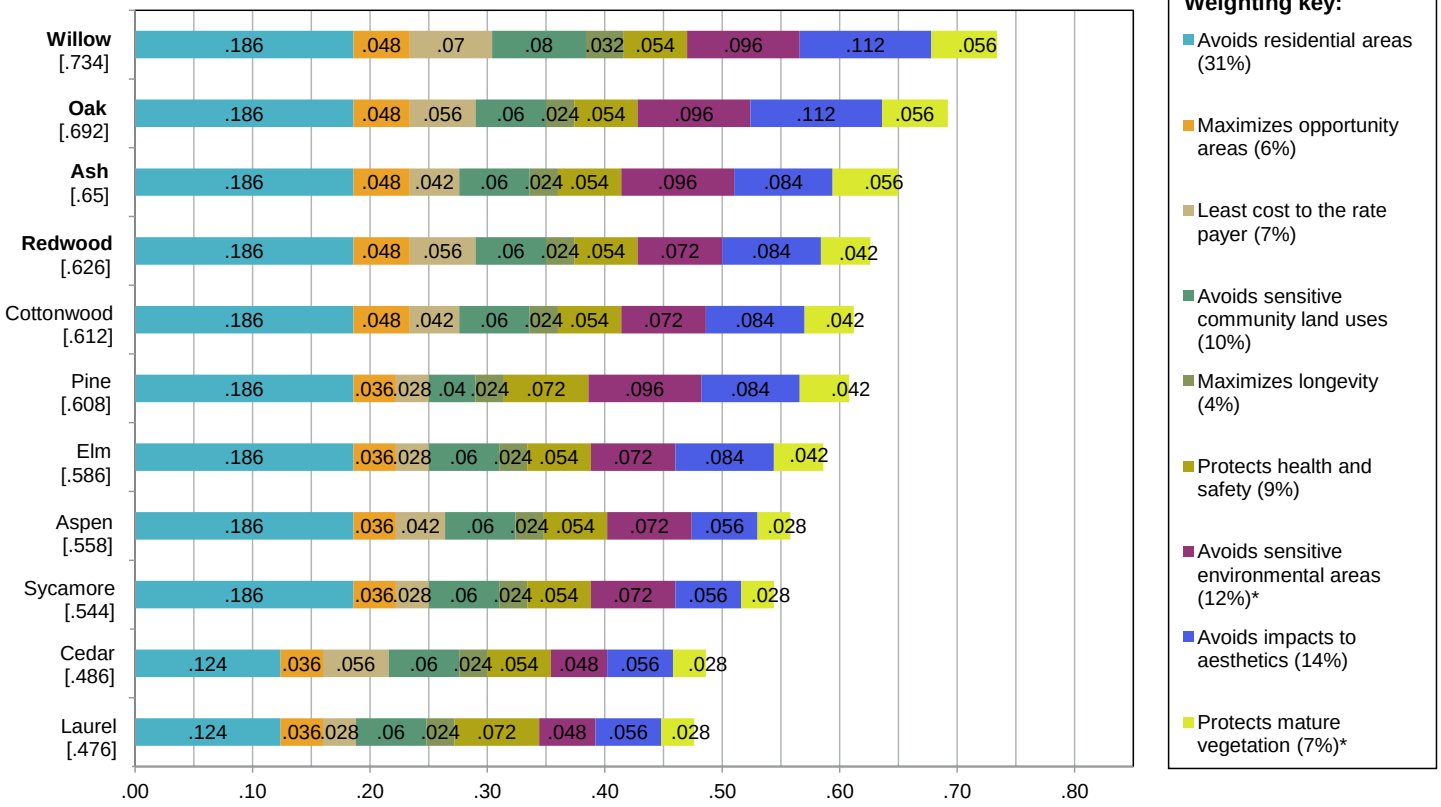


Figure 6: MODA results - Community survey weighting



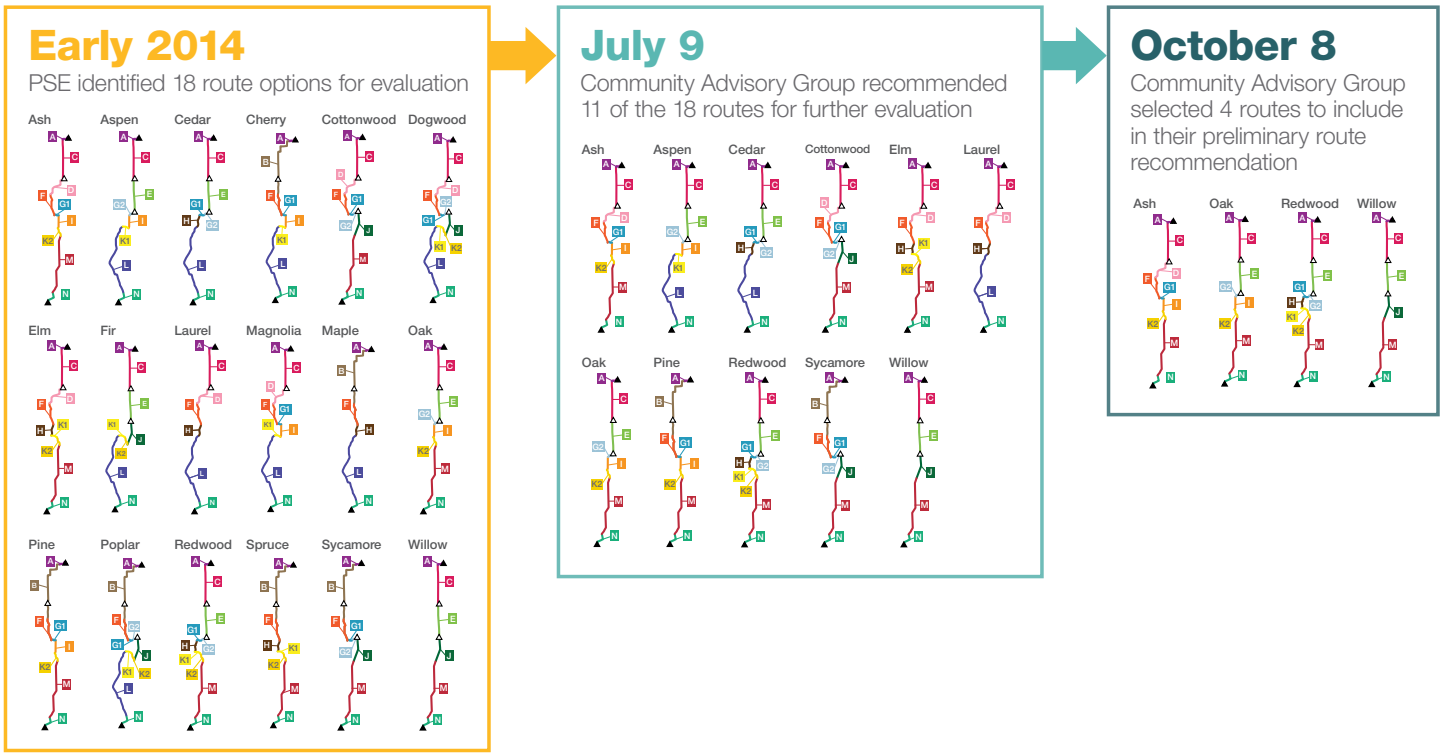
* Note: Transparent Choice, the online MODA software used to compile and calculate results, can only use weighting values that are whole numbers. As a result, the evaluation factors “Avoids sensitive environmental areas” and “Protects mature vegetation” were rounded to the nearest whole number.

October 2014: Preliminary route recommendation

At their Oct. 8 meeting, the advisory group selected four route options – Ash, Oak, Redwood and Willow – as their preliminary route recommendation (see Figure 7).[4] Information sources that helped the group determine their recommendation included:

- Results of the Multi-Objective Decision Analysis (MODA) using evaluation factor weightings from both the advisory group and community survey results
- Feedback from the summer community survey and other community input
- Discussion of the 11 route options at advisory group meetings

Figure 7. Narrowed route options and the preliminary route recommendation in October 2014



4 Of the 18 members present, 15 supported the recommendation, two members abstained and one had a dissenting opinion to include only three routes.

Reviewing results from the blind evaluation at Community Advisory Group Meeting #4b in Renton.

V. Community involvement

In addition to convening the Community Advisory Group, PSE involved the community in the public routing discussion from announcement of the project (December 2013) through the completion of the advisory group process (December 2014) by hosting community meetings, briefing organizations and gathering and responding to comments about the project.

PSE community involvement included:

- More than 240 briefings with individuals, neighborhoods, cities and other stakeholder groups
- 6 public open houses at key project milestones
- 2 online open houses
- 2 question and answer community meetings
- 1 webinar on undergrounding and electric and magnetic fields

Additional project outreach included:

- More than 2,300 comments and questions received from the public, summarized in monthly public comment and open house summaries made available to the advisory group
- 6 project newsletters and postcards sent to more than 50,000 residents and business owners
- Attendance at more than 60 community events
- A traveling kiosk displaying project updates throughout the Eastside
- Project update emails to distribution list, community organizations and elected officials
- Targeted outreach to traditionally underrepresented populations

Reviewing route option maps at Open House #1 in Renton.

Community Projects Manager Jackson Taylor providing project background at the Bellevue Strawberry Festival.

Public comment at Question and Answer Meeting #1 in Renton.

VI. Recommendation of the Community Advisory Group

On Dec. 10, 2014, the Community Advisory Group selected routes Oak and Willow as their final route recommendation for PSE's consideration (see Figure 8).

With this recommendation, the Community Advisory Group fulfilled their purpose as outlined in their charter:

"Work collaboratively, creatively and constructively to help determine community/property owner values and engage in a process to evaluate route segments and select a recommended route option."

Twenty-two advisory group members and four residential association alternates participated in the recommendation discussion. Twenty supported the final recommendation as follows:[1]

- Ten expressed preference for the Oak route
- Five expressed preference for the Willow route
- Five did not express a preference

Four advisory group members and two residential association alternates[2] – representing Bridle Trails Community Club, City of Newcastle, Liberty Ridge Homeowners Association, Olympus Neighborhood Association, Somerset Community Association, and Sunset Community Association – dissented from the recommendation and supported none of the routes. Refer to Appendix B for the dissenting opinion.

Figure 8. The Community Advisory Group final route recommendation

1 The above count includes the advisory group members and residential association alternates present at the Dec. 10, 2014 meeting, as well as six members and residential association alternates who did not attend the meeting but later provided feedback on the recommendation.

2 Darius Richards (Kennydale Neighborhood Association) and Scott Kaseburg (Lake Lanes Community Association), who supported the final recommendation in the meeting, signed the dissenting report after the meeting.

At the Dec. 10 meeting, advisory group members and residential association alternates who expressed a preference for Oak or Willow discussed several benefits and tradeoffs of each. See Table 4.

Table 4. Route benefits and tradeoffs noted by Community Advisory Group members and residential association alternates with a route preference expressed at the Dec. 10 meeting[3]

Routes	Benefits	Tradeoffs
Oak (Segments: A-C-E-G2-I-K2-M-N)	• Has fewer adjacent residential parcels (524) of the two routes • Has one quarter of adjacent residential parcels (31 in segments G2, I, K2) compared to same portion in Willow (123 in Segment J) and less than half the residences within 600 feet (289 vs. 721) • Avoids residential areas by using Segment I, which is a largely commercial corridor	• Estimated cost is $22 million more than Willow ($176 million total cost; $1.03 estimated monthly increase to an average residential customer) • Requires building infrastructure in new areas (83% of the route is within the existing corridor) • Has a larger number of adjacent residential tax accounts (1,425)
Willow (Segments: A-C-E-J-M-N)	• Has fewer adjacent residential tax accounts (1,422) of the two routes (One advisory group member noted that the difference in residences between Oak and Willow was minor.) • Is the most direct route • Has the highest percentage of route within the existing corridor (100%) • Is the least expensive ($154 million total cost; $0.90 estimated monthly increase to an average residential customer) • Has the greatest longevity (2038)	• Has a larger number of adjacent residential parcels (616) of the two routes • Uses Segment J, which is a view neighborhood

3 For more data on Oak, Willow, and all route options considered by the Community Advisory Group, refer to the complete route options data table on the Energize Eastside project website.

Discussing the final route recommendation at Community Advisory Group Meeting #6 in Bellevue.

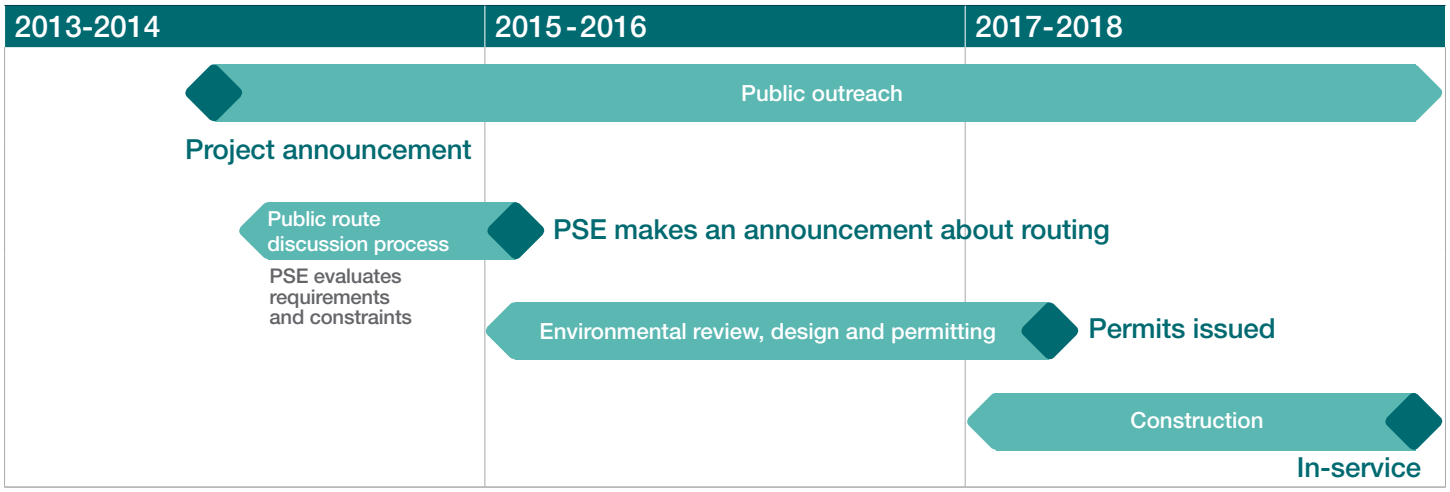
VII. Puget Sound Energy's next steps

Following the completion of the Community Advisory Group's process, PSE's next steps in 2015 are to:

- Take the Community Advisory Group's recommendation under consideration and make an announcement about routing that balances the needs of customers, the local community, property owners and PSE
- Work directly with property owners and tenants to begin detailed fieldwork to inform environmental review, design and permitting
- Ask for community input on project design, which may include pole height, finish and other design considerations
- Work with the City of Bellevue and other affected jurisdictions and agencies on the project's Environmental Impact Statement (EIS) process

Once these steps are complete, PSE will apply for necessary permits from appropriate agencies and jurisdictions. The project design and permitting phase is expected to run through early 2017. Once fully designed and permitted, project construction is expected to begin in 2017, with project completion planned for 2018. See Figure 9.

Figure 9: Project schedule and next steps



Appendices

Appendix A: Community Advisory Group Charter

Appendix B: Minority Report

Appendix C: Community Advisory Group meeting materials, presentations and summaries

Appendix D: Bibliography

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Community Advisory Group Charter

Revised:3/24/14

Purpose

The main purposes of the Community Advisory Group are to:

- Learn about PSE's proposed route segments, PSE's route analysis work to date, and the complexity of identifying the route segments, and to work with PSE to combine segments to develop a Community Advisory Group-recommend route to inform PSE as PSE selects a final route.
- Collaborate with PSE to decide on a community values-based evaluation process that will be used by the Community Advisory Group to consider PSE's various route segments, combine into possible route options, and narrow route options down to a Community Advisory Group-recommended route.
- Provide a forum for the community to give meaningful input on route segments and route options.
- Help PSE better understand community/property owner values as PSE selects the preferred route that balances the needs of their customers, the local community, property owners and PSE.

The Community Advisory Group will:

- Develop an understanding of the Energize Eastside project and project need.
- Report back to the people/groups they represent on project details, gather feedback from the interests they represent and provide ongoing communications between PSE and the group they represent throughout the process.
- Provide advice, as community representatives, on ways to address community concerns.
- Participate in geographic Community Advisory Group Sub-Area Committee meetings to determine recommended route segments.
- Work collaboratively, creatively and constructively to help determine community/property owner values and engage in a process to evaluate route segments and select a recommended route option.
- Partner with PSE to combine route segments into one Community Advisory Group recommended route.

Community Advisory Group Sub-Area Committees

- Sub-Area Committees will consist of Community Advisory Group members and their residential association alternates from each of the geographic sub-areas (North – Kirkland, Redmond and North Bellevue; Central – Bellevue; and South – Newcastle and Renton), as well as a representative from each potentially affected neighborhood association that does not have a member or residential association alternate on the advisory group. Additional community representatives will be invited as needed to ensure comprehensive discussion of issues.
- Community Advisory Group members are expected to attend the Sub-Area Committee meetings for their geographic sub-area. In order to participate in the Sub-Area Committees, members should attend the first two advisory group meetings to ensure they have an understanding of the project.
- Residential association alternates are required to attend the Sub-Area Committees to ensure balanced representation from neighborhoods. Alternates representing other interests are recommended to attend, but it is not required.
- The purpose of the Sub-Area Committees is to have an interest-based conversation on route segments and preferred sub-area options. The outcome of the Sub-Area Committee meetings will

be to develop sub-area segment combination recommendations for the full Community Advisory Group discussion.

PSE staff will:

- Provide information on the area's growth, the need for the project and the factors involved in developing route segments.
- Provide draft materials to Community Advisory Group members one week before meetings.
- Provide technical experts to provide a greater understanding of the topics at hand and inform Community Advisory Group dialogue.
- Consult with the Community Advisory Group, listen carefully and consider advisory group input prior to making final decisions on key technical issues, and explain all decisions made.
- Listen and take into consideration recommendations from the advisory group with regards to providing data and requests for analysis and research to support advisory group deliberations.

Norms for individual work as members of the Community Advisory Group

- We acknowledge our group's diversity and value different points of view. We will respect each other's opinions and will operate in consistently constructive ways.
- We will make every effort to attend meetings, to participate actively, to read and be prepared to discuss information and issues, and to be available for work between formal meetings.
- We will keep an open mind and come to meetings with interests, not entrenched positions. We will share our interests and objectives with all Community Advisory Group members. We will openly explain and discuss the reasons behind our statements, questions and actions.
- We will be responsible for representing the interests and concerns of the community we represent at the table. We will consult with our constituencies on a regular basis concerning the discussions and preferences of the Community Advisory Group.
- We will listen carefully to the views expressed by others, avoid interruptions, and seek ways to reconcile others' views with our own. We will represent information accurately and appropriately.
- We will adhere to the ground rules and respect the procedural guidance and procedural recommendations of the facilitator.

Norms for our work together

Use of time

- We will respect each other's time by being on time. Meetings will begin and end on time, unless otherwise agreed to by the Community Advisory Group members.
- When making our comments, we will consider the time needed for others to share their perspectives.

Recommending a route

- Community Advisory Group members will strive to collectively make reasonable requests and suggestions through a cooperative and collaborative discussion process with PSE. PSE will inform the Community Advisory Group of any areas of flexibility in the route recommendation development process.
- In discussions, suggestions may not represent unanimity. The facilitator is responsible for seeking and probing for group preferences. It is the responsibility of each stakeholder group member to voice dissent if s/he cannot live with any particular suggestion.
- Any recommendations from the Community Advisory Group and sub-area committees will be considered by PSE. PSE will evaluate requirements and constraints, and select a preferred route. PSE is the final decision maker regarding selecting a preferred route.
- If PSE chooses not to move forward with the recommended route as PSE's preferred route for permitting, PSE will explain the reason for its decision.

Facilitator

- We give the facilitator permission to keep the group on track and "table" discussions to keep the group moving.
- We expect the facilitator to help the Community Advisory Group accomplish our purpose in a completely neutral, balanced and fair manner.
- We want the facilitator to:
    - Develop draft meeting agendas.
    - Manage Community Advisory Group meetings and discussions.
    - Consult with Community Advisory Group members between meetings about how to manage the process and address issues of concern.
    - Prepare meeting summaries.

Role of alternates

- Each Community Advisory Group member may have one alternate who will be available to stand in for Community Advisory Group members who are unable to attend meetings. Alternates are encouraged to attend all meetings but will not be asked to participate unless called upon.
- Alternates can participate in the Sub-Area Committee meetings if they have attended both of the initial Community Advisory Group meetings.
- Community Advisory Group members are expected to update alternates between meetings so they can replace members on a moment's notice.

Role of residential association alternates

- Each Community Advisory Group member representing a residential organization may have an appointed residential association alternate that represents a different neighborhood within their city. Residential association alternates are intended to help balance representation from neighborhoods along the route segments.
- Residential association alternates can ask Community Advisory Group members to yield their seat to ask a question or make a comment during Community Advisory Group meetings.
- Residential association alternates serve as members of their geographic Sub-Area Committee and are expected to attend Sub-Area Committee meetings.

Proposed meeting ground rules

- Start / end on time
- Silence cell phones
- Come prepared
- Listen respectfully
- Speak from interests, not positions
- Participate in the process

Norms for our work with others outside the Community Advisory Group

External communications

- All Community Advisory Group meetings shall be open to the public.
- The public will be given the opportunity to comment during each Community Advisory Group meeting. Those wishing to provide public comment to the advisory group will be strongly encouraged to direct their comments towards the issues and topics of focus on the advisory group's agenda.

- We will avoid characterizing the views or opinions of other Community Advisory Group members outside of any advisory group meeting or activity.
- We will accurately describe Community Advisory Group preferences that are conveyed to PSE.
- Community Advisory Group meetings will be announced on the Energize Eastside website, and meeting announcements with date, time and location, will be provided to local blogs and other media outlets for distribution to the broader community.
- Community Advisory Group meeting products, such as agendas, summaries, and PowerPoint presentations will be posted at pse.com/energizeeastside and will be available to advisory group members for distribution to their constituents. Note: Community Advisory Group member names and affiliations will be included in these materials and will be listed on the project website.

Appendix B: Minority Report

Some Community Advisory Group members did not concur with the consensus recommendation. The report of the minority is provided here in the interest of inclusiveness. The Community Advisory Group majority has not reviewed this report; consequently, it has not been verified by the Community Advisory Group majority for consistency with the Community Advisory Group charter or for technical accuracy, either independently or in conjunction with engineering support from Puget Sound Energy. This report reflects only the opinion of its signatories.

Appendix B: Minority Report

Dissenting Report

We, the undersigned members of the "Community Advisory Group" (CAG) for PSE's Energize Eastside project, declare our dissent from the recommendations included in the Final Report of the CAG.

The CAG did not truly represent the wishes of the community for the following reasons:

1. CAG members were selected by PSE, not the community.
2. PSE misrepresented the full purpose of Energize Eastside.
3. PSE did not provide real data establishing the need for the project.
4. PSE did not provide a complete list of alternative solutions, and CAG members weren't allowed to discuss alternatives.
5. The CAG was not given real choices, because some of the route segments were never viable.
6. Few CAG members participated in critical evaluations.
7. The CAG facilitator was not impartial and frequently pressured members to support the group's conclusions.
8. CAG members were not asked to officially endorse the outcome of the CAG process.

The remainder of this report will provide additional detail regarding these eight objections.

1. CAG selection

Composition of the CAG was determined by PSE, not the community. PSE diluted the votes of residential neighborhoods that had the most at stake. Only one quarter of the voting members represented neighborhoods, and many affected neighborhoods had no representative. Some members represented organizations which receive generous donations from the PSE Foundation.

2. The full purpose of Energize Eastside

Documents available from ColumbiaGrid, Seattle City Light, and the Bonneville Power Administration make it clear that Energize Eastside solves three simultaneous problems: 1) load for PSE, 2) load for Seattle City Light, and 3) regional grid reliability for Bonneville Power Administration (a federal agency). According to a 2012 Memorandum of Agreement signed by PSE, SCL, and BPA, transmission lines in the Puget Sound region can become congested when high local needs coincide with high flows of electricity to British Columbia, especially when there are faults on BPA's trunk lines. This is a concern because the United States is obligated to provide electricity to Canada through the Columbia River Treaty. The large scale of the Energize Eastside project addresses both local and international electricity needs. However, Energize Eastside is not the only solution that can do this. It might not even be the most economical solution, when the project's impact on the community is considered. Reduced property values along the entire 18-mile length of the line cause declines in economic activity and tax receipts, which must be compensated by increasing tax rates on other residents, or decreasing support to people who need tax-funded services.

PSE never disclosed the whole purpose of the project to CAG members. The company sought to minimize regional questions by claiming only 3-8% of power flow serves Canada. While this might be true on a normal day, Energize Eastside is designed to handle extraordinary power flows that occur in rare emergency conditions. Without a full disclosure of the scope and purpose of the project, CAG members were not able to accurately represent the views of their constituents regarding the project.

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3. Eastside need

PSE illustrates the need for Energize Eastside using a graph titled "Eastside Customer Demand Forecast."[1] This graph has been simplified so it can be easily grasped by the public. It shows demand growing at an average rate of 1.9% per year, crossing the "System Capacity" line in 2017. According to PSE, electricity outages will become more likely after that.

CAG members are well-informed individuals who had months to understand the issues. Therefore, we expected PSE would provide CAG members with more detailed information regarding the need for the project. There are many questions that members had. How has the Eastside's electricity demand grown over time? Why is demand supposedly growing at a much faster rate than population or economic growth? Why is PSE's projection of Eastside's demand growth more than double that of Seattle's or Portland's? Would programs such as Demand Response help mitigate our demand growth?

PSE did not answer these questions, saying that they were outside the scope of the CAG's stated mission. The CAG was formed only to provide recommendations on which route the overhead lines should take through the five Eastside cities. PSE said that community input was not needed regarding any other aspect of the project.

4. Alternative solutions

CAG members also raised questions about alternative solutions. They wondered why alternatives were eliminated from consideration and further discussion of alternatives was not allowed.

We believe it is important to list reasonable and viable alternatives to Energize Eastside here, since these ideas do not appear in the limited Final Report. The alternatives described below address only the Eastside's local need. BPA would have to build its own project to solve Canadian reliability issues, at a lower cost to PSE's customers.

The issue of cost is of critical importance to many CAG members, especially organizations representing low-income residents like Hopelink and the YMCA. It is also of interest to businesses that are sensitive to the cost of electricity. Adding 1-2% to electricity costs for the next 40 years may affect their profitability. Many CAG members would have supported lower-cost alternatives if PSE had allowed them to be explored by the CAG.

a. **Demand-side Resources.** Demand-side Resource (DSR) programs are used by utilities in almost every state to reduce the stresses of peak load service and avoid construction of new generation and transmission infrastructure. In the Northwest, Portland General Electric devotes 14 pages of its latest Integrated Resource Plan to descriptions of various programs, including a curtailment tariff, residential direct load control, critical peak pricing, and conservation voltage reduction. Similar programs were studied in a detailed report created by the Cadmus Group for PSE's most recent IRP[2]. Which of these programs is PSE planning to implement? The IRP says, "Demand response program costs are higher than supply-side alternatives at this time, and PSE does not currently have a program in place." Translation: it's cheaper to burn coal in a plant located in Colstrip, Montana (one of the dirtiest coal plants in the nation) that provides nearly 1/3 of the Eastside's electricity. The economics of cheap coal

[1] http://energizeeastside.com/Media/Default/AbouttheProject/2013_1030_Single_Line_Load_Chart_v3.png
[2] https://pse.com/aboutpse/EnergySupply/Documents/IRP_2013_AppN.pdf

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and guaranteed returns for capital improvements like Energize Eastside provide little financial incentive for PSE to pursue DSR programs.

b. **Lake Tradition transformer.** For several years before Energize Eastside was conceived, PSE proposed to meet Eastside demand by adding a new 230/115 kV transformer located at Lake Tradition (near Issaquah). Additional power would be delivered on existing 115 kV lines to the Lakeside substation. PSE now claims that this solution causes other transformers to overload in power flow simulations conducted by the company. However, these simulations include the surge of electricity caused by faults in BPA's trunk lines. If BPA were to solve those problems with their own project, Lake Tradition might become a viable solution with much lower costs and community impacts than Energize Eastside.

c. **Upgrade 115 kV lines.** It's possible to use thicker wire and higher capacity transformers on existing lines to increase capacity by approximately 29%. That is enough to delay further action for at least a decade. During that time, it's likely that technologies such as grid batteries, distributed generation, and increasing efficiency will make other solutions possible. This will be cheaper than Energize Eastside, and better for the environment. Upgrading the lines at their current voltage will spare nearly 8000 mature trees that must be cut or removed along the Oak or Willow routes to accommodate a 230 kV line (according to PSE's counts). There is no record that PSE studied this option. It was never mentioned during CAG meetings.

d. **Gas powered plant.** PSE studied the possibility of meeting Eastside needs using a gas-powered generation plant. They dismissed this option in 3 sentences in their Solutions Study. Two of the potential sites for the plant were judged to be too difficult to permit, although this determination was made solely by the company without input from city officials. A third site was dismissed because it would require construction of transmission lines. Neither the CAG nor the cities were given further details about the costs of such a plant, where the transmission lines would be located, how reliability of local generation compares to remote generation, how it impacts the community, or how it might help reduce use of coal that creates much higher emissions of atmospheric carbon, mercury, and sulfur.

e. **Micro-grids and small turbines.** A national expert says that the Puget Sound area is an ideal place to use small gas turbines to inexpensively and incrementally serve peak loads. There is no record that PSE studied this option.

f. **Grid batteries.** PSE says grid batteries are likely to play an important role in the future. The company already has a pilot battery project in Bainbridge. But according to PSE, batteries are too expensive and too risky to use at this time. The company says it can forecast future demand, but it can't forecast the viability of technology solutions that might address that demand.

We believe that one or more of the above solutions would address Eastside's demand and reliability needs for many years at a lower cost than Energize Eastside, allowing us time to develop clean, sustainable solutions rather than rushing a project that is out of scale for our needs as well as our beautiful scenery.

For completeness, we will mention two other alternatives that CAG members were interested in. Both of these would solve Canadian reliability issues as well as Eastside need, but for a considerably higher price tag:

g. **Underground lines.** We list this alternative because it is the most frequently asked question by the public: "In this day and age, why can't we bury our transmission lines?" PSE has made this option politically impossible, due to a tariff the company proposed to the Washington Utilities and Transportation Commission (and which the UTC subsequently adopted). The tariff requires each community who requests an underground line to bear the high cost of underground infrastructure on their own. With the exorbitant costs estimated by PSE, this is not a realistic option for any community. While this tariff seems reasonable for local distribution lines, we hope its application to regional transmission lines will be revisited by the UTC.

h. **Underwater lines.** There are many examples in the U.S. of high-voltage transmission lines being placed in lakes, rivers, and bays. This technology is maturing rapidly. PSE said they would write a white paper on this alternative. The white paper was not released in time for consideration by the CAG.

5. No real choices

It should be no surprise that the final routes selected by the CAG mostly follow the existing transmission corridor. This is the result PSE expected from the beginning, and was confirmed by a senior PSE engineer who said the process of route selection was needed to help the public feel like they were involved in the project.

In particular, the choice between the L and M segments was a false choice. The L segment was never a legally viable option due to well-known conflicts and impacts. PSE should have known this. It is also highly questionable that the B segment was viable, due to the large amount of new right-of-way that would need to be acquired to construct that segment.

We believe the CAG process was more about PR for PSE than real choices for the community.

6. CAG participation

In several cases, only a few CAG members participated in important evaluations. For example, at the July 9th meeting, it was revealed that only 8 CAG members (less than a third of the CAG membership) participated in an evaluation process to eliminate potential routes. These low participation rates didn't occur because CAG members were lazy or on vacation. Many of the residential representatives refused to participate because they objected to the process.

7. CAG process

The facilitator for the CAG was a contractor hired by PSE, harming the appearance of impartiality. The facilitator appeared to have two goals: 1) produce a route recommendation that isn't too onerous to PSE, and 2) achieve this result using "consensus building" techniques.

Unfortunately, these goals were achieved by pressuring or cajoling CAG members to abandon their preferences and join the consensus view. For example, the facilitator would often say to a reluctant member, "Could you live with the emerging consensus of the group?" Or, "Do you want your name to be listed as the dissenting vote?" There were many times when a dissenting member would reluctantly

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give up significant objections to avoid appearing obstinate or going against the other members. An anonymous ballot would have produced a different result than the facilitated outcome.

Do decisions made in this manner truly represent community values? One need only observe the audience at the final CAG meeting to answer that question. At least 90% of the 400-member audience enthusiastically supported dissenting remarks made by members of the CAG. We conclude the recommendations of the CAG do not represent the desires of the community.

This is also evident in the routes that were finally selected. Both the CAG and hundreds of residents voting online agreed that the top factor to be used to judge routes was "Avoids residential areas." For both the CAG and the community, this factor rated significantly higher than any other. However, in the rush to consensus, the CAG ignored the criterion they previously agreed was the most important and focused instead on cost. All of the routes inequitably burden residential neighborhoods with poles as high as 135 feet that are out of scale with residential land use codes.

8. No endorsements

As of December 15, CAG members were not asked to endorse the Final Report with their signatures. We note a stark contrast with the outcome of a different advisory group for a previous PSE project:

> *"We, the members of the Sammamish-Juanita 115 kV Project Stakeholder Advisory Group, affirm and support this recommendations report to Puget Sound Energy. We believe PSE's community-involved siting process for this project has been transparent and reflects community input."*

Why aren't members of our CAG signing a similar statement in support of their recommendations for Energize Eastside? Could members of this CAG sign a positive statement like this in good faith?

Conclusion

Energize Eastside is one possible step towards our energy future. This is a decision that should be made by citizens and their elected representatives, taking into account values such as community impact, environmental impact, cost, reliability, and safety. This decision should not be made by a utility company or an advisory group with little community support.

The undersigned members of the CAG declare our dissent with the CAG's Final Report.
(By signing this document, we are not rescinding the opinions we expressed or votes we cast during CAG meetings, but simply stating our dissent with the overall project and process.)

Norman Hayzen CAG, BELLEVUE BRIDLE TRAILS COMMUNITY

T Kaseburg

Tim McHarg, City of Newcastle

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Darius F. Richards

Steven D. O'Donnell

David T. Evans

Lindy Bruce Sunset Community Assn.

Appendix C: Community Advisory Group Meeting Materials, Presentations, and Summaries

The following links provide all Community Advisory Group meeting materials, presentations and meeting summaries:

Jan. 22, 2014 - Community Advisory Group Meeting #1
Convened the advisory group

Feb. 12, 2014 - Community Advisory Group Meeting #2
Learned about the solution selection process and project routing

June 4, 2014 - Community Advisory Group Meeting #3
Reviewed key findings from the Sub-Area Workshops and Committee Meetings

June 25, 2014 - Community Advisory Group Meeting #4a
Reviewed potential route options

July 9, 2014 - Community Advisory Group Meeting #4b
Narrowied potential route options and finalizing evaluation factors

Oct. 1, 2014 - Community Advisory Group Meeting #5a
Reviewed key findings from the open houses and preparing for route evaluation

Oct. 8, 2014 - Community Advisory Group Meeting #5b
Developed preliminary route recommendation

Dec. 10, 2014 - Community Advisory Group Meeting #6
Finalized route recommendation for PSE to consider

Appendix D: Bibliography

The list below includes key reports developed by PSE and/or third-party experts, the findings of which were shared with the Community Advisory Group. All linked documents are available on the Energize Eastside project website at pse.com/energizeeastside.

Quanta Technology and Puget Sound Energy, *Eastside Needs Assessment Report*, 2013.

- Executive Summary
- Full Report

Quanta Technology and Puget Sound Energy, *Eastside Transmission Solutions Report,* 2013.

- Executive Summary
- Full Report

TetraTech, *Eastside 230 kV Project Opportunity and Constraints Study for Linear Site Selection,* 2013.

- Executive Summary
- Full Report

Energy + Environmental Economics, *Non-wire Solutions Analysis*, 2014.

- Full report

Power Engineers, *Underground Feasibility Study,* 2014.

- Full report
- Appendix A - Aerial Route Drawings (part 1)
- Appendix A - Aerial Route Drawings (part 2)
- Appendix B - Typical Detail Drawings

Additional documents referenced throughout the Final Report:

Puget Sound Regional Council 2013 Land Use Baseline: Maintenance Release 1 (MR1), update April 2014.

Letter from Seattle City Light, June 2, 2014.

Tariff schedule 80, section 34, 2006

Puget Sound Energy - Energize Eastside Conditional Use Permit

Description of Proposal – South Bellevue Segment

Puget Sound Energy, Inc. (PSE) proposes the construction of a new substation in Bellevue (the "Richards Creek substation") and the upgrade of 18 miles of two existing 115 kV transmission lines with 230 kV lines (collectively the "Energize Eastside Project" or the "Project"). The new substation and upgraded lines are needed to address electrical system deficiencies identified during federally-required planning studies. Combined with aggressive conservation, the Project significantly improves reliability for Eastside communities, including the City of Bellevue (City), and will supply the additional electrical capacity needed for current and anticipated growth.

The existing system is not robust enough to maintain reliable service if the entire facility is taken out of service at one time. Therefore, the Energize Eastside Project will be constructed in two phases. This will allow PSE to keep the existing 115 kV facilities partially in service during construction, which will allow PSE to maintain reliable service to all customers during construction. This approach best ensures that PSE continues to deliver reliable electricity to all of PSE's customers during construction. The first phase (the "South Bellevue Segment") is the focus of this application and includes the following components:

- Construction of the Richards Creek substation, a new 230 kV to 115 kV substation in Bellevue. The Richards Creek substation will be constructed directly south of PSE's existing Lakeside Switching Station. Situated on parcel 1024059083, the 8.46 acre substation site is currently used as a PSE pole storage yard.

- Upgrading 3.3 miles (Bellevue Portion) of existing 115 kV lines with 230 kV lines between the Lakeside and Talbot Hill substations. This requires replacing existing wood H-frame poles with steel monopoles. After deliberate review and extensive stakeholder input, PSE proposes to undertake this work in the existing transmission line corridor rather than siting a new corridor through Eastside communities. Within the existing utility corridor, the proposed pole locations for the rebuilt lines will generally be in the same locations as the existing poles. Selective tree removal will also be required within the managed corridor to meet federal vegetation management requirements and PSE standards. Use of the existing corridor (which has housed transmission lines since the 1920s and 30s) minimizes environmental impacts and impacts to adjacent uses to the fullest extent feasible.

The following section demonstrates PSE's compliance with the City of Bellevue's Conditional Use Decision Criteria (LUC 20.30B.140):

A. The conditional use is consistent with the Comprehensive Plan; and

Response: The proposed transmission line replacement and substation construction are consistent with the City's Comprehensive Plan. As stated in the introduction to the Land Use Element of the Comprehensive Plan:

One of the fundamental roles of the Comprehensive Plan is to anticipate, guide, and plan for a growth in a way that helps the city achieve its vision. The plan is a tool to look ahead to the likely growth and ensure that the city's plans for land uses, infrastructure, and services are aligned.

PSE has a statutory duty to provide safe and reliable power at a reasonable cost. *See* RCW 80.28.010(2). The Energize Eastside project is a key electrical infrastructure project needed to bring a 230 kV power source to the Eastside region, including the City of Bellevue, the region's largest city and job center. As required by the state Growth Management Act, one of the elements that must be addressed in the City's Comprehensive Plan is Utilities.

As stated in the Utilities Element, the City must plan for adequate provision of utilities consistent with the goals and objectives of the Comprehensive Plan, *taking into consideration the public service obligation of the utility involved*.

The expansion of the PSE Sammamish to Talbot Hill transmission corridor is shown in the Comprehensive Plan's Map UT-7. PSE is proposing to replace two existing 115 kV transmission lines with two 230 kV transmission lines within the existing corridor. In addition, expansion of the Lakeside substation is also included on the UT-7 map.

The goals outlined in the Utilities Element are:

- *To develop and maintain all utilities at the appropriate levels of service to accommodate the city's projected growth.*
- *To ensure reliable utility service is provided in a way that balances public concerns about infrastructure safety and health impacts, consumer interest in paying a fair and reasonable price for service, potential impacts on the natural environment, and aesthetic compatibility with surrounding land uses.*
- *Utility facilities are permitted and approved by the city in a fair and timely manner and in accord with development regulations, to encourage predictability.*
- *New technology to improve utility services and reliability is balanced with health and safety, economic, aesthetics, and environmental factors.*

As explained in detail below, the following policies support these goals and are applicable to the proposed Energize Eastside transmission line upgrade and substation project:

General Utility System	
UT-3: Use design and construction standards that are environmentally sensitive, safe, cost-effective, and appropriate. **UT-8:** Design, construct, and maintain facilities to minimize their impact on surrounding neighborhoods.	**Response:** The proposed transmission line replacement will have temporary construction impacts on surrounding neighbors as many of the transmission poles are within easements in residential backyards. Construction impacts will be minimized to the greatest extent feasible through use of

	existing or historic access routes that were used for initial pole installation and/or maintenance activities. As required by state law, utility locates will be performed prior to ground disturbing activities to avoid any potential conflicts. Appropriate temporary erosion control measures will be used during work activities. A safe work area will be established around each pole removal and installation location, providing space for placing equipment, vehicles, and materials. PSE also complies with all City codes relating to hours of construction and noise. PSE will work with individual property owners to restore areas impacted during construction to its previous or an improved state. PSE will mitigate in-kind as required by applicable regulations when restoration is not possible. All applicable codes and standards will be followed during design and construction, including electrical, stormwater and erosion control, tree protection, and noise. PSE's proposed use of the existing utility corridor minimizes impacts on surrounding neighborhoods by preventing new impacts. The properties adjacent to the proposed transmission line upgrade already house transmission lines. By locating new poles in proximity to existing pole locations, PSE's proposed line minimizes impacts to surrounding neighborhoods. The Richards Creek Substation has been sited in a Light Industrial zoning district on a parcel that is substantially larger than the substation footprint. This location provides a high level of screening and compatibility with the surrounding land uses.
Utility Coordination	
UT-18: Coordinate with other jurisdictions and governmental entities in the planning and implementation of multi-jurisdictional utility facility additions and improvements.	**Response:** The proposed transmission line upgrade is a linear utility project that crosses through multiple jurisdictions (including the cities of Redmond, Bellevue, Renton and Newcastle; collectively "Partner Cities"). In addition, because some of the early route alternatives crossed through the City of Kirkland, it also participated in the EIS process. The south segment of this project

	will traverse the cities of Bellevue, Renton and Newcastle, while the north half traverses Bellevue and Redmond. Significant outreach and coordination efforts have occurred to inform potentially affected entities about the proposed project, a process reflected in the Phase 1 and Phase 2 Draft Environmental Impact Statements, which were developed co-operatively by the Partner Cities. King County was invited to participate in the EIS process with the Partner Cities, but declined.
General Non City-Managed Utilities	
UT-45: Coordinate with non-city utility providers to ensure planning for system growth consistent with the city's Comprehensive Plan and growth forecasts. **UT-47:** Defer to the serving utility the implementation sequence of utility plan components. **UT-48:** Coordinate with the appropriate jurisdictions and governmental entities in the planning and implementation of multi-jurisdictional utility facility additions and improvements. **(same as UT-18)**	**Response:** PSE meets with the City of Bellevue on an annual basis to share information and understand the City's projected growth and key development projects. Forecasts for capacity needs are based upon anticipated growth. In 2012, the City of Bellevue published an Electrical Reliability Study, which was performed by their third party consultant, Exponent, to ensure that PSE was planning for and providing a reliable power supply to the City. The Exponent study determined that short-term and long-range planning efforts were on target to provide a reliable power supply. Long-term planning at that time forecasted the need to upgrade the existing transmission line. Based upon the findings of the study, the City and PSE conduct an annual electrical reliability workshop to discuss electric system reliability (system performance and metrics) and planned reliability projects. Project construction will be done in two sequential phases to ensure continuous power supply at all times. In 2015, the City of Bellevue commissioned an independent technical analysis of the need for the proposed Energize Eastside transmission line project. The City's consultant, Utility Systems Efficiencies (USE) confirmed that: the project is needed to address the reliability of the electric grid on the Eastside. Consistent with this conclusion, PSE has determined that it must proceed with the permitting and construction of the Energize Eastside Project as soon as

	is feasible. In preparation for the construction of the Energize Eastside Project, PSE has been in close communication with Olympic Pipeline Company to ensure coordination during construction and operation of the Energize Eastside Project. PSE has also coordinated with other utilities, such as the various telecommunications companies, Seattle Public Utilities, and Sound Transit.
UT-60: Work with Puget Sound Energy, telecom providers, state regulatory agencies, and other responsible parties to develop funding tools to enable full mitigation of the neighborhood impacts of deploying electrical and telecommunications infrastructure.	If requested by third party tenant utilities (typically communications), the existing facilities will be transferred to the new poles. Approvals for such changes would be obtained by the cellular operators from the jurisdiction agency. With respect to the Energize Eastside Project, PSE will complete all mitigation required under the City's land use code and applicable law. Alternative funding sources are not needed in this instance.
UT-64: Require the reasonable screening and/or architectural compatible integration of all new utility and telecommunications facilities.	**Response:** The Land Use Code addresses substation screening in LUC 20.20.255.F. Transmission lines are exempt from screening requirements. Richards Creek substation will be substantially screened from surrounding land uses by native vegetation from adjoining properties. The site is surrounded to the north by PSE's existing Lakeside Switch Substation parcel, to the south by King County's Factoria Transfer Station Facility and to the west by a water and wastewater supply company with outdoor storage. There is significant vegetation screening between each of the properties due to the presence of stream and wetland critical areas. The property to the east of the site is upslope and contains a fenced stormwater detention facility that receives stormwater from a multifamily development complex east of the site across 139th Avenue SE. Between the stormwater pond tract and 139th Avenue SE, there are two parcels of heavily forested park land owned by the City of Bellevue. In addition to this permanent screening, PSE is proposing to augment tree removal on the slope between the new substation and the

	eastern property boundary with tree and shrub screening vegetation compliant with the Land Use Code. Transmission poles do not naturally blend in with the surrounding environment. PSE is proposing to offset the aesthetic impacts through pole design and finish selection based on neighborhood context, replacing poles as close to existing pole locations as possible, consolidating two lines on one pole where feasible, reducing the overall number of poles, and designing poles to the minimum height necessary based on topography, site context, and electrical design standards. Different types of finish are available for the replacement steel poles include naturally weathering (Corten), galvanized, or powder coated. Corten is long-lasting and low maintenance. When the steel is exposed to moisture and air, a rust patina forms. As the structure rusts it becomes brown in appearance, and over time the patina darkens in color. Once the patina forms on weathering steel, a natural protective layer prevents corrosion. The use of Corten steel poles is very suitable, and often preferred, within forested areas because of their rust brown finish. Galvanized steel is a common choice for transmission poles because of its durability and low maintenance characteristics. The pole is coated with a layer of zinc that prevents the steel from rusting. Initially, the steel can have a shiny finish, but as the zinc weathers it becomes dull in appearance. Galvanizing provides decades of protection for steel from corrosion. It is gray in color and is better suited for areas with minimal backdrop as to better blend in with the skyscape. Powder Coated steel is used less often. It provides an even and durable low maintenance finish, but the process of powder coating steel is labor intensive and expensive. It is usually reserved for specific areas or for design district mitigation

	purposes. Pole finish will be determined based upon accessibility to the pole, characteristics of the surrounding environment, community preference, and/or environmental restrictions.
UT-68: Encourage the use of utility corridors as non-motorized trails. The city and utility company should coordinate the acquisition, use, and enhancement of utility corridors for pedestrian, bicycle, and equestrian trails and for wildlife corridors and habitat.	**Response:** The proposed transmission line upgrade is located within an existing corridor that was established in the late 1920s and early 1930s and is mostly composed of easements on private property. Residential and commercial development has occurred around the easement areas, limiting public access. Additionally, much of the corridor is within private backyards and is fenced off, preventing connectivity between properties. There are existing areas along the corridor where informal trails have been established on larger parcels. These include south of the Lake Hills Connector behind the Sunset Hills Memorial Park near Kelsey Creek Park and City of Bellevue Utilities and Parks (including Coal Creek Park) parcels in the south Somerset neighborhood. There is an established regional trail in south Bellevue and Newcastle along the SPU waterline corridor adjacent to the PSE transmission corridor. PSE's proposed project will not cause long-term impacts to access to these existing trails.
UT-69: Avoid, when reasonably possible, locating overhead lines in greenbelt and open spaces as identified in the Parks and Open Space System Plan.	**Response:** The existing corridor crosses over City of Bellevue Parks property in some locations. PSE's transmission corridor was established prior to the establishment of the City and prior to the designation of property for public park use. In areas such as Coal Creek Park, the corridor has provided the opportunity for the establishment of an informal trail. By locating the upgraded transmission facilities in the existing corridor, PSE is avoiding any new impacts to parks and open space.
UT-72: Encourage cooperation with other jurisdictions in the planning and implementation of multi-jurisdictional utility facility additions and improvements. Decisions made regarding utility facilities shall be made in a manner consistent with, and complementary to, regional demand and resources, and shall reinforce an interconnected regional distribution network.	**Response:** The proposed transmission line upgrade is a linear utility project that crosses through multiple jurisdictions (including the cities of Redmond, Bellevue, Renton and Newcastle; collectively "Partner Cities"). In addition, because some of the early route alternatives crossed through the City of Kirkland, it also participated in the EIS process. The south segment of this project

	will traverse the cities of Bellevue, Renton and Newcastle. Significant outreach and coordination efforts have occurred to inform potentially affected entities about the proposed project, a process reflected in the Phase 1 and Phase 2 Environmental Impact Statements which were developed co-operatively by the Partner Cities. King County was invited to participate in the EIS process with the Partner Cities, but declined. The purpose of the Energize Eastside project is to bring a new 230 kV power source to the Eastside region to meet capacity and reliability needs as determined through PSE planning studies. The 230 kV power brought into Richards Creek substation will supply existing and future 115 kV transmission lines providing power to the entire Eastside region. All of the Partner Cities, including those directly impacted by construction of the south segment, will experience increased reliability and the transmission system will be better able to meet forecasted increases in electricity demands.
UT-75: Prior to seeking city approval for facilities, encourage utility service providers to solicit community input on siting of proposed facilities which may have a significant adverse impact on the surrounding community.	**Response:** The PSE Energize Eastside team has engaged in public outreach since the project launched in December 2013. In 2014, PSE led a public route discussion process, shared information about the project with the public, and solicited and obtained considerable public input. PSE continues to inform the public about the project and connect with property owners regarding fieldwork efforts through mailers, emails, PSE's website, public testimony to decision-makers, and public meetings. Throughout 2014, PSE worked with a Community Advisory Group (CAG) to identify and consider the values held by the community in evaluating different transmission line route options and potential substation locations. CAG members represented various interests, including potentially affected neighborhood organizations, cities, schools, social service organizations, major commercial users, and economic development groups. The CAG looked at factors used to develop different route options, narrowed the route options

	based on values and constraints, and prepared route option recommendations for PSE's consideration. Throughout the CAG process, PSE held public open houses to inform the public of the CAG's work and hosted additional community meetings and events to share information, respond to questions, and learn more about community values and interests. PSE has also provided numerous presentations and briefings to individual property owners, neighborhood groups, organizations, and other interested stakeholders. PSE regularly informs the public about the project and its development process through mailings, email updates, and a project website. To date, public outreach, and involvement has included: • 22 Community Advisory Group-related meetings, including • 6 public open houses, 2 question and answer sessions, and 2 online open houses at key project milestones • 500+ briefings with individuals, neighborhoods, cities and other stakeholder groups • More than 2,900 comments and questions received • 30+ email updates to more than 1,500 subscribers • 8 project newsletters to 55,000+ households • Ongoing outreach to 500+ property owners, including door-to-door and individual meetings • Participation in 16 EIS-related public meetings
UT-77: Require all utility equipment support facilities to be aesthetically compatible with the area in which they are placed by using landscape screening and/or architecturally compatible details and integration.	The use of the existing utility corridor is the most effective method of ensuring area compatibility, as the proposed route replaces existing equipment rather than creating new corridors. In addition, the replacement of H-frame poles with fewer steel poles helps to reduce visual interference and is arguably an improvement from existing conditions. Pole finishes can also enhance integration with various settings. PSE is working closely with the City to identify City preferences on variables that may further increase

	compatibility with surrounding areas (e.g., pole color and pole height).
Non City-Managed Utilities – Additional Electrical Facilities Policies	
UT-91: Encourage the public to conserve electrical energy through public education.	PSE has led all northwest utilities in energy conservation since 1979. Its energy-efficiency programs have helped PSE customers conserve nearly 5 billion kilowatt-hours of electricity. PSE continues to develop and undertake aggressive conservation programs. More information can be found in PSE's 2014-2015 Biennial Conservation Report, Electric Programs and at: https://pse.com/savingsandenergycenter/About/Pages/default.aspx
UT-94: Require in the planning, siting, and construction of all electrical facilities, systems, lines, and substations that the electrical utility strike a balance between potential health effects and the cost and impacts of mitigating those effects by taking reasonable cost-effective steps.	**Response:** PSE has conducted studies on potential health effects of the proposed transmission line upgrade, which have been peer reviewed by City of Bellevue consultants through the State Environmental Policy Act (SEPA) review and drafting of an Environmental Impact Statement (EIS) for this project. In particular, the EIS looked at electric and magnetic fields (EMF) and pipeline safety. As outlined in the *Phase 2 Draft Environmental Impact Statement* no unavoidable significant adverse impacts were identified that could result from the Energize Eastside project related to health effects.
UT-95: Work with Puget Sound Energy to implement the electrical service system serving Bellevue in such a manner that new and expanded transmission and substation facilities are compatible and consistent with local context and the land use pattern established in the Comprehensive Plan. *Discussion: Where feasible, electrical facilities should be sited within the area requiring additional service. Electrical facilities primarily serving commercial and mixed use areas should be located in commercial and mixed use areas, and not in areas that are primarily residential. Further, the siting and design of these facilities should incorporate measures to mitigate the visual impact on nearby residential areas. These*	**Response:** The Energize Eastside project is required because an additional 230 kV power source is required to serve the Eastside region, inclusive of Bellevue, and meet federal planning requirements. PSE studies have concluded that the power source must be centrally located in the defined Eastside region. The transmission lines will connect the new power source (a new transformer) with existing 230 kV substations in the region in Redmond, at the Sammamish substation, and in Renton, at the Talbot Hill substation. This project will serve all uses in the Eastside service area, including industrial, commercial, residential, and public facilities in the City of Bellevue. Projected electricity demand in the City of Bellevue, which is a population and job center on the Eastside, significantly

considerations should be balanced with the community's need to have an adequate and reliable power supply.	contributed to the need for PSE's proposed project. Thus, the proposed transmission line facilities will serve the areas requiring additional service. The City of Bellevue is made up of a mix of land uses that have developed around the utility corridor that was established in the late 1920s and early 1930s. The corridor is identified in the Utilities Element of the Comprehensive Plan on both Map UT-6 (Existing Facilities) and Map UT-7 (Proposed Facilities). An Alternative Siting Analysis has been completed as required by the City of Bellevue Land Use Code and Comprehensive Plan for transmission corridors identified as sensitive sites. As described in the Phase I DEIS, the proposed Richards Creek Substation will be located in an area zoned as light industrial. Land uses surrounding the substation site include a mix of industrial, institutional, vacant lands, and utility (PSE's Lakeside substation). A private school (Chestnut Hill Academy) is about 325 feet north of the substation site, adjacent to (and just east of) the Lakeside substation. As the proposed substation is adjacent to an existing PSE substation, it is compatible and consistent with local context and the land use pattern which already integrates utilities. Similarly, the proposed transmission lines will be sited in the existing utility corridor and traverses a variety of land uses (including commercial, industrial, multi-family residential, and single family residential districts). The corridor predates the incorporation of the City and the existing land use patterns already integrate the utility facilities, keeping the proposed project compatible and consistent with local context and land use patterns. This conclusion is confirmed by the Phase 2 DEIS, which found that impacts to land use will be "be less-than-significant because [the proposed project] is consistent with city and subarea plans, and would not adversely affect existing or future land use patterns."

	DEIS at 3.1-37.
UT-96: Require siting analysis through the development review process for new facilities, and expanded facilities at sensitive sites, including a consideration of alternative sites and collocation. *Discussion: Sensitive facility sites are those new facilities and existing facilities proposed to be expanded where located in or in close proximity to residentially – zoned districts such that there is potential for visual impacts absent appropriate siting and mitigation. The city will update Map UT-7 to the extent needed to stay current with changes in Puget Sound Energy's system planning.*	**Response:** PSE has prepared a siting analysis as required for expanded facilities at sensitive sites. Please see the Energize Eastside Alternative Siting Analysis - South Phase submitted with the Conditional Use Permit application for this project.
UT-97: Avoid, minimize, and mitigate the impacts of new or expanded electrical facilities through the use of land use regulation and performance standards that address siting considerations, architectural design, site screening, landscaping, maintenance, avoidable technologies, aesthetics, and other appropriate measures.	**Response:** The City of Bellevue and partner jurisdictions of Redmond, Renton, Kirkland, and Newcastle are in the process of completing a Final Environmental Impact Statement (FEIS) that addresses anticipated impacts from the proposed Energize Eastside project. Avoidance, minimization, and potential mitigation measures are discussed in detail in the *Phase 2 Draft Environmental Impact Statement* for the Energize Eastside project. Alternative technologies were analyzed in detail in the *Phase 1 Draft Environmental Impact Statement*. PSE proposes mitigation that fully complies with all of all of the City's code requirements. Mitigation measures include, but are not limited to, revegetation, pole height reduction, and selection of pole finishes that are suitable to the context. PSE is also in discussions with the City to coordinate and ensure that any impact identified during the Partner Cities' State Environmental Policy Act review are avoided, minimized and mitigated to the extent feasible under the law (*i.e.,* any mitigation must be proportionate to identified impacts caused by the proposed project).
UT-98: Discourage new aerial facilities within corridors that have no existing aerial facilities.	**Response:** PSE is proposing to replace two existing aerial 115 kV lines with two 230 kV lines within an existing, established utility corridor. No new aerial facilities are proposed outside the corridor.

UT-99: Work with and encourage Puget Sound Energy to plan, site, build and maintain an electrical system that meets the needs of existing and future development, and provides highly reliable service for Bellevue customers. *Discussion: Providing highly reliable service is a critical expectation for the service provider, given the importance of reliable and uninterrupted electrical service for public safety and health, as well as convenience. Highly reliable service means there are few and infrequent outages, and when an unavoidable occurs in its short duration and customers are frequently updated as to when power is likely to be restored. A highly reliable system will be designed, operated and maintained to keep pace with the expectations and needs of residents and businesses as well as evolving technologies and operating standards as they advance over time.*	**Response:** PSE has prepared two studies that describe the need for the Energize Eastside project: the *Eastside Needs Assessment Report* and the *Supplemental Eastside Needs Assessment Report* (Gentile et al., 2014, 2015). The deficiency in the transmission capacity on the Eastside is based on a number of factors. Key factors include growing population and employment in the Eastside (including significant projected growth in Bellevue), changing power consumption patterns, and changing utility regulations that require a higher standard of reliability. PSE has concluded that the most effective and efficient solution to meet the need objectives is to site a new 230 kV transformer at a central location on the Eastside that will be fed from the Sammamish substation in Redmond from the north and the Talbot Hill substation in Renton from the south. This decision is consistent with the City's comprehensive plan, which requires not just reliable power, but "highly reliable" power. Without adding transmission capacity, a deficiency during peak periods could develop on the Eastside as early as the winter of 2017-2018, with the potential for load shedding (forced power outages) by the summer of 2018. The proposed project is needed to meet the needs of the City's residents and businesses.

Environmental Element

The proposed transmission line replacement and substation project will have impacts on environmental resources within the City of Bellevue.

Environmental Stewardship	
EN-12: Work toward a citywide tree canopy target of at least 40% canopy coverage that reflects our "City in a Park" character and maintain an action plan for meeting the target across multiple land use types including right-of-way, public lands, and residential and commercial uses. **EN-13:** Minimize the loss of tree canopy and natural areas due to transportation and infrastructure projects and mitigate for losses, where impacts are unavoidable.	**Response:** Selective tree canopy will be removed as part of the substation development and transmission line upgrade. Strict federal clearance requirements must be met with the upgrade from a 115 kV transmission corridor to a 230 kV transmission corridor, resulting in additional vegetation management within the existing corridor. Mature vegetation will also be cleared to construct the proposed substation on the Richards Creek substation site and prevent mature vegetation from falling into

	the new substation and causing an outage. Substation-compatible trees and understory will be used to restore areas where tree removal is to occur outside the substation footprint. Additionally, wildlife snags will be created where possible from trees removed. To mitigate for loss of significant trees in the transmission corridor, PSE is proposing mitigation ratios that meet or exceed regulatory standards. PSE will work with individual property owners to replace trees on private property. Where individual property owners decline to have new trees planted onsite, PSE will work with the City to place additional trees offsite. PSE is required by federal standards to maintain safe clearances between vegetation and utility lines. The upgraded transmission lines will have to comply with PSE's 230 kV vegetation management standards, which generally require removal of trees located in the wire zone that have a mature height of more than 15 feet. Taller trees within the transmission right of way may also be affected depending on tree species, tree health, distance from the wires, and topography. PSE has been meeting with property owners along the existing corridor to discuss tree replacement and will continue to work together to develop property-specific landscaping and tree replacement plans. It is anticipated that a number of trees cannot be replaced onsite due to property owners' preferences. In those cases, replacement trees will need to be planted outside the corridor. One benefit of offsite planting is the option to plant larger trees that will contribute to habitat quality and area aesthetics. Offsite options may include city parks, neighborhood groups/HOAs, and developments within the Spring District. PSE will work with the City to identify other offsite areas that would benefit from these trees. PSE's goal is that the proposed project will result in a net increase in the number of trees, which should assist the City in

	achieving its tree cover goals.
Water Resources	
EN-19: Retain existing open surface water systems in a natural state and restore conditions that have become degraded.	**Response:** The substation development will include the replacement of the existing culvert under the access driveway with a fish passable culvert that will enhance drainage and sediment flow within the stream channel. The stream channel will be regraded to assist with sediment transport and create habitat for potential fish species. Habitat will also be enhanced along the stream channel on the Richards Creek substation site. No other natural open surface water systems in Bellevue will be affected by the project.
EN-26: Manage water runoff for new development and redevelopment to meet water quality objectives, consistent with state law.	**Response:** The proposed substation development will occur on a site with existing impervious surface and an associated stormwater detention pond. The new substation development will meet current City of Bellevue Stormwater Engineering Design Standards. The existing pond will be replaced with a stormwater vault to control runoff from the substation site. These measures are protective of state water quality objectives.
Geo Hazards	
EN-30: Regulate land use and development to protect natural topographic, geologic, vegetational, and hydrological features. **EN-39:** Use specific criteria in decisions to exempt specific small, isolated, or artificially created steep slopes from critical areas designation. **EN-40:** Minimize and control soil erosion during and after development through the use of best management practices and other development restrictions.	**Response:** All applicable City of Bellevue land use and clearing regulations, including LUC 20.25H.125 – Performance Standards, will be complied with as part of the Energize Eastside project construction. There will be selective tree removal and 24 poles (20 in buffers and 4 in critical area - south half) will be replaced within geo hazard areas. Per the Bellevue code, areas that do not meet the 10 foot rise or 1,000 square feet threshold (including small engineered or manmade slopes) have been removed from the geo hazard analysis. A temporary erosion and sediment control plan will be developed for the project, including the transmission corridor and substation site. Necessary best management practices (BMPs) will be used as appropriate, including chipping and scattering of removed vegetation. Disturbance will be limited to the minimum necessary within geo hazard areas, including limiting equipment access and disturbance

	areas. All disturbed areas will be restored.
Fish and Wildlife Habitat	
EN-63: Preserve and maintain fish and wildlife habitat conservation areas and wetlands in a natural state and restore similar areas that have been degraded. **EN-67:** Prohibit creating new fish passage barriers and remove existing artificial fish passage barriers in accordance with applicable state law. **EN-70:** Improve wildlife habitat especially in patches and linkages by enhancing vegetation composition and structure, and incorporating indigenous plant species compatible with the site. **EN-71:** Preserve a portion of significant trees throughout the city in order to sustain fish and wildlife habitat.	**Response:** Impacts to fish, wildlife, wetlands and habitat conservation areas are discussed and analyzed in detail in the Critical Areas Report and Biological Evaluations associated with the proposed project. As explained in those documents, limited disturbance is anticipated within fish and wildlife habitat areas and wetlands. Existing poles within wetlands will be replaced outside of wetland areas to the greatest extent feasible. Buffer impacts will be limited to the pole footprint and selective vegetation management activities required by federal clearance standards. The Richards Creek culvert replacement and restoration project will significantly enhance fish passage and habitat along the existing stream channel at the Richards Creek substation site. This will provide linkages to mitigation areas on the adjacent Lakeside substation and King County Transfer Station sites.
Critical Areas	
EN-84: Use science based mitigation for unavoidable adverse impacts to critical areas to protect overall critical areas function in the watershed.	**Response:** The proposed mitigation for wetland and buffer impacts caused by the Energize Eastside project will be mitigated using the best available science in compliance with LUC 20.25H, the City of Bellevue's critical areas code. The Richards Creek culvert replacement and stream restoration will result in measurable habitat improvement to critical area functions and values. Mitigation specifics are presented in the associated Critical Areas Report.

Subareas

The existing transmission corridor crosses through the Richards Valley, Factoria, and Newport Hills Subareas identified in the Comprehensive Plan. The Richards Creek substation site is located within the Richards Valley subarea.

Richards Valley	
General Land Use	
Policy S-RV-1. Enhance the natural environment within the industrial area by encouraging redevelopment to consider natural features in site design, including but not limited to reducing impervious surface,	**Response:** The proposed Richards Creek substation will be located on a site zoned as Light Industrial within the Richards Valley subarea. The site contains wetland and stream critical areas. The substation

improving the functions of wetlands and stream corridors, incorporating natural drainage features, retaining trees, and restoring vegetated corridors.	development will be consolidated on the portion of the site that results in the least impact to critical areas. The existing stream corridor and associated wetlands will be enhanced through the replacement of the existing culvert with a fish passable culvert, which will also improve stream and sediment flow and fish habitat. The corridor will be enhanced with appropriate vegetation to provide stream and wetland habitat improvements. The associated Critical Areas Reports provide additional information.
Natural Determinants	
Policy S-RV-6. Protect and enhance the capability of Richards Creek, Kelsey Creek, and Mercer Slough and their tributaries to support fisheries along with other water-related wildlife. **Policy S-RV-7.** Retain and enhance existing vegetation on steep slopes, within wetland areas, and along stream corridors to control erosion and landslide hazard potential and to protect the natural drainage system.	**Response:** The Richards Creek culvert replacement and stream enhancement project on the Richards Creek substation site will support stream habitat through the replacement of an existing under-sized culvert with a fish passable culvert that will improve stream and sediment flows in the channel. Habitat along the stream will also be improved and will enhance the natural drainage system. Additional description and analysis of landslide hazard potential associated with the project can be found in the Bellevue South Segment Critical Areas Report.
Utilities	
Policy S-RV-20. Use common corridors for new utilities if needed. *Discussion: If new power lines are needed in the Subarea, they should be developed in areas that already contain power lines, rather than causing visual impacts in new areas.*	**Response:** The existing 115 kV transmission lines within the Sammamish-Lakeside-Talbot Hill corridor will be upgraded to 230 kV in lieu of the development of a new corridor. The Richards Creek substation site is also located along the existing corridor.
Policy S-RV-21. Improve the appearance of public streets and power line rights-of-way.	The transmission line corridor within the Richards Creek subarea is located in a Light Industrial land use district. There are currently numerous transmission lines and other utilities in the corridor. PSE will explore opportunities with the City.
Community Design	
Policy S-RV-33. Develop areas designated for light industrial uses with sensitivity to the natural constraints of the sites.	**Response:** The Richards Creek substation will be located within the Light Industrial zoning district. It will be developed on the least sensitive portion of the site, making use of existing disturbed areas and limiting new impacts to critical areas and buffers.
Factoria	
General Land Use	

Policy S-FA-2: Protect single family neighborhoods from encroachment by more intense uses.	**Response:** The transmission line project will upgrade existing transmission lines within an existing transmission corridor, avoiding encroachment into neighboring single-family areas. The vast majority of the area development has occurred around the transmission corridor, which was established in the late 1920s and early 1930s. Any single family neighborhoods adjacent to the proposed line are already adjacent to the existing transmission lines.
Critical Areas	
Policy S-FA-8: Protect and enhance the capability of Sunset Creek, Richards Creek, Coal Creek, and their tributaries to support fisheries and other water related wildlife. **Policy S-FA-9:** Retain and enhance vegetation on steep slopes, within wetland areas, and along stream corridors in order to control erosion, reduce landslide hazard and to protect the natural drainage system.	**Response:** The Richards Creek culvert replacement and stream enhancement project on the Richards Creek substation site will support stream habitat through the replacement of an existing under-sized culvert with a fish passable culvert that will improve stream and sediment flows in the channel. Habitat along the stream will also be improved and will enhance the natural drainage system. Additional description and analysis of landslide hazard potential associated with the project can be found in the Bellevue South Segment Critical Areas Report.
Utilities	
Policy S-FA-24. Encourage the undergrounding of utility distribution lines in areas of new development and redevelopment.	Energize Eastside is a transmission project. Policy S-FA-24 it not applicable as it only applies to distribution lines.
Newport Hills	
General Land Use	
S-NH-8. Protect significant trees and environmentally-sensitive areas (steep slopes, riparian corridors, and wetlands) in accordance with the provisions of the Land Use Code.	**Response:** Selective tree removal will occur within the corridor, including in critical areas, to meet federal clearance requirement for vegetation management. Most disturbance within these areas will be temporary and restored to an equal or better condition. Unavoidable impacts to trees and critical areas will be mitigated in accordance with the provisions of the Land Use Code.
Environment	
S-NH-28. Ensure that all new development and redevelopment includes measures to protect and enhance surface water quality.	**Response:** The transmission line upgrade project will result in little net stormwater runoff. Appropriate BMPs will be used during construction to ensure protection of potentially affected surface water. The wetland rehabilitation and culvert

	replacement proposed in conjunction with the Richards Creek substation will likely have a positive effect on surface water quality.
S-NH-30. Protect and enhance fish and wildlife habitat in environmentally-sensitive areas.	**Response:** Where possible, areas with fish and wildlife habitat will be avoided. If impacts are unavoidable, the appropriate mitigation will be included as required by the Land Use Code.

B. *The design is compatible with and responds to the existing or intended character, appearance, quality of development and physical characteristics of the subject property and immediate vicinity; and*

Response: The Energize Eastside project is compatible with and responds to the existing character, appearance, quality of development and physical characteristics of the subject site and immediate vicinity.

Richards Creek Substation. The property currently serves as a pole storage yard and has a utility corridor with existing transmission lines, water pipelines, and a petroleum pipeline through the center of the site. It is well screened from surrounding uses by mature vegetation. The site is surrounded to the north by PSE's existing Lakeside Switch substation, to the west by industrial development including a water and wastewater supply company, to the south by King County's Factoria Solid Waste Transfer Station, and upslope to the east by a stormwater detention facility tract that is heavily vegetated. The substation use is consistent with the uses in the area and the current use of the site. Located within the Light Industrial (LI) zoning district, the existing site screening will be enhanced with the Richards Creek culvert replacement project and stream restoration and enhancement proposal.

Transmission Line. The transmission line corridor is an existing utility corridor that was established in the late 1920s and early 1930s. The current uses adjacent to the corridor developed over time as areas were annexed into the City and these areas became more dense and populated. The utility corridor is part of the existing character of these areas. PSE is proposing to replace the existing 115 kV transmission poles with steel poles to accommodate 230 kV conductors. The poles will generally be installed in the same location or in close proximity to the existing poles. In most cases, the number of poles will be reduced from four to one or two. The consistency of the proposed transmission lines with other uses in the vicinity was confirmed by the Phase 2 DEIS, which found that impacts to land use will be "be less-than-significant because [the proposed project] is consistent with city and subarea plans, and would not adversely affect existing or future land use patterns." DEIS at 3.1-37.

The DEIS identified potential aesthetic impacts with respect to a limited number of poles located in the Somerset neighborhood. PSE has diligently worked to reduce these aesthetic impacts. For example, the DEIS assessed aesthetic impacts by assuming that all poles

would be a rust/brown color. Alternative pole colors, however, are a powerful and effective tool in reducing contrast with the horizon and aesthetic impacts. PSE accordingly proposes the use of transmission line poles that are either galvanized or powder coated with a light blue or light grey paint to decrease any perceived contrast with the horizon in the Somerset viewshed. Consideration of pole finish will also be evaluated along the entire project to help minimize potential aesthetic impacts. Additional information is provided above under the UT-64 discussion.

PSE has also undertaken additional design work to refine pole placement, reduce the number of poles, decrease pole height and use more streamlined pole designs. Based on this, PSE has determined that pole height in the Somerset area can be reduced from the around 85-foot poles analyzed in the DEIS to approximately 75-foot poles.

In many areas, PSE further proposes using a *delta* conductor configuration that uses less hardware rather than the arguably more impactful rectilinear design assessed in the DEIS. By limiting the area of visual impact and mirroring other natural elements, PSE can effectively mitigate aesthetic impacts and ensure consistency with adjacent uses.

C. *The conditional use will be served by adequate public facilities including streets, fire protection, and utilities; and*

Response: The transmission line upgrade will consist of replacing two existing 115 kV transmission lines within an existing 100-foot wide corridor, with two 230 kV lines in the same corridor. No new permanent access or other public facilities will be required to accommodate the upgraded lines. The proposed substation will be constructed on an existing PSE-owned site within the Light Industrial zoning district north of I-90. The site currently serves as a pole storage yard and is accessed from SE 30th Street. The existing driveway will be realigned to serve the new substation and a new fish passable culvert will be installed under the driveway to assist with stream sediment capacity and flow. The existing transmission corridor and new substation will not require any new permanent access or public facilities or services. Traffic to the new substation will be minimal and will not require additional public facilities.

D. *The conditional use will not be materially detrimental to uses or property in the immediate vicinity of the subject property; and*

Response: ***Richards Creek Substation.*** Bellevue's land use code does not define "materially detrimental." But a recent Division I decision found that "'material' can be defined as '[b]eing both relevant and consequential; crucial.' And 'detrimental' means '[c]ausing damage or harm; injurious.'" *Puget Sound Energy, Inc. v. East Bellevue Community Council*, Case No. No. 74464-0-1 (January 30, 2017). Applying this definition, the new substation will not be materially detrimental to uses or properties in the immediate vicinity of the subject property because it builds on the existing utility facilities and is consistent with the surrounding Light Industrial uses.

The area around the proposed Richards Creek Substation site houses industrial warehouses, PSE's Lakeside substation, an elementary school, a range of commercial building types, and two- to three-story apartment/condo buildings. The site itself is currently used as a pole storage yard and is situated within the Light Industrial zoning district north of I-90 in Factoria. As stated in the DEIS "[o]verall, visual quality is low in the vicinity of the Richards Creek substation site because the built environment dominates the natural environment (except for the undeveloped wooded area to the east) and building form lacks consistency, the built environment consists of an industrial area with different building forms and configurations and large parking lots, and a high presence of utility infrastructure that varies in form (Lakeside substation and 115 kV transmission lines)." DEIS at Table 3.2-1.

The Richards Creek substation will be screened with existing or replacement vegetation, and adjacent to other compatible uses, such as the PSE Lakeside switching substation and the King County Factoria Transfer Station facility. As analyzed in detail in the Partner Cities' Phase 2 DEIS, "[t]here would be no long-term impacts to land use and housing from operation of the substation *because the Richards Creek substation would be compatible with the existing and nearby land uses (industrial) and neighborhood character*." DEIS at 3.1-21. This supports a finding that the proposed substation would not materially damage or harm current uses in the vicinity. In addition, the DEIS concluded that the Richards Creek substation is consistent with future light industrial uses proposed for the parcel. DEIS at 3.1-21. As such, the proposed facility would not be materially harmful to future land uses proposed in the vicinity.

Transmission Line—South Segment. The south segment of the proposed transmission line upgrade will also not be materially detrimental to uses or properties in the immediate vicinity. PSE proposes siting the south segment along the same corridor used by existing transmission lines. This corridor has been established for almost a century. Because adjacent land uses and properties already integrate transmission line facilities, they will not be materially impacted by replacement of the existing transmission line facilities. The consistency of the proposed transmission lines with other uses in the vicinity was confirmed by the Phase 2 DEIS, which found that impacts to land use will "be less-than-significant because [the proposed project] is consistent with city and subarea plans, and would not adversely affect existing or future land use patterns." DEIS at 3.1-37.

With respect to aesthetic impacts to properties in the vicinity of the proposed transmission line, the DEIS describes the south segment as follows:

> Areas with generally high visual quality include the Coal Creek Natural Area (where the natural environment is less disturbed by the built environment) and residential areas away from the existing transmission line that have consistent building height and form. Areas with generally low visual quality are those located along I-90 and residential areas located adjacent to the transmission line. Utilities

> are present, including a 115 kV transmission line, and the utility configuration has consistent form and height along the option.

DEIS at 3.2-13. The DEIS ultimately concludes that, with the exception of the Somerset neighborhood, "[c]ontrast with the existing aesthetic environment would generally be low because the transmission line would be within the existing corridor." DEIS at 3.2-69.

PSE understands that some community groups in Somerset are concerned about the change in height of poles associated with the upgraded transmission line and may argue that this causes a materially detrimental impact to viewscapes that already house poles. A majority of these homes are outside of the "immediate vicinity" of PSE's proposed transmission line upgrade. That said, to limit materially harmful and damaging impacts to *all* of PSE's Bellevue customers, PSE proposes using the existing utility line corridor where transmission lines currently exist.

PSE's engineers continue to work diligently at each pole location to solicit community and property owner feedback on pole design, reduce the height of all poles to the extent technically feasible and safe, and to move pole location when feasible. PSE's engineers have had significant success advancing these goals. For example, proposed pole height in the south segment was reduced from an average of approximately 95 ft (as analyzed in the DEIS) to around 85 ft. These efforts limit perceived impacts, minimize perceived magnitude of change, and ensure that there are no materially detrimental impacts.

Assessment of aesthetic impacts is highly subjective and adaptable (*i.e.*, people become acclimated to a changed aesthetic environment). *See e.g.*, DEIS at 3.2-25 ("Because the value of scenic views and the aesthetic environment is subjective, it is difficult to quantify or estimate impacts."); DEIS at 3.10-1 ("studies have found that the effects on property values… tend to diminish over time after the project is constructed."). One more objective rubric for assessing harm to properties in the vicinity is house values. The Phase I and Phase II of the DEIS confirmed that there would be no materially detrimental impact to house values resulting from PSE's proposed transmission line upgrade. DEIS at 3.10-1—2; *see also*, Energize Eastside Project -- Phase I Draft Environmental Impact Statement at Ch. 10-21—22 (summarizing studies detailing economic impacts of transmission lines on housing values). This is especially significant as the studies reviewed contemplated the siting of a new transmission line, rather than a transmission line upgrade where similar utilities already exist. The DEIS's conclusions on economic impacts provides further evidence that PSE's proposed transmission line upgrade would not be materially harmful to properties in the immediate vicinity.

E. The conditional use complies with the applicable requirements of this Code.

Response: The proposed transmission line upgrade and substation project complies with the applicable requirements of the City of Bellevue code as evidenced through the documentation provided by this Conditional Use application.

LUC 20.20.255.E: Electrical utility facility decision criteria:

1. The proposal is consistent with Puget Sound Energy's System Plan;

Response: The need for additional 230 kV capacity in the Eastside region was identified, and has been included in PSE's Electrical Facilities Plan for King County ("Plan"), since 1993. As explained in the Plan, "[t]he 230 kV sources for the 115 kV system in northeast King County are primarily the Sammamish and Talbot Hill substation. The loads on the 230-115 kV transformers in these stations will be high enough to require new sources of transformation." Additionally, the "Lakeside 230 kV Substation project [now referred to as Energize Eastside] will rebuild two existing 115 kV lines to 230 kV between Sammamish and Lakeside [where PSE proposes the construction of the Richards Creek substation], and between Lakeside and Talbot Hill."

2. The design, use, and operation of the electrical utility facility complies with applicable guidelines, rules, regulations, or statutes adopted by state law, or any agency or jurisdiction with authority;

Response: Performance requirements for any integrated transmission system are heavily regulated at both the federal and regional levels. PSE's regulators include FERC, NERC and WECC (the Federal Energy Regulatory Commission, North American Electric Reliability Corporation and Western Electricity Coordinating Council, respectively).

NERC is the regulatory authority certified by FERC to develop and enforce reliability standards. NERC has delegated the task of monitoring and enforcing the federal reliability standards to WECC, the regional entity that has authority over transmission in the western region.

The NERC standards mandate that certain forecasts and studies must be completed to determine if the system has sufficient capability to meet expected loads now and in the future. When completing transmission planning studies, contingencies are simulated to determine if the electric system meets the mandatory NERC performance requirements[1] for

[1] The transmission planning standards that were in effect in 2012-2013 were: TPL-001-3, TPL-002-0b 2nd Rev (TPL-002-2b), TPL-003-0b 2nd Rev (TPL-003-2b), and TPL-004-2. TPL-001-3, TPL-002-2b, TPL-003-2b, and TPL-004-2 are being retired as they are replaced in their entirety by TPL-001-4. Enforcement of the new standards began January 1, 2015. Visit the NERC website at http://www.nerc.com/pa/Stand/Reliability Standards/TPL-001-4.pdf for more information.

a given set of forecasted demand levels, generation configurations and levels, and multiple system component outages.

Notwithstanding questions of likelihood, federal regulations require that the appropriate planning be undertaken proactively. This conservative planning methodology is implemented to prevent large scale, cascading, transmission system blackouts, like those that have occurred in the recent past (for example, the 2003 Northeast blackout that affected 55 million people in the Northeast and Midwest regions of the United States and Canada).

The PSE transmission planning studies performed in 2013 and 2015 determined that thermal violations on transmission line and transformer equipment might occur under foreseeable scenarios within the next few years. The thermal violations are a result of running scenarios for several component outage contingencies, as required by NERC, that take into consideration peak demand (which is heavily dependent on seasonal temperatures and daily demand profiles) and levels of conservation. In essence, this is a requirement to have redundancy in the transmission system.

2.2.4 FERC FINDINGS AND CONCLUSION

In an effort to stop PSE's Energize Eastside project, a complaint was filed with the Federal Energy Regulatory Commission (FERC) against PSE and other utilities (Attachment A). FERC dismissed all aspects of the complaint, stating:

> "Based on the record before us, we find that Puget Sound [PSE] and the other Respondents complied with their transmission planning responsibilities under Order No. 890 in proposing and evaluating the Energize Eastside Project." (FERC Docket No. EL15-74-000, Order Dismissing Complaint, Issued Oct. 21, 2015.)

The FERC response also concluded:

> "We agree with Puget Sound [PSE] and ColumbiaGrid that the Energize Eastside Project was properly classified a Single System Project because it was designed to address Puget Sound's projected inability to serve its own customers, ColumbiaGrid's Puget Sound Area Study Team did not find any Material Adverse Impacts associated with the project, and ColumbiaGrid included the project as a Single System Project in its most recent 2015 Biennial Plan. Accordingly, we find that the Energize Eastside Project was proposed and evaluated in accordance with the then-applicable transmission planning requirements." (FERC Docket No. EL15-74-000, Order Dismissing Complaint, Issued Oct. 21, 2015.)

3. *The applicant shall demonstrate that an operational need exists that requires the location or expansion at the proposed site;*

Response: The Richards Creek substation is essentially an expansion of the Lakeside substation, which is mapped as a "non-sensitive" site in the City's Comprehensive Plan (Map UT-7). Normal practice is to have the 230 kV station co-located with the adjoining 115 kV station; however, due to topographic and environmental considerations located south of the Lakeside substation, expanding the station in that direction would be challenging. Therefore, placing the two stations on separate parcels was determined to be the most effective approach. Since the two yards have separate access points, they are required to have different names for operational and emergency purposes.

Using the existing transmission line corridor provides the shortest path between the Sammamish substation in the north and the Talbot Hill substation in the south to the Lakeside substation area. Operationally, replacing the existing 115 kV lines with 230 kV lines utilizes an existing corridor without the need for creating a new one through areas that do not have transmission lines today.

4. *The applicant shall demonstrate that the proposed electrical utility facility improves reliability of the system as a whole, as certified by the applicant's licensed engineer;*

Response: In total, five separate studies performed by four separate parties have confirmed the need to address Eastside transmission capacity (20.20.255.E.4; D.3.b & c):

- Electrical Reliability Study by Exponent, 2012 (City of Bellevue);
- Eastside Needs Assessment Report by Quanta Services, 2013 (PSE);
- Supplemental Eastside Needs Assessment Report by Quanta Services, 2015 (PSE);
- Independent Technical Analysis by Utility Systems Efficiencies, Inc., 2015 (City of Bellevue); and
- Review Memo by Stantec Consulting Services Inc., 2015 (EIS consultant)

All of these studies are provided in the Alternative Siting Analysis. These studies were reviewed and confirmed by Jens Nedrud, Manager of System Planning, a WA State licensed engineer. See Attachment B (containing PSE's Certification of Need).

PSE transmission planning studies demonstrate that, under certain contingencies, the delivery system on the Eastside could not continue to meet reliability requirements without significant infrastructure upgrades.

The Needs Assessment reports published in 2013 and 2015 and performed pursuant to the mandatory federal transmission planning standards, identified four major areas of concern:

1. Overload of PSE facilities in the Eastside area. Studies identified potential overloading of transformers at Sammamish and Talbot Hill substations, and several 115 kV transmission lines routing power to the Eastside area are at risk of overloading under certain conditions.
2. Small margin of error to manage risks from inherent load forecast uncertainties. PSE's planning studies rely in large part on load forecast data. Imbedded in PSE's load forecasts are several factors that include elements of risk. These include conservation, weather and block loads.
    - Conservation: To date, PSE customers have achieved 100 percent of the company's conservation goals, which are very aggressive within the industry. If 100 percent of conservation goals are not achieved, then the transmission system capacity will be surpassed sooner than expected.
    - Weather: PSE's load forecast assumes "every other year" cold weather. (Some utilities take a more conservative approach, using the coldest and hottest weather in five or ten years, as inputs to system performance studies[2].) If the region experiences weather extremes outside of those used in PSE's planning studies, electricity demand will surpass the transmission system capacity sooner than expected.
    - Block loads: These include large development projects that add significant load to the system. If block load growth increases more than anticipated, demand for electricity will surpass the transmission capacity sooner than expected.
3. Increased use and expansion of Corrective Action Plans (CAPs) to keep the system compliant. CAPs are a series of operational steps used to prevent system overloads or loss of customers' power. They are a short-term fix to alleviate potential operational conditions that could put the entire grid at risk. They protect against large-scale, cascading power outages; however, they can put large numbers of customers at increased risk of power outages. For example, to prevent winter overloads on the Talbot Hill transformer banks, PSE is already using CAPs, which increases outage risk to customers. As growth continues, additional CAPs will be needed. By Federal standards, CAPs are not intended to be long-term solutions to system deficiencies.
4. Impacts to interconnections identified by ColumbiaGrid. Though the need for Energize Eastside is driven by local demand, because the electric system is interconnected for the benefit of all, it is a federal requirement to study all electric transmission projects to ensure there are no material adverse impacts to the reliability or operating characteristics of PSE's or any surrounding utilities' electric systems. ColumbiaGrid, the regional planning entity, produces a Biennial Transmission Expansion Plan that addresses system needs in the Pacific Northwest, including the PSE system.

    PSE's 2015 Supplemental Needs Assessment Report confirmed the winter deficit findings in the 2013 Needs Assessment Report, stating that:

[2] For example, ISO-NE plans to a 90/10 or one in ten year weather forecast.

By winter of 2017-18, there is a transmission capacity deficiency on the Eastside that impacts PSE customers and communities in and around Kirkland, Redmond, Bellevue, Issaquah, Newcastle, and Renton along with Clyde Hill, Medina, and Mercer Island... ***By winter of 2019-20, at an Eastside load level of approximately 706 MW, additional CAPs are required that will put approximately 63,200 Eastside customers at risk of outages.***

The 2015 Needs Assessment also confirmed that by summer of 2018, there would be a transmission capacity deficiency on the Eastside that impacts PSE customers and communities in and around Kirkland, Redmond, Renton, Bellevue, Issaquah and Newcastle along with Clyde Hill, Medina and Mercer Island. **By summer of 2018, CAPs will be required to manage overloads under certain N-1-1 contingencies, and the use of these CAPs will place approximately 68,800 customers at risk and could require 74 MW of load shedding, affecting approximately 10,900 customers at a time.**

Based on the 2015 Needs assessment, if the Energize Eastside project gets delayed until after the summer of 2018, load shedding may be used as a corrective action plan to meet the mandatory reliability requirements defined by NERC. This could result in PSE having to turn the power off to tens of thousands of customers under certain forecasted conditions and would be necessary to prevent more widespread outages beyond the Eastside area. To further study this, in 2015 PSE commissioned Nexant to simulate three scenarios of rotating outages that could be needed if no action is taken to upgrade the Eastside's transmission system. Nexant's Energize Eastside Outage Cost Study determined that if PSE must use corrective action plans that include rolling blackouts, more than 130,000 customers could be impacted as early as the summer of 2018, at a cost of tens of millions of dollars to the local economy.

Load shedding is not a practice that PSE or many other responsible utilities use (unless absolutely necessary). Since load shedding adversely impacts residential, commercial and industrial customers, and surrounding cities, towns and neighboring communities, it is necessary and good utility practice to coordinate with cities, towns, municipal officials and emergency services, and to publicly inform those affected.

The City of Bellevue contracted with Utility System Efficiencies, Inc. (USE) to perform an independent technical analysis (ITA) of the purpose, need and timing of the Energize Eastside project, and this study confirmed the capacity deficiency in the Eastside area. The ITA was performed to verify the project need and PSE's study methods, as these were questioned by a small public opposition group.

The ITA concluded that "PSE used reasonable methods to develop its forecast showing the Eastside area growing at a higher level [faster pace] than the county or system level". Additionally, the ITA addressed common questions about the project, including:

- Is the Energize Eastside project needed to address the reliability of the electric grid on the Eastside? **The ITA determined, "YES."**
- If the load growth rate was reduced, would the project still be needed? **The ITA determined, "YES."**
- If generation was increased in the Puget Sound area, would the project still be needed? **The ITA determined, "YES."**
- Is there a need for the project to address regional flows, with imports/exports to Canada ? **The ITA determined that by modeling zero flow to Canada, the project is still necessary to address local need**.

5. *For proposals located on sensitive sites as referenced in Figure UT.5a of the Utility Element of the Comprehensive Plan, the applicant shall demonstrate:*
   a. *Compliance with the alternative siting analysis requirements of subsection D of this section;*

   See PSE's Alternative Siting Analysis.

   b. *Where feasible, the preferred site alternative identified in subsection D.2.d of this section is located in the land use district requiring additional service and residential land use districts are avoided when the proposed new or expanded electrical utility facility serves a nonresidential land use district;*

   As explained in the five studies assessing the need for Energize Eastside, PSE's proposed transmission line upgrade is responsive to projected growth in the Eastside generally and the City of Bellevue specifically.

6. *The proposal shall provide mitigation sufficient to eliminate or minimize long-term impacts to properties located near the electrical utility facility.*

   The Phase 1 and Phase 2 DEISs identified limited unavoidable significant adverse impacts. PSE is committed to implementing avoidance, minimization, and mitigation identified through the SEPA review process where feasible to avoid and address any significant adverse impacts. PSE is committed to fully complying with all mitigation required in the City's code and permit conditions. Specifically, PSE will mitigate those impacts identified in the Critical Areas Report, as well as tree impacts that are necessary to meet federal transmission line operational standards. PSE will work with affected property owners, the City, and other stakeholders to replace trees in the most effective manner that meets the permit conditions.

F. *Design Standards:*
In addition to the requirements set forth in Part 20.30B LUC, Part 20.30E LUC, Part 20.25B LUC (if applicable), and other applicable provisions of this section, all proposals to locate or expand an electrical utility facility shall comply with the following:

1. *Site Landscaping. Electrical utility facilities shall be sight-screened as specified in LUC 20.20.520.F.2 or as required for the applicable land use district. Alternatively, the provisions of LUC 20.20.520.J may be used, provided this subsection does not apply to transmission lines as defined in LUC 20.50.018.*

   Response: The proposed project in the South Bellevue Segment consists of a transmission line corridor and substation site. This requirement is not applicable within the transmission line corridor. At the Richards Creek substation site, LUC 20.20.520.F.2 requires 15 feet of Type I landscaping on all sides of the substation, subject to restrictions on landscaping within critical areas. The substation site contains wetland and stream critical areas on the north, south, and western portions of the site.

   As part of the Conditional Use Permit submittal, PSE has submitted a landscape plan proposing the required landscape screen along the eastern side of the substation with a combination of proposed replacement trees and existing understory vegetation. The screen will be elevated above the existing substation due to a retaining wall and screens the substation from undeveloped property that is forested and contains a stormwater detention facility that serves multi-family development further east across 139th Ave SE.

   LUC 20.20.520.F.6 states that if a proposal is located within the Critical Area Overlay District, the Director shall waive the planting requirement of F.2 and shall require the use of native vegetation within the critical area or critical area buffer in lieu of landscape development if the width of the existing vegetation is at least twice that as required under F.2. Supplemental plantings can be added to achieve the required width. Existing critical areas along the north side of substation are within the transmission corridor that leads to PSE's existing Lakeside switching station. Critical areas located to the south and west of the proposed substation will be enhanced as part of the Richards Creek culvert replacement and restoration portion of the substation project.

2. *Fencing. Electrical utility facilities shall be screened by a site-obscuring fence not less than eight feet in height, provided this subsection does not apply to transmission lines as defined in LUC 20.50.018. This requirement may be modified by the City if the site is not considered sensitive as referenced in Figure UT.5a [UT-7] of the Utility Element of the Comprehensive Plan, is adequately screened by topography and/or existing or added vegetation, or if the facility is fully enclosed within a structure. To the maximum extent possible, all electrical utility facility components, excluding transmission lines, shall be screened by either a site-obscuring fence or alternative screening.*

   Response: This criterion is only applicable to the Richards Creek substation portion of the project and not the transmission corridor. The Richards Creek substation site on Figure UT.5a (now Map UT-7 in the Comprehensive Plan) is a non-sensitive site. Additionally, the site is sufficiently screened by critical area vegetation (existing and proposed enhancement) and based on the site topography, location at the end of a public street, and the proposed location of the substation footprint setback in the hill to the east, it is unlikely the substation will be noticeably visible from outside the substation property.

3. *Required Setback. The proposed (including required fencing) shall conform to the setback requirement for structures in the land use district.*

   Response: The required structure setbacks for the Light Industrial zoning district are:

	Required	Proposed
Front	15 feet	280 feet
Rear	15 feet	63 feet
Side	15 feet	168 feet /87 feet

4. *Height limitations. For all electrical utility facility components, including transmission lines, the City may approve a request to exceed the height limit for the underlying land use district if the applicant demonstrates:*
   a. The requested increase is the minimum necessary for the effective functioning of the electrical utility facility; and

   Response: The request to exceed the height limit is the minimum necessary for the effective and safe functions of the transmission lines. The existing corridor is located within different zoning districts throughout the City, including residential, commercial, and industrial. The replacement pole height will need to increase over the current pole height. NESC provides minimum clearance requirements for conductors from the ground based on operating temperature and loading to account for sag. These safety standards also require increased separation between the three conductors necessary for each circuit, when the voltage is increased from 115 kV to 230 kV. This increased conductor separation adds height to the poles. Poles are designed to meet the minimum height, the required safety and design standards, and ensure effective functioning of the transmission line during all operational conditions.

   b. Impacts associated with the electrical utility facility have been mitigated to the greatest extent technically feasible.

   Response: As stated in Decision Criterion E6 above and the Alternative Siting Analysis, the location of the new transmission line minimizes impacts to adjacent properties by using an existing transmission line corridor that was established more than eighty years ago. The site selected for the substation is located in a Light Industrial zoning district on a large property that provides a greater opportunity for natural and enhanced screening. Additionally, extensive engineering, which included design and operational parameters, was undertaken to minimize pole height to the extent possible. This approach also allowed for a reduction in EMF, which in turn allowed for the lowest AC interaction with other utilities that share the corridor. Flexibility of pole finish has been accounted for in an effort to help minimize the contrast of the replacement poles with the dominant background.

ATTACHMENT A
FERC Order

153 FERC ¶ 61,076
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Norman C. Bay, Chairman;
Philip D. Moeller, Cheryl A. LaFleur,
Tony Clark, and Colette D. Honorable.

Coalition of Eastside Neighborhoods for Sensible Energy,
Citizens for Sane Eastside Energy,
Larry G. Johnson,
Glenna F. White, and
Steven D. O'Donnell

v. Docket No. EL15-74-000

Puget Sound Energy,
Seattle City Light,
Bonneville Power Administration, and
ColumbiaGrid

ORDER DISMISSING COMPLAINT

(Issued October 21, 2015)

1. In this order, we dismiss a complaint (Complaint) filed by the Coalition of Eastside Neighborhoods for Sensible Energy, Citizens for Sane Eastside Energy, and individuals Larry G. Johnson, Glenna F. White, and Steven D. O'Donnell (collectively, Complainants) against Puget Sound Energy (Puget Sound), Seattle City Light, a department of the City of Seattle (Seattle), Bonneville Power Administration (Bonneville), and ColumbiaGrid (collectively, Respondents).

I. Background

2. Puget Sound, Seattle, and Bonneville are members of ColumbiaGrid, a non-profit membership corporation whose purpose is to coordinate the operation, use, and expansion of the Pacific Northwest transmission system. Currently, however,

Puget Sound is the only Respondent that is an enrolled member in the ColumbiaGrid transmission planning region, established by certain parties to comply with Order No. 1000.[1] Puget Sound is planning to construct a transmission project consisting of approximately 18 miles of electric transmission lines and associated substation upgrades between the Cities of Redmond and Renton in the State of Washington (Energize Eastside Project). Specifically, the Energize Eastside Project will add a 230/115 kV transformer near Puget Sound's Lakeside Substation and rebuild the existing Sammamish-Lakeside-Talbot 115 kV lines to convert them to 230 kV lines. The exact location of the rebuilt 230 kV transmission lines will be determined after the completion of the state Environmental Impact Statement and local land use permitting processes, which are currently underway. The Energize Eastside Project will be located completely within Puget Sound's service territory. Puget Sound is planning to construct the project in order to accommodate projected local load growth that Puget Sound projects will create local transmission capacity deficiencies in the area beginning by the winter of 2017-18.

3. On June 9, 2015, Complainants filed the Complaint pursuant to section 206 of the Federal Power Act (FPA)[2] and Rule 206 of the Commission's Rules of Practice and Procedure.[3] Complainants allege that the Energize Eastside Project was promoted and implemented by Respondents in a manner that violates Order Nos. 890[4] and 1000. Complainants also assert that Respondents have violated Order No. 2000,[5] "contractual

[1] *Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities*, Order No. 1000, FERC Stats. & Regs. ¶ 31,323 (2011), *order on reh'g*, Order No. 1000-A, 139 FERC ¶ 61,132, *order on reh'g and clarification*, Order No. 1000-B, 141 FERC ¶ 61,044 (2012), *aff'd sub nom. S.C. Pub. Serv. Auth.* v. *FERC*, 762 F.3d 41 (D.C. Cir. 2014) (Order No. 1000).

[2] 16 U.S.C. § 824e (2012).

[3] 18 C.F.R. § 385.206 (2015).

[4] *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs. ¶ 31,241, *order on reh'g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *order on reh'g*, Order No. 890-B, 123 FERC ¶ 61,299 (2008), *order on reh'g*, Order No. 890-C, 126 FERC ¶ 61,228 (2009), *order on clarification*, Order No. 890-D, 129 FERC ¶ 61,126 (2009) (Order No. 890).

[5] *Regional Transmission Organizations*, Order No. 2000, FERC Stats. & Regs. ¶ 31,089 (1999), *order on reh'g*, Order No. 2000-A, FERC Stats. & Regs. ¶ 31,092 (2000), *aff'd sub nom. Pub. Util. Dist. No. 1 v. FERC*, 272 F.3d 607 (D.C. Cir. 2001) (Order No. 2000).

obligations they have entered into with the Commission that incorporate the provisions and policies set forth in those Orders," and the terms of their Open Access Transmission Tariffs (Tariffs).[6]

4. Complainants argue that the Energize Eastside Project is a Bulk Electric System facility, as defined in Order No. 773,[7] based on the Commission's "bright line" test, because it is a 230 kV project.[8] They further argue that because the project meets more than one regional need – it is intended to meet both Puget Sound's local load needs and to provide additional transmission capacity to support 1,500 MW of power flow north to Canada in order to satisfy Bonneville's obligation to deliver power to Canada under the terms of the Columbia River Treaty[9] – it was subject to the requirements of Order No. 1000 and should have gone out to bid to third parties.[10]

5. Complainants argue that, under Order No. 1000, ColumbiaGrid was required to initially determine whether there is a transmission need on the regional system that would require a project such as the Energize Eastside Project. Complainants assert that, if ColumbiaGrid determined that there was such a need, it needed to inform its members and other interested stakeholders, allow them to propose solutions to resolve the transmission need, and then study those proposals and the associated load flow studies. Complainants further argue that, if ColumbiaGrid determined that the preferred solution met the goals of more than one entity, it needed to determine a fair allocation of the costs of the project.[11] Complainants assert that this process was not followed because Puget Sound alone determined that the Energize Eastside Project was necessary and

[6] Complaint at 1-2.

[7] *Revisions to Electric Reliability Organization Definition of Bulk Electric System and Rules of Procedure*, Order No. 773, 141 FERC ¶ 61,236 (2012) (Order No. 773).

[8] Complaint at 6.

[9] *Id.*, J. Richard Lauckhart Aff. at P 18.

[10] *Id.* at 2, 6.

[11] *Id.*, J. Richard Lauckhart Aff. at PP 20-22.

conducted the associated load flow studies,[12] and ColumbiaGrid did not determine any regional cost allocation.[13]

6. Complainants conclude that Respondents have violated the regional planning process required by Order Nos. 890 and 1000 because they have violated the "single utility" rule, failed to properly ascertain the regional need for the Energize Eastside Project, failed to conduct their own environmental assessment of the project, and did not conduct industry-standard load flow studies to determine whether the Energize Eastside Project might be duplicative, less efficient, and more costly than better alternatives.[14]

7. In particular, Complainants assert that Order No. 1000's "single utility" rule required the Respondents to study the regional system as if a single utility owned all relevant generating, transmission, and distribution facilities.[15] Complainants argue that Respondents have not complied with this requirement because Puget Sound did not ask ColumbiaGrid to conduct regional power flow studies for the Energize Eastside Project, but instead, conducted inappropriate power flow studies of its own to determine if the project was necessary.[16] Complainants contend that if these studies were performed on a single utility basis, they would have logically looked at using existing Seattle transmission lines to address the transmission capacity deficiency.[17] Complainants note that Seattle allegedly refused to allow Puget Sound to use those lines because Seattle preferred to reserve those lines for its own use to meet its operating needs.[18]

8. Complainants argue that Respondents also circumvented the requirements of Order No. 1000 because ColumbiaGrid did not evaluate the potential negative environmental impacts of the Energize Eastside Project on its own[19] and Respondents

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[12] *Id.*, J. Richard Lauckhart Aff. at P 25.

[13] *Id.*, J. Richard Lauckhart Aff. at P 22.

[14] *Id.* at 2-3.

[15] *Id.*, J. Richard Lauckhart Aff. at P 49.

[16] *Id.*, J. Richard Lauckhart Aff. at P 25.

[17] *Id.* at 7.

[18] *Id.*, J. Richard Lauckhart Aff. at P 47, n.16; Attachment K.

[19] *Id.* at 8.

chose the Energize Eastside Project without giving any consideration to its environmental impacts or considering the environmental impacts of alternatives.[20]

9. Complainants also allege that the load flow studies Puget Sound conducted were flawed. In particular, they argue that the studies should not have included 1,500 MW of firm transmission to Canada because the transmission system has operated for over 50 years without the ability to deliver 1,500 MW to Canada.[21] Complainants contend that the Columbia River Treaty envisioned the construction of a new transmission line in order to facilitate the delivery of power to Canada that was contemplated in the treaty, but that Bonneville and its counterparty to the treaty, the British Columbia Hydro and Power Authority (BC Hydro), chose not to build this line. Complainants argue that, as a result, Bonneville put in place an operating procedure to curtail flows to Canada anytime such flows might cause overloads on transmission lines in western Washington. Thus, Complainants assert that the transmission system has operated without the ability to deliver the 1,500 MW of treaty power to Canada. Complainants argue, therefore, that the load flow studies for the Energize Eastside Project should have been conducted with no flow between Canada and the United States.[22]

10. In addition, Complainants assert that Puget Sound's load flow studies were flawed because they did not include 1,435 MW of output from eight Puget Sound-controlled natural gas generators located in western Washington. Complainants state that a load flow study performed by Utility Systems Efficiencies, Inc. (Utility Systems) for the City of Bellevue included some, but not nearly all, of this output. Complainants argue that this omission creates inappropriate results in the Puget Sound and Utility Systems load flow studies.[23]

11. Complainants also assert that Puget Sound's 2013 Integrated Resource Plan shows that it needs an additional 1,500 MW of generating capacity by 2018 in order to cover estimated peak load and provide an appropriate level of reserves. Complainants argue that Puget Sound has not determined where it will obtain this additional 1,500 MW of supply and that, therefore, Puget Sound will need to run all of its resources to cover peak load in 2018, including the natural gas plants that were excluded from the Puget Sound and Utility Systems load flow studies. Complainants contend that, as a result, the load

[20] *Id.*, J. Richard Lauckhart Aff. at P 75.

[21] *Id.* at 4.

[22] *Id.*, J. Richard Lauckhart Aff. at PP 78-86.

[23] *Id.*, J. Richard Lauckhart Aff. at PP 37-44.

flow studies need to include the natural gas plants that were excluded from the Puget Sound and Utility Systems load flow studies.[24] Complainants also note that Puget Sound's 2013 Integrated Resource Plan did not address the possibility of building additional generating units in the area of the Energize Eastside Project to accomplish the dual objective of contributing to the need for 1,500 MW of additional generating capacity and addressing a potential transmission problem in the area.[25]

12. Complainants describe several alternatives to the Energize Eastside Project that they allege could be put in place at a lower cost and with lower environmental impact than the Energize Eastside Project.[26] Complainants also assert that ColumbiaGrid and its member utilities are not acting in compliance with Order No. 1000 because they have yet to agree on a ColumbiaGrid Planning and Expansion Functional Agreement (Planning Agreement) that brings them into compliance with Order No. 1000. Complainants acknowledge that the Planning Agreement and subsequent amendments have been accepted by the Commission, but they assert that ColumbiaGrid and its member utilities have not agreed on an Order No. 1000-compliant Planning Agreement because Bonneville has not yet made a compliance filing to fully conform its Tariff to the Commission's *pro forma* Tariff, as modified by Order No. 1000.[27]

13. Complainants request that the Commission order ColumbiaGrid to perform transparent and industry-standard load flow studies to determine whether the Energize Eastside Project meets a local transmission need and whether a more efficient, less expensive, and less environmentally destructive alternative exists.[28] Complainants assert that Puget Sound, Bonneville, and Seattle have already committed to have ColumbiaGrid perform such studies in their Order Nos. 890 and 1000 compliance filings and in the Planning Agreement.[29]

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[24] *Id.*, J. Richard Lauckhart Aff. at PP 90-92.

[25] *Id.*, J. Richard Lauckhart Aff. at PP 102-103.

[26] *Id.* at 5; J. Richard Lauckhart Aff. at PP 47, 95-104.

[27] *Id.*, J. Richard Lauckhart Aff. at PP 6-9; 11-15.

[28] *Id.* at 7.

[29] *Id.* at 5.

14. Complainants ask that the Commission order Puget Sound to "cease and desist from any further activity with respect to [the Energize Eastside Project], including seeking permits for it" once Complainants' requested load flow studies "show conclusively there is no local load reliability issue that would justify [the Energize Eastside Project] being built."[30]

15. Complainants further request that the Commission order Seattle and Bonneville to cooperate in restarting the project selection process at the ColumbiaGrid level, cooperate in properly performed load flow studies, and to not engage in any further acts that are subversive of the Order Nos. 890 and 1000 processes.[31]

16. Additionally, Complainants request that the Commission order Puget Sound, Bonneville, and Seattle to provide an Order No. 1000-compliant Planning Agreement. Complainants ask that, if these entities fail to provide an Order No. 1000-compliant Planning Agreement, the Commission direct them to form a Regional Transmission Organization (RTO) or Independent System Operator (ISO) to ensure Order Nos. 890 and 1000 compliance. Finally, Complainants state that, because ColumbiaGrid's method for selecting its board members is not fully compliant with the "independence" requirements set out in Order No. 2000, the selection method should be considered in consolidation with ColumbiaGrid's ongoing Order No. 1000 compliance proceeding in Docket No. ER15-429-000, *et al.*[32]

II. Notice and Responsive Pleadings

17. Notice of the Complaint was published in the *Federal Register*, 80 Fed. Reg. 34,631 (2015), with answers, protests, and interventions due on or before June 29, 2015. Avista Corporation (Avista) filed a timely motion to intervene and comments. Puget Sound and ColumbiaGrid filed a joint motion to dismiss and answer. Bonneville filed a motion to dismiss Bonneville as a Respondent. Seattle filed a motion to dismiss and answer. Powerex Corp. (Powerex) filed a motion to intervene out-of-time.

18. On July 13, 2015, Complainants filed answers and, separately, a motion for order of default against Bonneville. On July 27, 2015, Seattle filed an answer to Complainants' answer. On July 28, 2015, Bonneville filed an answer to Complainants' answer and an answer to Complainants' motion for order of default. On August 11, 2015, Puget Sound

[30] *Id.* at 7.

[31] *Id.* at 8.

[32] *Id.*

submitted supplemental information to its motion to dismiss and answer and Complainants submitted a letter objecting to the inclusion of that supplemental information in the record.

A. Puget Sound and ColumbiaGrid Motion to Dismiss and Answer

19. Puget Sound and ColumbiaGrid argue that the Complaint should be dismissed because Complainants have failed to satisfy the Commission's rules for structuring a complaint, set forth in Rule 206 of the Commission's Rules of Practice and Procedure.[33] Specifically, Puget Sound and ColumbiaGrid assert that the Complaint does not "clearly identify the action or inaction which is alleged to violate applicable statutory standards or regulatory requirements,"[34] or "explain how the action or inaction violates the applicable statutory standards or regulatory requirements"[35] because the Complaint does not cite any particular portion or provision of Order Nos. 890 or 1000 that Respondents have allegedly violated. Puget Sound and ColumbiaGrid note that Order Nos. 890 and 1000 require the development of an Attachment K to Puget Sound's Tariff that satisfies those orders and thus, Attachment K, not Order Nos. 890 and 1000, defines the planning process that Puget Sound must carry out. Puget Sound and ColumbiaGrid further state that Puget Sound's Attachment K relies on the planning obligations set forth in the Planning Agreement, which was first approved by the Commission in 2007 and is used by ColumbiaGrid to facilitate the coordinated planning of multi-system transmission projects.[36] Puget Sound and ColumbiaGrid argue that the Complaint also does not cite any provision of Attachment K or the Planning Agreement that Respondents have allegedly violated. They assert that the Commission has previously dismissed complaints for failing to comply with these requirements.[37]

20. Puget Sound and ColumbiaGrid also argue that the Complaint fails to set forth the "business, commercial, economic or other issues presented by the action/inaction as such relate to or affect the Complainants,"[38] and to make a "good faith effort to quantify the

[33] Puget Sound and ColumbiaGrid Answer at 7.

[34] 18 C.F.R. § 385.206(b)(1) (2015).

[35] 18 C.F.R. § 385.206(b)(2) (2015).

[36] Puget Sound and ColumbiaGrid Answer at 4, 8.

[37] *Id.* at 7-8 (citing *Citizens Energy Task Force v. Midwest Reliability Org.*, 144 FERC ¶ 61,006, at P 38 (2013)).

[38] *Id.* at 9 (citing 18 C.F.R. § 385.206(b)(3) (2015)).

financial impact or burden (if any) created for the complainant as a result of the action or inaction."[39] Rather, Puget Sound and ColumbiaGrid state that Complainants generally assert that the Energize Eastside Project is "more costly" than their preferred alternatives, but they do not provide any information on the cost of the proposed alternatives. In fact, Puget Sound and ColumbiaGrid contend that Complainants merely assert that unnamed realtors have informed Complainants that their homes (whose number and present value are also unspecified) may decrease in value if the Energize Eastside Project is constructed and then argue, without further support, that local taxes will increase if the project is built.[40]

21. Puget Sound and ColumbiaGrid allege that the Complaint has also failed to indicate "the practical, operational, or other nonfinancial impacts imposed as a result of the action or inaction, including, where applicable, the environmental, safety or reliability impacts of the action or inaction."[41] Puget Sound and ColumbiaGrid assert that the Complaint merely states that the Energize Eastside Project is "environmentally unsound and hazardous" without any support other than noting that the project will be co-located with an existing pipeline and require routine tree-cutting.[42]

22. Puget Sound and ColumbiaGrid also note that Complainants are required to state "the specific relief or remedy requested,"[43] but that some of the relief requested in the Complaint cannot be granted. They explain that Complainants request that the Commission order Puget Sound to cease and desist from any further activity with respect to the Energize Eastside Project, including seeking permits for it; however, transmission construction, siting, and permitting fall within the purview of state and local jurisdictions, so it would be beyond the scope of the Commission's jurisdiction to direct Puget Sound to refrain from seeking state and local permits for the project.[44]

[39] *Id.* at 9-10 (citing 18 C.F.R. § 385.206(b)(4) (2015)).

[40] *Id.*

[41] *Id.* at 10 (citing 18 C.F.R. § 385.206(b)(5) (2015)).

[42] *Id.*

[43] *Id.* at 11 (citing 18 C.F.R. § 385.206(b)(7) (2015)).

[44] *Id.*

23. In addition, Puget Sound and ColumbiaGrid assert that Complainants do not have standing to bring a complaint regarding Attachment K or the Planning Agreement; Attachment K describes the process by which Puget Sound coordinates with its transmission customers, neighboring transmission providers, affected state authorities, and other stakeholders, and Complainants do not fall within any of those categories because they are merely landowners in the area where the Energize Eastside Project will be built. Similarly, Puget Sound and ColumbiaGrid assert that Complainants are third-party non-signatories to the Planning Agreement and therefore do not have standing to bring a complaint regarding the Planning Agreement.[45]

24. Puget Sound and ColumbiaGrid argue that Complainants' allegations should be dismissed as impermissible collateral attacks on Commission Order Nos. 890, 1000, and 2000. They contend that Complainants' allegation that ColumbiaGrid's method for selecting its board members does not comply with the "independence" requirements set out in Order No. 2000 and Complainants' request that the Commission order Respondents to form an RTO or ISO are not relevant to whether Puget Sound complied with its transmission planning obligations. Puget Sound and ColumbiaGrid argue that, because ColumbiaGrid is not an RTO, the Order No. 2000 "independence" requirements are not applicable. Puget Sound and ColumbiaGrid also assert that Order No. 2000 did not mandate the creation of RTOs, and Order Nos. 890 and 1000 did not impose any specific requirements for the structure in which public utilities must implement the planning provisions that were to be incorporated into Attachment K. Therefore, they argue that Complainants' assertions regarding ColumbiaGrid's method for selecting its board members and their request that the Commission order Respondents to form an RTO or ISO are impermissible collateral attacks on Order Nos. 890, 1000, and 2000.[46]

25. Puget Sound and ColumbiaGrid also contend that Complainants collaterally attack Order Nos. 890 and 1000, and the Commission's orders accepting Puget Sound's compliance filings made pursuant to those orders, when they assert that the Energize Eastside Project should have gone out to bid to third parties and that Puget Sound should be required to abandon the project if new studies show there is no load reliability issue. Puget Sound and ColumbiaGrid assert that there is no requirement in Attachment K of Puget Sound's Tariff or the Planning Agreement that Puget Sound request bids or issue a request for proposals prior to any construction of a transmission facility. They also contend that the inclusion of any project, including the Energize Eastside Project, in a

[45] *Id.* at 11-13.

[46] *Id.* at 13-14.

ColumbiaGrid transmission plan is not a condition precedent to Puget Sound's decision to build a project.[47]

26. Puget Sound and ColumbiaGrid further argue that the Complaint should be dismissed for a lack of jurisdiction as it applies to ColumbiaGrid. They assert that the Commission has found that ColumbiaGrid does not own, operate, or control jurisdictional facilities necessary to qualify it as public utility under the FPA, and, therefore, ColumbiaGrid is not subject to section 206 of the FPA.[48]

27. In answering the Complaint, Puget Sound and ColumbiaGrid argue that, if the Commission considers the substantive issues raised by the Complaint, the Complaint must be rejected because Complainants have not demonstrated that Puget Sound has failed to comply with its Commission-approved transmission planning process contained in Attachment K of the Puget Sound Tariff and the Planning Agreement, nor have they demonstrated that the Respondents have violated Orders Nos. 890 and 1000.[49]

28. In support, Puget Sound and ColumbiaGrid assert that the Energize Eastside Project was originally conceived in 2006 and pre-dates the Order No. 1000 amendments to Attachment K of Puget Sound's Tariff; therefore, the Energize Eastside Project was subject to the Order No. 890 transmission planning requirements, not the Order No. 1000 requirements. They note that the Commission held that the Order No. 1000 requirements "apply to the evaluation or reevaluation of any transmission facility that occurs *after* the effective date of the public utility transmission provider's filing adopting the transmission planning and cost allocation reforms of the pro forma [Tariff] required by this Final Rule."[50] They state that Puget Sound's Order No. 1000 amendments to Attachment K of its Tariff did not take effect until January 1, 2015, and, therefore, that Complainants' allegations regarding supposed non-compliance with Order No. 1000 are inapposite.[51]

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[47] *Id.* at 15-16.

[48] *Id.* at 19.

[49] *Id.* at 19-20.

[50] *Id.* at 20-21 (citing Order No. 1000, FERC Stats. & Regs. ¶ 31,323 at P 65) (emphasis added).

[51] *Id.*

29. Moreover, Puget Sound and ColumbiaGrid argue that Puget Sound complied with its then-applicable Order No. 890 transmission planning requirements for the Energize Eastside Project. They state that, pursuant to Puget Sound's Attachment K that was approved following Order No. 890, Puget Sound was required to develop an annual 10-year plan that identified new transmission facilities and facility replacements or upgrades that it was planning over the next 10 years. They explain that, pursuant to the then-applicable Planning Agreement, Puget Sound was required to advise ColumbiaGrid of any "Single System Projects" that it was planning on its system and submit those proposed projects to ColumbiaGrid. Puget Sound and ColumbiaGrid assert that Puget Sound complied with these requirements.[52]

30. Puget Sound and ColumbiaGrid state that, in accordance with Puget Sound's Order No. 890-compliant Attachment K, Puget Sound identified the Energize Eastside Project in each of its annual 10-year plans from 2009 to 2014, and posted all of those annual plans on its Open Access Same-Time Information System. They explain that Puget Sound notified ColumbiaGrid of the Energize Eastside Project as a Single System Project, as required by the Planning Agreement, and that ColumbiaGrid subsequently included the Energize Eastside Project in its Biennial Transmission Expansion Plans.[53]

31. Puget Sound and ColumbiaGrid argue that, contrary to Complainants' arguments, their studies properly included the 1,500 MW of transmission capacity associated with Bonneville's obligation to return power to Canada under the Columbia River Treaty. They assert that, when studying energy flows on the transmission system, transmission planners study the paths upon which energy flows rather than the contract paths upon which energy is commercially transacted and scheduled. They state that all flows of energy in the Puget Sound region, such as flows related to Bonneville's obligation to deliver power to Canada, affect the flows of energy on parallel transmission facilities like Puget Sound's facilities. Puget Sound and ColumbiaGrid argue that, to ensure transmission system reliability, Puget Sound's and ColumbiaGrid's studies considered a range of possible operating conditions, including one where Bonneville schedules 1,500 MW of energy on its contract path, and the effect those operating conditions have on Puget Sound's underlying transmission facilities. They assert that these assumptions are consistent with prudent utility practice because Bonneville's legal obligation to Canada exists, and it must be accounted for and anticipated in planning studies.[54]

[52] *Id.* at 21-22.

[53] *Id.* at 27-28.

[54] *Id.* at 6, n.20.

32. Puget Sound and ColumbiaGrid argue that the Energize Eastside Project was properly classified a Single System Project. They state that Puget Sound's then-applicable Attachment K defines a Single System Project as "any modification of a single Transmission System that[:] (i) is for the purpose of meeting a Need that impacts only such single Transmission System; (ii) does not result in Material Adverse Impacts on any transmission system; and (iii) is included as a Single System Project in a Plan."[55] They explain that the Energize Eastside Project meets a "Need" that impacts only a single transmission system. They state that a "Need" is defined to include a projected inability of a transmission owner to serve its network load, native load customer obligations, or other existing long-term firm transmission obligations. Puget Sound and ColumbiaGrid assert that, in reports from 2013 and 2015, Puget Sound identified a need for transmission supply on Puget Sound's system in order to serve Puget Sound customers.[56]

33. Puget Sound and ColumbiaGrid state that Puget Sound introduced the Energize Eastside Project into ColumbiaGrid's existing Puget Sound Area Study Team transmission expansion planning process and the study team adopted the Energize Eastside Project in the team's expansion plan, without any finding of Material Adverse Impacts on any transmission system.[57] Puget Sound and ColumbiaGrid maintain that the Energize Eastside Project was included as a Single System Project in a "Plan." They state that "Plan" is defined as "at any time the then current Biennial Plan, as then revised by any Plan Updates." They assert that ColumbiaGrid explicitly included the Energize Eastside Project as a Single System Project in its most recent 2015 Biennial Plan.[58]

34. Puget Sound and ColumbiaGrid contend that ColumbiaGrid also complied with its remaining transmission planning responsibilities with respect to the Energize Eastside Project. They note that, in accordance with the Planning Agreement, ColumbiaGrid is required to develop a Biennial Plan, which must include those Single System Projects on a transmission system that have been submitted for inclusion in the Biennial Plan. Puget Sound and ColumbiaGrid assert that ColumbiaGrid has complied with this obligation because Puget Sound properly submitted the Energize Eastside Project to ColumbiaGrid

[55] *Id.* at 23 (citing Puget Sound Attachment K § A.51; Planning Agreement § 1.51).

[56] *Id.* at 24-25.

[57] *Id.* at 25-27.

[58] *Id.* at 27.

for consideration, and ColumbiaGrid included the project as a Single System Project in its Biennial Plans.[59]

35. Finally, Puget Sound and ColumbiaGrid argue that, even assuming *arguendo* that the Energize Eastside Project is subject to the Order No. 1000 amendments to the Puget Sound Tariff and the Planning Agreement, the Commission has made clear that Order No. 1000 "do[es] not require that the transmission facilities in a public utility transmission provider's local transmission plan be subject to approval at the regional or interregional level, unless that public utility transmission provider seeks to have any of those facilities selected in the regional transmission plan for purposes of cost allocation."[60] Puget Sound and ColumbiaGrid assert that the Energize Eastside Project is a local load-serving project and that none of the Respondents is seeking to include the project in the regional plan for purposes of cost allocation; therefore, the Energize Eastside Project would not be subject to Order No. 1000's regional approval process.[61]

B. Seattle Motion to Dismiss and Answer

36. Seattle explains that it is a department of the City of Seattle through which the city provides electric utility service. Seattle moves to dismiss the Complaint on the grounds that nothing in Order Nos. 890 or 1000 prevents a utility from building facilities in its service territory that are needed to serve load. Seattle also asserts that Complainants' references to Order No. 2000 are irrelevant to their claims because Order No. 2000 details the requirements applicable to RTOs, and there are no RTOs in the Energize Eastside Project's region.[62]

37. More specifically, Seattle argues that, in Order No. 890, the Commission expressly disavowed any intention to dictate which investments a utility would undertake, finding that "the planning obligations imposed in this Final Rule do not address or dictate which investments identified in a transmission plan should be undertaken by transmission providers."[63] Seattle further notes that Attachment K to the Puget Sound Tariff reflects the same concept, as the Tariff states that it "does not dictate or establish which

[59] *Id.* at 28-29.

[60] *Id.* at 21 (citing Order No. 1000, FERC Stats. & Regs. ¶ 31,323 at P 65).

[61] *Id.*

[62] Seattle Answer at 2-3.

[63] *Id.* at 7 (citing Order No. 890, FERC Stats. & Regs. ¶ 31,241 at P 438).

investments identified in a transmission plan should be performed or how such investments should be compensated."[64]

38. Seattle maintains that Order No. 1000 expressly permits incumbent public utility transmission providers to develop and build local transmission facilities outside of the Order No. 1000 process, provided the project is located solely within the public utility's retail distribution service area, and is not proposed or selected in the regional transmission plan for purposes of cost allocation.[65] Seattle further explains that Order No. 1000 defined a "local transmission facility" as "a transmission facility located solely within a public utility transmission provider's retail distribution service territory or footprint that is not selected in the regional transmission plan for purposes of cost allocation."[66]

39. Seattle asserts that the Energize Eastside Project falls within the Commission's definition of a "local transmission facility" since the transmission line is limited in length to 18 miles, the proposed route for the line sits entirely within Puget Sound's combined electric and gas service area, and Puget Sound has not opted to include the project in the ColumbiaGrid regional cost allocation process under Order No. 1000.[67] Seattle argues that, therefore, the Energize Eastside Project is the type of project the Commission made clear can be developed independently by an incumbent utility, without running afoul of Order No. 1000.[68]

40. Seattle further asserts that Complainants' claim that the Energize Eastside Project is a Bulk Electric System facility under the definition adopted in Order No. 773 is irrelevant. Seattle argues that the applicable scope of the Reliability Standards enforced by the North American Electric Reliability Corporation (NERC) has nothing to do with the scope of the transmission planning process under Order No. 1000.[69]

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[64] *Id.* (citing Puget Sound Tariff, Attachment K, Part II).

[65] *Id.* at 1-2.

[66] *Id.* at 7-8 (citing Order No. 1000, FERC Stats. & Regs. ¶ 31,323 at P 63).

[67] *Id.*

[68] *Id.* at 9.

[69] *Id.* at 10.

41. Finally, Seattle points out that Order No. 1000 has no direct application to entities like Seattle that fall within the definition of a non-public utility under section 201(f) of the FPA.[70] Seattle explains that it is a non-public utility because it is a department of the City of Seattle and the City of Seattle is a city organized under a Charter authorized by the Washington State Constitution.[71] Seattle asserts that, in Order Nos. 890 and 1000, the Commission expressly declined to take action under section 211A of the FPA[72] to require non-public utilities to participate in the Order Nos. 890 and 1000 processes.[73]

C. Bonneville Motion to Dismiss

42. Bonneville argues that it should be dismissed as a Respondent because the Complaint was filed pursuant to section 206 of the FPA, but the Commission has no jurisdiction over Bonneville pursuant to section 206.[74] Bonneville asserts that the Commission and several U.S. Circuit Courts have held that the Commission lacks jurisdiction over Bonneville pursuant to section 206.[75] Bonneville also notes that it is a party to a Memorandum of Agreement with Seattle and Puget Sound that memorializes the parties' plans to construct certain transmission projects, but that a subsequent letter agreement clarified that Bonneville is not participating in the Energize Eastside Project.[76]

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[70] 16 U.S.C. § 824 (2012).

[71] Seattle Answer at 2, 6, 11.

[72] 16 U.S.C. § 824j-1 (2012).

[73] Seattle Answer at 11 (citing Order No. 890, FERC Stats. & Regs. ¶ 31,241 at P 192; Order No. 1000, FERC Stats. & Regs. ¶ 31,323 at PP 815, 821; Order No. 1000-A, 139 FERC ¶ 61,132 at P 778).

[74] Bonneville Motion to Dismiss at 3-4.

[75] *Id.* at 4 (citing *Avista Corp.*, 143 FERC ¶ 61,255, P 2, n.4 (2013) ("[w]e recognize that Bonneville Power is not a public utility under section 201 of the FPA, 16 U.S.C. § 824 (2006), and is not subject to Commission directives made pursuant to FPA section 206;" *Bonneville Power Admin. v. FERC*, 422 F.3d 908, 924 (9th Cir. 2005) (*Bonneville*))).

[76] *Id.* at 2-3.

D. Avista Comments

43. Avista supports the Puget Sound and ColumbiaGrid Answer and reiterates that the Complaint contains no allegations of any violations of any specific provision of Order Nos. 890 and 1000, or of Attachment K to Puget Sound's Tariff.[77] Avista also reiterates that Order No. 1000 planning requirements do not apply to the Energize Eastside Project because the project predates the January 1, 2015 effective date of the Order No. 1000 amendments to Attachment K of Puget Sound's Tariff.[78] Avista further asserts that Complainants' request that the Commission order Puget Sound, Bonneville, and Seattle to file an Order No. 1000-compliant Planning Agreement is moot because the Commission has already conditionally accepted Respondents' Planning Agreement, subject to a further compliance filing that remains pending before the Commission.[79]

E. Complainants Answers and Motion for Order of Default

44. Complainants filed three separate answers to respond to the Puget Sound and ColumbiaGrid Answer, the Seattle Answer, and the Bonneville Motion to Dismiss, as well as a motion for Order of Default against Bonneville. In Complainants' answer to the Puget Sound and ColumbiaGrid Answer, they reiterate that the Energize Eastside Project is not a local load facility because it falls within the Bulk Electric System definition. Complainants also argue that the project should not be considered as a local load facility because its cost will be included in the rate for firm transmission service on the Puget Sound transmission system.[80] Complainants further contend that ColumbiaGrid has agreed to submit itself to the Commission's jurisdiction because it has signed the Planning Agreement and has a Commission-approved rate schedule on file with the Commission.[81] Finally, Complainants reiterate that Puget Sound's load flow studies were flawed because they included 1,500 MW of transmission capacity for Bonneville's delivery of power to Canada.[82]

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[77] Avista Comments at 3-4.

[78] *Id.* at 4.

[79] *Id.* at 5.

[80] Complainants Answer to Puget Sound and ColumbiaGrid Answer at 3-5.

[81] *Id.* at 12.

[82] *Id.* at 13-17.

45. In their answer to the Seattle Answer, Complainants argue that the Energize Eastside Project has been "selected in a regional transmission plan for purposes of cost allocation" because its cost would go into the rate for firm transmission service on the Puget Sound transmission system.[83] Complainants also reiterate that a "single-utility" approach would have identified Puget Sound's use of Seattle's transmission facilities as the solution to meet the need that the Energize Eastside Project is designed to address.[84] Complainants further contend that the Commission has jurisdiction over Seattle pursuant to section 211A of the FPA.[85] In addition, Complainants state that Seattle is subject to sanctions under section 211A because it does not have a Tariff on file with the Commission.[86]

46. In response to the Bonneville Motion to Dismiss, Complainants argue that section 211A of the FPA authorizes the Commission to enforce the requirements of Order No. 890 against even non-public utility transmission providers like Bonneville.[87] Complainants also argue that Bonneville has voluntarily submitted to the Commission's jurisdiction under Order No. 890 in exchange for reciprocity because Bonneville has signed the Planning Agreement and has an Attachment K to its Tariff on file with the Commission.[88]

47. In the motion for Order of Default against Bonneville, Complainants argue that, because Bonneville only moved to dismiss the Complaint and did not answer the Complaint, Bonneville should be considered in default under Rule 213(e) of the Commission's Rules of Practice and Procedure[89] and, as to Bonneville, all relevant facts stated in the Complaint should be deemed admitted.[90]

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[83] Complainants Answer to Seattle Answer at 6.

[84] *Id.* at 11-12.

[85] *Id.* at 13-14.

[86] *Id.* at 3-4.

[87] Complainants Answer to Bonneville Motion to Dismiss at 2, 4-7.

[88] *Id.* at 4, 10.

[89] 18 C.F.R. § 385.213(e) (2015).

[90] Complainants Motion for Order of Default at 1-2.

F. Seattle July 27 Answer

48. Seattle argues that Complainants are incorrect in claiming that Seattle is out of compliance with the Commission's open access policies because it does not have a Tariff on file with the Commission. Seattle asserts that reciprocity does not require Seattle to file its Tariff with the Commission. Seattle explains that it satisfies the reciprocity condition by offering to provide transmission service under the terms of its publicly-available Tariff, but it is not required to file that Tariff with the Commission.[91]

49. Seattle also argues that Complainants are wrong in asserting that there is a basis for proceeding against Seattle under section 211A of the FPA. Seattle asserts that the Complaint was framed as a complaint under section 206, which has no application to Seattle, a non-public utility under section 201(f).[92]

G. Bonneville July 28 Answers

50. Bonneville reiterates that the Complaint was filed under section 206 of the FPA, which does not apply to Bonneville, and that the Complaint fails to allege any violation on the part of Bonneville that falls within the Commission's jurisdiction. In response to Complainants' argument that section 211A authorizes the Commission to enforce the requirements of Order No. 890 against Bonneville, Bonneville argues that Complainants have not made any arguments that fall within the Commission's section 211A authority. Bonneville states that section 211A(b)(2) authorizes the Commission to issue a rule or order requiring an unregulated transmission utility, such as Bonneville, to provide transmission services "on terms and conditions (not relating to rates) that are comparable to those under which the unregulated transmitting utility provides transmission services to itself and that are not unduly discriminatory or preferential."[93] However, Bonneville argues that Complainants do not make any allegation of non-comparable or discriminatory effects as required by section 211A. Bonneville asserts that, moreover, Complainants are not current or potential transmission customers of Bonneville, and thus could not have been denied any service on Bonneville's system or be treated differently than any other of Bonneville's customers.[94]

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[91] Seattle July 27 Answer at 3-4.

[92] *Id.* at 5.

[93] Bonneville July 28 Answer at 3-4 (citing 16 U.S.C. § 824j-1(b)(2) (2012)).

[94] *Id.* at 4.

51. Bonneville also disputes that it has voluntarily submitted itself to the Commission's jurisdiction. It states that, in *Bonneville*, the U.S. Court of Appeals for the Ninth Circuit rejected an argument that Bonneville had submitted itself to Commission jurisdiction by agreeing to abide by certain tariffs, and found that the Commission cannot exercise jurisdiction beyond what is authorized in the statute, regardless of whether the jurisdiction is exercised without objection or even with the consent of the relevant parties.[95]

52. Bonneville also filed an answer to Complainants' motion for Order of Default. Bonneville states that Rule 213(e) of the Commission's Rules of Practice and Procedure does not require the Commission to find an entity in default for failing to answer a complaint, but instead provides that any person failing to answer a complaint "may" be considered in default and the relevant facts "may" be deemed admitted as to that person. Bonneville argues that it should not be considered in default because the Commission's lack of jurisdiction over Bonneville under section 206 is well settled and, thus, it would be a waste of Bonneville's and the Commission's resources to require Bonneville to answer the Complaint. If the Commission finds that it has jurisdiction over Bonneville in this case, Bonneville requests that the Commission deny the motion for Order of Default and allow Bonneville additional time to file an answer.[96]

H. Subsequent Pleadings

53. On August 11, 2015, Puget Sound filed a letter providing supplemental information to the factual assertions in its answer. On the same day, Complainants filed a letter asking the Commission not to make Puget Sound's letter part of the record.

III. Discussion

A. Procedural Matters

54. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2015), Avista's timely, unopposed motion to intervene serves to make it a party to this proceeding. Pursuant to Rule 214(d) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214(d) (2015), the Commission will grant the late-filed motion to intervene of Powerex, given its interest in the proceeding, the early stage of the proceeding, and the absence of undue prejudice or delay.

[95] *Bonneville*, 422 F.3d at 924.

[96] Bonneville July 28 Answer to Motion for Order of Default at 3-5.

55. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2015), prohibits an answer to an answer unless otherwise ordered by the decisional authority. We will accept the answers in this case because they provided information that assisted us in our decision-making process.

B. Substantive Matters

56. We will dismiss the Complaint with respect to Bonneville, Seattle, and ColumbiaGrid because the Complaint was filed pursuant to section 206 of the FPA, and Bonneville, Seattle, and ColumbiaGrid are not subject to the Commission's section 206 jurisdiction. Section 201 of the FPA specifies the scope of the Commission's jurisdiction under subchapter II of the FPA, which includes section 206. Section 201(f) provides that, "[n]o provision in this subchapter shall apply to, or be deemed to include, the United States, a State or any political subdivision of a State. . . or any agency, authority, or instrumentality of . . . the foregoing . . .unless such provision makes specific reference thereto."[97] Bonneville is a federal power marketing administration within the United States Department of Energy[98] and Seattle is a city organized under a Charter authorized by the Washington State Constitution;[99] section 206 of the FPA does not make any specific reference to include entities such as Bonneville or Seattle. Therefore, Bonneville and Seattle are not subject to the Commission's jurisdiction under section 206 of the FPA. The Commission has also found that ColumbiaGrid does not own, operate or control jurisdictional facilities necessary to qualify it as public utility under the FPA; thus, it is not subject to the Commission's jurisdiction under section 206 of the FPA.[100] Accordingly, we dismiss the Complaint against Bonneville, Seattle, and ColumbiaGrid.

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[97] 16 U.S.C. § 824(f).

[98] *See, e.g.*, Bonneville Motion to Dismiss at 3; *Avista Corp*., 143 FERC ¶ 61,255, at P 2, n.4 (2013) ("We recognize that Bonneville Power is not a public utility under section 201 of the FPA…and is not subject to Commission directives made pursuant to FPA section 206.").

[99] *See* Seattle Answer at 11.

[100] *See ColumbiaGrid*, 119 FERC ¶ 61,007, at PP 16, 27 (2007) ("NIPPC argues that the Commission should find that ColumbiaGrid is subject to the Commission's jurisdiction because ColumbiaGrid will perform certain jurisdictional services… We also disagree with assertions raised by NIPPC regarding the jurisdictional status of ColumbiaGrid… The current Planning Agreement does not cause ColumbiaGrid to own, operate or control jurisdictional facilities").

57. Complainants argue that the Commission has jurisdiction over Bonneville and Seattle in this matter pursuant to section 211A of the FPA.[101] We disagree. Section 211A provides that the Commission may issue a rule or order requiring an unregulated transmitting utility, such as Bonneville or Seattle, to provide transmission services "(1) at rates that are comparable to those that the unregulated transmitting utility charges itself; and (2) on terms and conditions (not relating to rates) that are comparable to those under which the unregulated transmitting utility provides transmission services to itself and that are not unduly discriminatory or preferential."[102] In Order No. 890, the Commission did not adopt a generic rule implementing section 211A with respect to all non-jurisdictional unregulated transmitting utilities[103] or invoke its authority under section 211A to require such non-jurisdictional entities to participate in the Order No. 890 planning processes, but instead found that it could exercise such authority on a "case-by-case" basis if there is an appropriate record.[104] Complainants have provided no basis for the Commission to exercise its authority under section 211A. The Complaint does not allege that Respondents are providing non-comparable, discriminatory, or preferential transmission services. Moreover, the Complaint does not allege that the Complainants are current or potential transmission customers of any Respondent; therefore, Complainants could not have received non-comparable or discriminatory transmission service from any Respondent, or have been treated differently from any other of Respondents' transmission customers.[105]

58. Complainants also argue that Bonneville, Seattle, and ColumbiaGrid have agreed to submit themselves to the Commission's jurisdiction because they are parties to the Planning Agreement and have tariffs or rate schedules on file with the Commission.[106]

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[101] *See* Complainants Answer to Bonneville Motion to Dismiss at 3-7; Complainants Answer to Seattle Answer at 13-14.

[102] 16 U.S.C. § 824j-1(b).

[103] Order No. 890, FERC Stats. & Regs. ¶ 31,241 at P 192.

[104] *Id.* P 441.

[105] *See id.* P 192 ("A *potential customer* may file an application with the Commission seeking an order compelling the unregulated transmitting utility to provide transmission service that meets the standards of FPA section 211A.") (emphasis added).

[106] *See, e.g.*, Complainants Answer to Puget Sound and ColumbiaGrid Answer at 12; Complainants Answer to Seattle Answer at 13-15; Complainants Answer to Bonneville Motion to Dismiss at 10.

Complainants assert that it is "commonplace" and "axiomatic" in the law that "a party not otherwise subject to the jurisdiction of a governmental entity can nevertheless agree to submit itself to that jurisdiction."[107] However, courts have found that the Commission cannot exercise jurisdiction or authority that is not authorized by statute, even if the relevant parties voluntarily participated in Commission-approved markets and the parties consent to the jurisdiction.[108]

59. We also will dismiss the Complaint with respect to the remaining Respondent, Puget Sound. Rule 206 of the Commission's Rules of Practice and Procedure provides that a complaint must "[c]learly identify the action or inaction which is alleged to violate applicable statutory standards or regulatory requirements"[109] and "[e]xplain how the action or inaction violates applicable statutory standards or regulatory requirements."[110] We find that the Complaint fails to meet these requirements because the Complaint does not cite any specific provision of any Commission order or regulation, or any specific provision of the Puget Sound Tariff or Planning Agreement, that Respondents have allegedly violated. Instead, Complainants make vague allegations that Respondents have violated Order Nos. 890, 1000, and 2000, as well as the Puget Sound Tariff and Planning Agreement, without citing any specific provision of those orders, the Tariff, or the Planning Agreement that Respondents have allegedly violated. Thus, Complainants have not identified the "applicable statutory standards or regulatory requirements," that Respondents have allegedly violated. We cannot conclude that the Complaint has sufficiently identified the behavior that allegedly violates the applicable standards or requirements, or that it has sufficiently explained how there is such a violation, when Complainants have not even identified the applicable standards or requirements.

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[107] *See, e.g.*, Complainants Answer to Puget Sound and ColumbiaGrid Answer at 12; Complainants Answer to Bonneville Motion to Dismiss at 10.

[108] *See, e.g.*, *Bonneville*, 422 F.3d 908, 924 ("[The Commission] cannot exercise jurisdiction or authority unless authorized by statute, regardless of whether the jurisdiction is exercised without objection or even with the consent of the relevant parties. . .Similarly, [the Commission] cannot expand its statutory authority to reach governmental entities/non-public utilities through § 206(b) simply because such entities voluntarily participated in markets approved by [the Commission] that involved [Commission]-jurisdictional wholesale sales of electric energy in interstate commerce.").

[109] 18 C.F.R. § 385.206(b)(1).

[110] 18 C.F.R. § 385.206(b)(2).

60. The Commission has previously dismissed complaints for failing to comply with these requirements. For example, in a case involving a complaint that alleged a violation of a NERC Reliability Standard, the Commission dismissed the complaint, finding that, "[i]f a complaint regarding an alleged violation of a Reliability Standard is to meet the threshold requirements of Rule 206, then the complaint must, at a minimum, set forth the specific provision of the Reliability Standard that is at issue."[111] The Complaint here similarly fails to provide that minimum level of specificity because it simply makes broad reference to Order Nos. 890, 1000, and 2000, the Puget Sound Tariff, and the Planning Agreement, and does not set forth any specific provision that is at issue.

61. In addition to the Complaint's procedural deficiencies, Complainants have not met their burden of proof under section 206 of the FPA to demonstrate that the Respondents' actions with respect to the Energize Eastside Project have violated any applicable requirement or are otherwise unjust, unreasonable, or unduly discriminatory, or preferential. Rather, contrary to Complainants' vague allegations that the Respondents have violated Order Nos. 890 and 1000, the record before us shows that Puget Sound and the other Respondents have complied with the applicable transmission planning requirements in those orders.

62. We agree with Puget Sound and ColumbiaGrid that the Energize Eastside Project was properly evaluated under the then-applicable Order No. 890 transmission planning requirements. The Commission has stated that Order No. 1000 does "not require that the transmission facilities in a public utility transmission provider's local transmission plan be subject to approval at the regional or interregional level, unless that public utility transmission provider seeks to have any of those facilities selected in the regional transmission plan for purposes of cost allocation."[112] The Commission has further explained that "Order No. 1000 does not prevent an incumbent transmission provider from meeting its reliability needs or service obligations by choosing to build new transmission facilities that are located solely within its retail distribution service territory or footprint and that are not selected in a regional transmission plan for purposes of cost allocation."[113] The record before us shows that the Energize Eastside Project is located completely within Puget Sound's service territory, that it was included in Puget Sound's local transmission plan to meet Puget Sound's reliability needs, and that neither Puget Sound, nor any other eligible party, requested to have the project selected in the

[111] *Citizens Energy Task Force v. Midwest Reliability Org.*, 144 FERC ¶ 61,006, at P 39 (2013).

[112] Order No. 1000-A, 139 FERC ¶ 61,132 at P 190.

[113] *Id.* P 425.

regional transmission plan for purposes of cost allocation;[114] therefore, the project is not subject to the Order No. 1000 regional approval process, and is instead subject to the Order No. 890 transmission planning requirements.

63. Based on the record before us, we find that Puget Sound and the other Respondents complied with their transmission planning responsibilities under Order No. 890 in proposing and evaluating the Energize Eastside Project. As required by the Attachment K of Puget Sound's Tariff that was approved following Order No. 890, Puget Sound identified the Energize Eastside Project in its annual 10-year plans. Puget Sound also notified ColumbiaGrid of the Energize Eastside Project as a Single System Project, as required by the then-applicable Planning Agreement, and ColumbiaGrid subsequently included the Energize Eastside Project in its Biennial Transmission Expansion Plans.[115] We agree with Puget Sound and ColumbiaGrid that the Energize Eastside Project was properly classified a Single System Project because it was designed to address Puget Sound's projected inability to serve its own customers, ColumbiaGrid's Puget Sound Area Study Team did not find any Material Adverse Impacts associated with the project, and ColumbiaGrid included the project as a Single System Project in its most recent 2015 Biennial Plan. Accordingly, we find that the Energize Eastside Project was proposed and evaluated in accordance with the then-applicable transmission planning requirements.

64. Complainants argue that the Energize Eastside Project has been "selected in a regional transmission plan for purposes of cost allocation," and therefore is subject to the Order No. 1000 regional approval process, because its cost would go into the transmission rate for firm transmission service on the Puget Sound transmission system.[116] However, Complainants' argument confuses two separate issues. The regional cost allocation contemplated in Order No. 1000 involves allocating the costs of a transmission facility across a region. Including the cost of the Energize Eastside Project in Puget Sound's rate for firm transmission service on its system affects only Puget Sound's transmission rate and does not mean that the project was "selected in a regional transmission plan for purposes of cost allocation."

[114] *See, e.g.*, Puget Sound and ColumbiaGrid Answer at 5, 21; Seattle Answer at 9.

[115] Puget Sound and ColumbiaGrid Answer at 27-28.

[116] *See* Complainants Answer to Seattle Answer at 6.

65. Complainants also assert that development of the Energize Eastside Project should have gone out to bid to third parties pursuant to Order No. 1000.[117] However, Complainants are incorrect because Order No. 1000 does not require project developers to be selected using a competitive bidding process[118] and there is no requirement in Puget Sound's Tariff or the Planning Agreement that Puget Sound issue a request for proposals or request bids prior to any construction of a transmission facility.

66. Complainants request that the Commission order Puget Sound "to cease and desist from any further activity with respect to [the Energize Eastside Project], including seeking permits for it."[119] Regardless of Complainants' arguments, we could not grant this requested relief because much of the "activity with respect to" the project, such as transmission siting and permitting, is not subject to the Commission's jurisdiction.

67. Complainants argue that the Energize Eastside Project is not a local load-serving project that is exempt from Order No. 1000 because it is a Bulk Electric System facility, as defined in Order No. 773.[120] This argument is inapposite. The Bulk Electric System definition was developed by NERC for use in determining the scope of NERC Reliability Standards and related obligations. Specifically, the definition of Bulk Electric System includes transmission facilities that are 100 kV or higher, with exceptions, such as local distribution facilities.[121] Order No. 1000 does not require that transmission planning regions use this Bulk Electric System definition to determine whether a transmission project is subject to the Order No. 1000 regional planning process. Instead, Order No. 1000 provides public utilities with the option to "use flexible criteria in lieu of 'bright line' metrics when determining which transmission projects are in the regional

[117] *See, e.g.*, Complaint at 2.

[118] Order No. 1000, FERC Stats. & Regs. ¶ 31,323 at PP 259, 321 & n.302 ("[T]he public utility transmission providers in a region may, but are not required to, use competitive solicitation to solicit projects or project developers to meet regional needs…[T]he Commission declines to adopt commenter suggestions to mandate a competitive bidding process for selecting project developers.").

[119] Complaint at 7.

[120] *See, e.g., id.* at 6; Complainants Answer to Puget Sound and ColumbiaGrid Answer at 4-5.

[121] Order No. 773, 141 FERC ¶ 61,236 at PP 45, 52, 56.

transmission plan."[122] Consistent with this option, ColumbiaGrid's regional planning process does not use the voltage of a transmission project as a threshold metric to determine whether the project should be in the regional plan. Nevertheless, the Energize Eastside Project is not subject to the Order No. 1000 regional approval process because it is located completely within Puget Sound's service territory, it was included in Puget Sound's local transmission plan to meet Puget Sound's reliability needs, and neither Puget Sound, nor any other eligible party, requested to have the project selected in the regional transmission plan for purposes of cost allocation. Whether or not the Energize Eastside Project falls within the Bulk Electric System definition does not affect this conclusion.

68. Complainants discuss alleged flaws in the load flow studies that Puget Sound conducted for the Energize Eastside Project. However, Complainants do not demonstrate that the studies violated any applicable transmission planning requirements or were otherwise unjust, unreasonable, or unduly discriminatory or preferential. Complainants do not cite anything that would require Puget Sound to use the study inputs and assumptions that Complainants prefer instead of the inputs and assumptions that Puget Sound used. Complainants state, without citation, that Puget Sound was obligated to ask ColumbiaGrid to conduct power flow studies for the project pursuant to a 2012 Order No. 1000 compliance filing.[123] They also assert that the studies did not comply with the "single utility" rule set forth in Order No. 1000.[124] However, as discussed above, any Order No. 1000 requirements are not applicable to the Energize Eastside Project. Beyond this, Complainants merely assert that Puget Sound's load flow studies were not "industry-standard," produced "tortured results," and used "undisclosed and dubious inputs."[125] Complainants do not explain what the "industry-standard" for such load flow studies is, and do not cite to anything demonstrating that Puget Sound's study inputs and assumptions were flawed beyond Complainants' mere allegations that they are

[122] Order No. 1000, FERC Stats. & Regs. ¶ 31,323 at P 223; Order No. 1000-A, 139 FERC ¶ 61,132 at P 283 (affirming that public utility transmission providers, in consultation with stakeholders, may apply either flexible criteria or bright-line metrics when determining which transmission facilities are in the regional transmission plan).

[123] *See* Complaint, J. Richard Lauckhart Aff. at P 25.

[124] *See id.* at 7, J. Richard Lauckhart Aff. at PP 49-50.

[125] *See id.* at 2-3; J. Richard Lauckhart Aff. at P 25.

flawed.[126] Moreover, Puget Sound has demonstrated that its needs assessments identified a transmission capacity deficiency, that the Energize Eastside Project was included in its annual transmission plans to address the deficiency beginning in 2009, that the project was reviewed by ColumbiaGrid's Puget Sound Area Study Team and not found to have any Material Adverse Impacts, and was included in ColumbiaGrid's Biennial Transmission Plans.[127] Accordingly, we do not believe that Complainants' allegations that Puget Sound's load flow studies were flawed provide any basis for the Commission to grant any of Complainants' requested relief.

69. Complainants also allege that ColumbiaGrid's method for selecting its board members is not fully compliant with the "independence" requirements set out in Order No. 2000. This allegation is inapposite because the Order No. 2000 "independence" requirements apply to RTOs, and ColumbiaGrid is neither an RTO nor ISO.[128] Accordingly, the "independence" requirement of Order No. 2000 does not apply to ColumbiaGrid.

70. Finally, Complainants request that the Commission order Puget Sound, Bonneville, and Seattle to provide the Commission with an Order No. 1000-compliant Planning Agreement, or, in the alternative, order those entities to form an RTO to ensure Order No. 890 and Order No. 1000 compliance.[129] Order No. 2000 encouraged the voluntary formation of RTOs, but did not require entities to form RTOs.[130] Therefore, Order No. 2000 does not support Complainants' argument that the Commission can order Puget Sound, Bonneville, and Seattle to form an RTO or ISO. Additionally, Complainants' request that the Commission order those Respondents to file an Order No. 1000-compliant Planning Agreement is also misplaced. Respondents have already

[126] *CAlifornians for Renewable Energy, Inc. v. Pac. Gas & Elec. Co.*, 142 FERC ¶ 61,143, at P 18 (2013) ("rather than bald allegations, [complainants] must make an adequate proffer of evidence including pertinent information and analysis to support its claims.") (quoting *Ill. Mun. Elec. Co. v. Cent. Ill. Pub. Serv. Co.*, 76 FERC ¶ 61,084, at 61,482 (1996)).

[127] *See, e.g.*, Puget Sound and ColumbiaGrid Answer at 5, 26-27.

[128] *See, e.g., id.* at 14; Avista Comments at 3, n.5.

[129] *See* Complaint at 8.

[130] Order No. 2000, FERC Stats. & Regs. ¶ 31,089 at 30,995 ("we find it appropriate in this instance to adopt an open collaborative process that relies on voluntary regional participation to design RTOs.").

filed the Planning Agreement with the Commission to facilitate compliance with Order No. 1000 and the Commission has conditionally accepted the Planning Agreement, subject to a further compliance filing, which remains pending before the Commission.[131] Any concerns that Complainants have regarding the compliance of Respondents' Planning Agreement with Order No. 1000 are more properly considered in that proceeding. Moreover, Complainants Coalition of Eastside Neighborhoods for Sensible Energy and Citizens for Sane Eastside Energy have filed a motion to intervene and protest in that ongoing proceeding,[132] and have not explained why timely resolution of their concerns regarding Order No. 1000 compliance cannot be achieved in that forum.[133]

71. Given our determinations above, we will deny Complainants' motion for Order of Default against Bonneville. As Bonneville notes, Rule 213 does not require the Commission to find an entity in default for failing to answer a complaint, but provides that the Commission "may" make such a finding.[134] Given that the Commission does not have section 206 jurisdiction over Bonneville in this proceeding, we find that Bonneville is not in default for not answering the Complaint.

[131] *See Avista Corp.*, 151 FERC ¶ 61,127, at P 2 (2015).

[132] Coalition of Eastside Neighborhoods for Sensible Energy, *et al.*, Motion to Intervene and Protest, Docket No. ER15-429-001, *et al.* (filed July 6, 2015).

[133] *See* 18 C.F.R. § 385.206(b)(6) (2015) (providing that a complaint must "[s]tate whether the issues presented are pending in an existing Commission proceeding or a proceeding in any other forum in which the complainant is a party, and if so, provide an explanation why timely resolution cannot be achieved in that forum.").

[134] 18 C.F.R. § 385.213(e) ("[a]ny person failing to answer a complaint *may be* considered in default, and all relevant facts stated in such complaint *may be* deemed admitted.") (emphasis added).

The Commission orders:

(A) The Complaint is hereby dismissed, as discussed in the body of this order.

(B) Complainants' motion for Order of Default is hereby denied, as discussed in the body of this order.

By the Commission.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

energizeEASTSIDE

Attachment B
Certification of Need

PUGET SOUND ENERGY

Puget Sound Energy
P.O. Box 97034
Bellevue, WA 98009-9734
PSE.com

July 20, 2017

Heidi Bedwell
Environmental Planning Manager
City of Bellevue
450 110th Avenue NE
Bellevue, WA 98009-9012

Re: Reliability Certification for Energize Eastside 230-kV Project (LUC 20.20.255.E)

Dear Ms. Bedwell,

Puget Sound Energy, Inc. (PSE) hereby certifies that the proposed electrical utility facility referenced above improves reliability to the customers served and reliability of the system as a whole.

The 2013 Eastside Needs Assessment confirmed that by winter of 2017-18, there is a transmission supply need on the Eastside of Lake Washington which impacts PSE customers and communities in and around Kirkland, Redmond, Bellevue, and Newcastle along with Clyde Hill, Medina, and Mercer Island. The 2015 Needs Assessment reconfirmed that, by winter of 2017-18, there is a transmission capacity deficiency on the Eastside. The supply need focuses on the two 230 kV supply injections into central King County at Sammamish Substation in the north and Talbot Hill Substation in the south. Rigorous comprehensive reliability assessments have been performed under the mandatory North American Electric Reliability Corporation's (NERC) Transmission Planning Standards (TPL-standards) and the WECC Reliability Standards to determine if any potential adverse impacts to the reliability of delivery of electricity exist on the PSE transmission system. In addition to the mandatory reliability standards, PSE also adheres to PSE's Transmission Planning Guidelines which describe how to plan and operate PSE's electric transmission system. These guidelines are in place to encourage the optimal use of the transmission system for service to loads and generators while complying with the mandatory standards. These guidelines also support transfers between utilities, when applicable, to support economic use of available resources.

To address this deficiency, PSE plans to build a new 230-115 kV substation in the Bellevue area with a 230-115 kV transformer and upgrade the existing 115-kV lines to 230-kV lines to provide a reliable source to the new substation. The new substation will allow existing 115 kV lines to distribute the power into Eastside communities. This would provide increased capacity and reliability for more than 100,000 customers in the Bellevue, Redmond, Kirkland, Newcastle, Clyde Hill, Medina, Mercer Island, Renton and Issaquah areas.

Completing this infrastructure upgrade would eliminate PSE's reliance on corrective action plans (CAPs). These CAPs could include intentional shedding of the load under certain conditions when re-dispatching the generation and/or sectionalizing the transmission system would not help in reducing the load beyond

capacity limitations of the transmission equipment. Thus, ensuring reliable service to all the Eastside customers and beyond by preventing a large area outage.

Should you have further questions, please feel free to contact Brad Strauch, Energize Eastside Infrastructure Program Manager at 425-456-2556 or bradley.strauch@pse.com.

Sincerely,

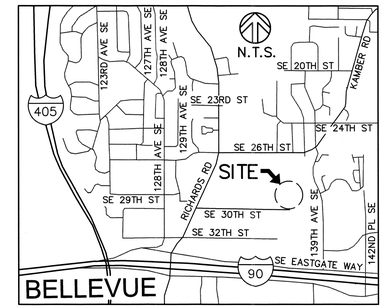
Jens Nedrud, PE
Manager, System Planning
PUGET SOUND ENERGY

PUGET SOUND ENERGY

RICHARDS CREEK 230kV SUBSTATION

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

CITY OF BELLEVUE, KING COUNTY, WASHINGTON



SURVEY NOTES:

1. PURPOSE OF THIS SURVEY THIS SURVEY REPRESENTS EXISTING CONDITIONS AT THE SITE OF THE PROPOSED RICHARDS CREEK SUBSTATION. THE SURVEY WAS PERFORMED IN JANUARY, 2015.

2. BASIS OF BEARING WASHINGTON COORDINATE SYSTEM, NORTH ZONE, NAD-83/07, EXPRESSED IN US SURVEY FEET.

   VERTICAL DATUM NAVD-88
   ALL VERTICAL ELEVATIONS ARE BASED ON NAVD88 DATUM FROM GPS OBSERVATIONS USING THE WASHINGTON STATE REFERENCE NETWORK.

3. BENCHMARKS

   APS #8 - HUB FND
   NORTH=215796.04
   EAST=1313420.82
   ELEV=102.98

   APS #2773 - MON FND
   NORTH=216381.56
   EAST=1313836.47
   ELEV=127.78

   APS #2432 - REBAR/CAP
   FND 5/8 INCH
   NORTH=2155785.62
   EAST=1313771.17
   ELEV=129.05

   APS #2832 - SPIKE SET
   W/CAP
   NORTH=216204.66
   EAST=1313518.66
   ELEV=101.70

4. METHODOLOGY THIS SURVEY WAS BASED ON A RTK VRS SURVEY (USING TRIMBLE R8 UNITS AND CORRECTIONS USING THE WASHINGTON STATE REFERENCE NETWORK) IN COMBINATION WITH A CONVENTIONAL SURVEY (USING LEICA 1200 SERIES 1" - 5" TOTAL STATION). THIS NETWORK MEETS OR EXCEEDS THE ACCURACY STANDARDS SET BY WAC 332-130-090.

5. PROPERTY LINES THIS IS NOT A BOUNDARY SURVEY. BOUNDARIES OF ADJOINING PROPERTIES ARE APPROXIMATE, BASED ON THE BEST AVAILABLE INFORMATION AND ARE SHOWN FOR GRAPHIC PURPOSES ONLY.

6. MONUMENTATION VISITATION ALL SURVEY MONUMENTS AND OTHER SURVEY MARKERS SHOWN HEREON WERE OCCUPIED OR OBSERVED DURING THE MONTHS OF NOVEMBER AND DECEMBER 2014.

7. ENCUMBRANCES THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT. ACCORDINGLY, ANY EASEMENTS OR RESTRICTIONS OF RECORD WHICH MAY BE REVEALED IN A TITLE REPORT HAVE NOT BEEN INCLUDED HEREON.

8. UNDERGROUND UTILITIES THE LOCATION OF SUBSURFACE UTILITIES ARE BASED ON OBSERVED UTILITY PAINT MARKS ON THE SURFACE, AND SET THERE BY OTHERS.

9. CONTOUR INTERVAL 2 FOOT

10. SUBSURFACE CONDITIONS WERE NOT EXAMINED OR CONSIDERED AS PART OF THIS SURVEY.

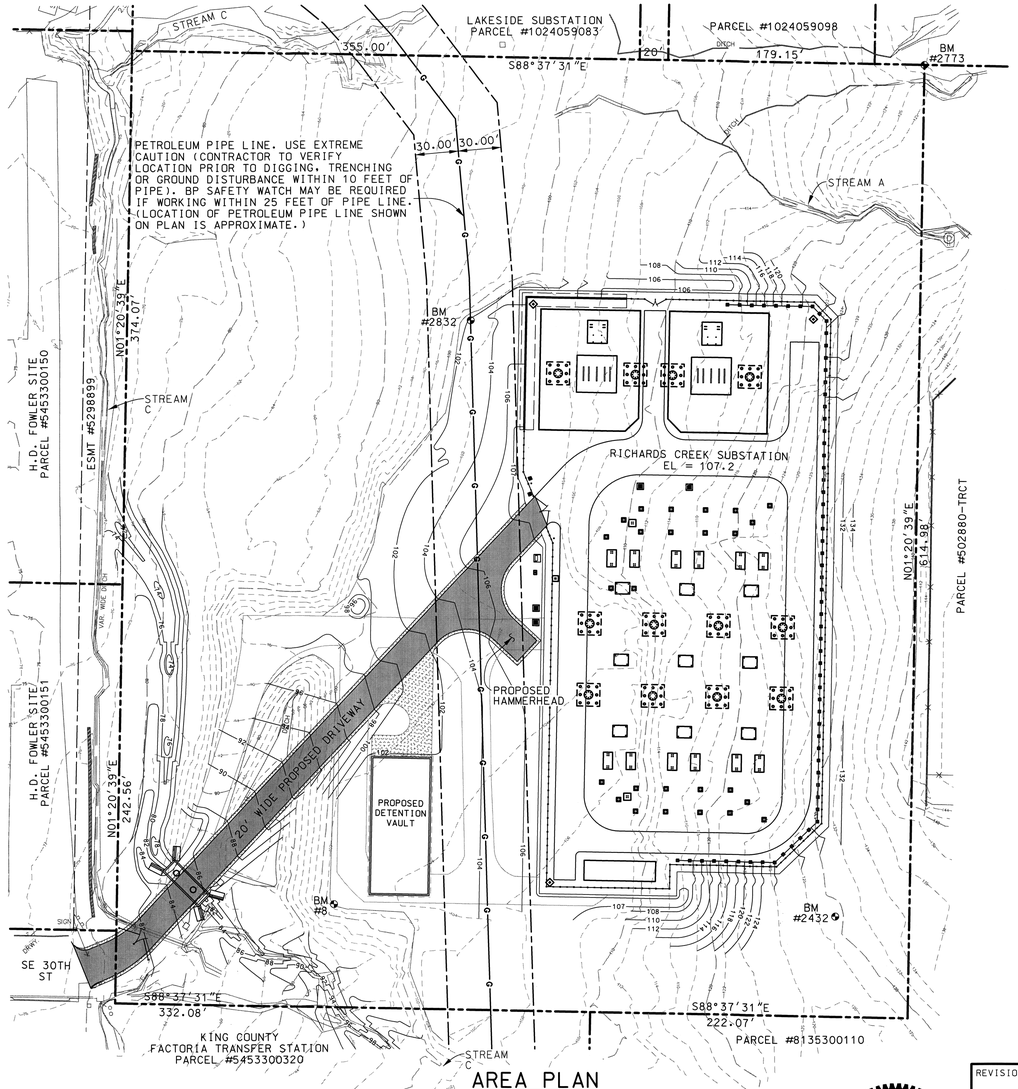
11. 1-800-424-5555 MUST BE CALLED NOT LESS THAN 48 HOURS BEFORE BEGINNING EXCAVATION WHERE ANY UNDERGROUND UTILITIES MAY BE LOCATED. FAILURE TO DO SO COULD MEAN BEARING SUBSTANTIAL REPAIR COSTS. (UP TO THREE TIMES THE COST OF REPAIRS TO THE SERVICE).

LEGAL DESCRIPTION:

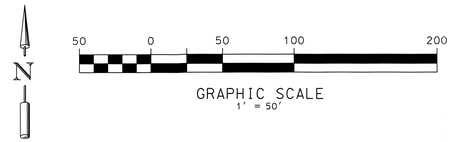
PARCEL C (TAX PARCEL 102405-9130):
THAT PORTION OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
BEGINNING AT THE NORTHWEST CORNER OF SAID SUBDIVISION;
THENCE SOUTHERLY ALONG THE WESTERLY MARGIN OF SAID SUBDIVISION 664.98 FEET, MORE OR LESS, TO THE NORTHWEST CORNER OF A TRACT CONVEYED TO KING COUNTY UNDER RECORDING NUMBER 5589770;
THENCE EASTERLY ALONG THE NORTH MARGIN OF SAID KING COUNTY TRACT, EXTENDED EASTERLY, A DISTANCE OF 554.152 FEET;
THENCE NORTHERLY PARALLEL TO THE WESTERLY MARGIN OF SAID SOUTHEAST QUARTER OF THE NORTHWEST QUARTER 664.98 FEET, MORE OR LESS, TO THE NORTH MARGIN OF SAID SUBDIVISION;
THENCE WESTERLY ALONG SAID NORTH MARGIN 554.152 FEET, MORE OR LESS, TO THE TRUE POINT OF BEGINNING.

SITE INFORMATION:

PROPERTY OWNER:	PUGET SOUND ENERGY
PARCEL NO:	102405-9130
ADDRESS:	13600 SE 30TH ST BELLEVUE, WA 98005
ZONING:	LI (LIGHT INDUSTRIAL)
LANDSCAPE SCREENING:	15' TYPE 1
COB UDEA #:	TBD
COB UTILITY GRID #:	I-11



AREA PLAN



PSE ENGINEERING CONTACTS
355 110TH AVE NE, BELLEVUE WA. 98004

GROUP	NAME	PHONE	EMAIL
PROJECT MANAGEMENT	MOLLY REED	425-462-3933	molly.reed@pse.com
ELECTRICAL	MIKE WOOD	425-647-1921	michael.wood@pse.com
CIVIL	SCOTT KIM	425-457-9866	scott.kim@pse.com
CONSTRUCTION MANAGEMENT	CODY SPENCE	425-456-2586	cody.spence@pse.com
CONTROLS	DAN MORMAN	425-456-2392	daniel.morman@pse.com
PERMITTING	BRAD STRAUCH	425-456-2556	bradley.strauch@pse.com

DRAWING LIST:

DRAWING NO:	SHEET NO:	TITLE:
D-19550	1	SITE LAYOUT AND GENERAL NOTES
D-19551	1	TOPOGRAPHIC AND BOUNDARY SURVEY (PARCEL C) #102405-9130
	2	TOPOGRAPHIC AND BOUNDARY SURVEY (PARCEL C) #102405-9130
D-19552	1	PRELIMINARY SITE PLAN B
	2	PRELIMINARY SITE PLAN B
D-19553	1	PRELIMINARY CLEARING, DEMOLITION AND TREE REMOVAL PLAN
D-19554	1	PRELIMINARY GRADING PLAN
	2	PRELIMINARY FENCING AND STATION DRIVEWAY LAYOUT PLAN
	3	PRELIMINARY SITE SECTION
	4	PRELIMINARY SITE SECTION
	5	PRELIMINARY ENTRANCE DRIVEWAY PLAN AND PROFILE
	6	PRELIMINARY ENTRANCE DRIVEWAY DETAIL
	7	PRELIMINARY GRADING SECTIONS AND DETAILS
	8	PRELIMINARY FENCING SECTIONS AND DETAILS
D-19555	1	LANDSCAPE PLAN 2
	2	LANDSCAPE DETAILS
D-18172	1	COVER SHEET
	2	GENERAL NOTES, TESC & QUANTITIES
	3	CONSTRUCTION SEQUENCE
	4	EXISTING CONDITIONS
	5	CHANNEL GRADING PLAN
	6	TESC & DEMOLITION PLAN
	7	TESC & DEMOLITION NOTES & DETAILS
	8	PROPOSED PLAN
	9	CULVERT DESIGN
	10	CULVERT & UTILITY CROSS-SECTION
	11	STATIONING & CROSS-SECTIONS
	12	STREAM CROSS-SECTIONS (1 OF 3)
	13	STREAM CROSS-SECTIONS (2 OF 3)
	14	STREAM CROSS-SECTIONS (3 OF 3) & PROFILE
	15	LARGE WOODY DEBRIS DETAILS
	16	LARGE WOODY DEBRIS ANCHOR DETAILS
	17	PLANTING PLAN (1 OF 3)
	18	PLANTING PLAN (2 OF 3)
	19	PLANTING PLAN (3 OF 3)
	20	PLANTING TYPICALS & SCHEDULE
	21	PLANTING NOTES & DETAILS (1 OF 2)
	22	PLANTING NOTES & DETAILS (2 OF 2)

NOTES:

1. CONTRACTOR SHALL HAVE A COPY OF THE 2017 CITY OF BELLEVUE UTILITY DEPARTMENT ENGINEERING STANDARDS AND UTILITY DEVELOPER EXTENSION AGREEMENT ON SITE AT ALL TIMES.
2. CRITICAL AREAS (WETLAND AND STREAM) ARE DEPICTED ON GRADING PLAN (D-18166, SHT 1).
3. NOTIFY BP PETROLEUM PRIOR TO ANY WORK.

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT C. KIM
STATE OF WASHINGTON
36044
REGISTERED PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489	
CUP AND CALUP SUBMITTAL		
		DATE (M/D/Y)
CAD	J. Nelson	8/17/17
ENGINEER	S. KIM	08/17/17
REVIEWED		/ /
APPROVED	J. HENRY	08/17/17

SITE LAYOUT AND GENERAL NOTES
RICHARDS CREEK SUBSTATION

PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO D-19550 | REV NO 0
SHEET: 1 OF 1
FILE NO:
SCALE: 1"= 50'-0" | CLASS: SITE
CADD NO: $$DGN$$ | CODE: RIC

DSD 002187

$USER$ $DATE$ $FILE$

WITHIN THE SW 1/4 OF THE NW 1/4 OF SECTION 10, T24N, R05E, BELLEVUE, WASHINGTON

REV	DATE	DESCRIPTION
1		
2		
3		

LEGAL DESCRIPTIONS - PSE PROPERTIES

PARCEL A (TAX PARCEL 102405-9083):

THE WEST 260 FEET OF THE NORTH 230 FEET OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER;
EXCEPT PORTION THEREOF LYING WITHIN SOUTHEAST 26TH STREET;
AND WEST 355 FEET OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF NORTHWEST QUARTER;
EXCEPT THE NORTH 230 FEET THEREOF;

ALL IN SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON.

PARCEL B (TAX PARCEL 102405-9097):

THE EAST 20 FEET OF THE WEST 375 FEET OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER;
EXCEPT THE NORTH 230 FEET THEREOF; OF SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON.

PARCEL C (TAX PARCEL (TAX PARCEL 102405-9130):

THAT PORTION OF THE SOUTHEAST -QUARTER OF THE NORTHWEST QUARTER OF SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID SUBDIVISION;
THENCE SOUTHERLY ALONG THE WESTERLY MARGIN OF SAID SUBDIVISION 664.98 FEET, MORE OR LESS, TO THE NORTHWEST CORNER OF A TRACT CONVEYED TO KING COUNTY UNDER RECORDING NUMBER 5589770;
THENCE EASTERLY ALONG THE NORTH MARGIN OF SAID KING COUNTY TRACT, EXTENDED EASTERLY, A DISTANCE OF 554.152 FEET;
THENCE NORTHERLY PARALLEL TO THE WESTERLY MARGIN OF SAID SOUTHEAST QUARTER OF THE NORTHWEST QUARTER 664.98 FEET, MORE OR LESS, TO THE NORTH MARGIN OF SAID SUBDIVISION;
THENCE WESTERLY ALONG SAID NORTH MARGIN 554.152 FEET, MORE OR LESS, TO THE TRUE POINT OF BEGINNING;
~~*EXCEPT THE SOUTH 50 FEET THEREOF DEEDED TO THE CITY OF BELLEVUE UNDER RECORDING NUMBER 8608150136~~.

*SINCE THIS LEGAL DESCRIPTION WAS CREATED THE SOUTH 50 FEET THEREOF DEEDED TO THE CITY OF BELLEVUE HAS REVERTED BACK TO PSE OWNERSHIP AS PER THE "NOTICE OF TERMINATION OF DEED OF DEDICATION", KING COUNTY RECORDING NUMBER 20151029000707.

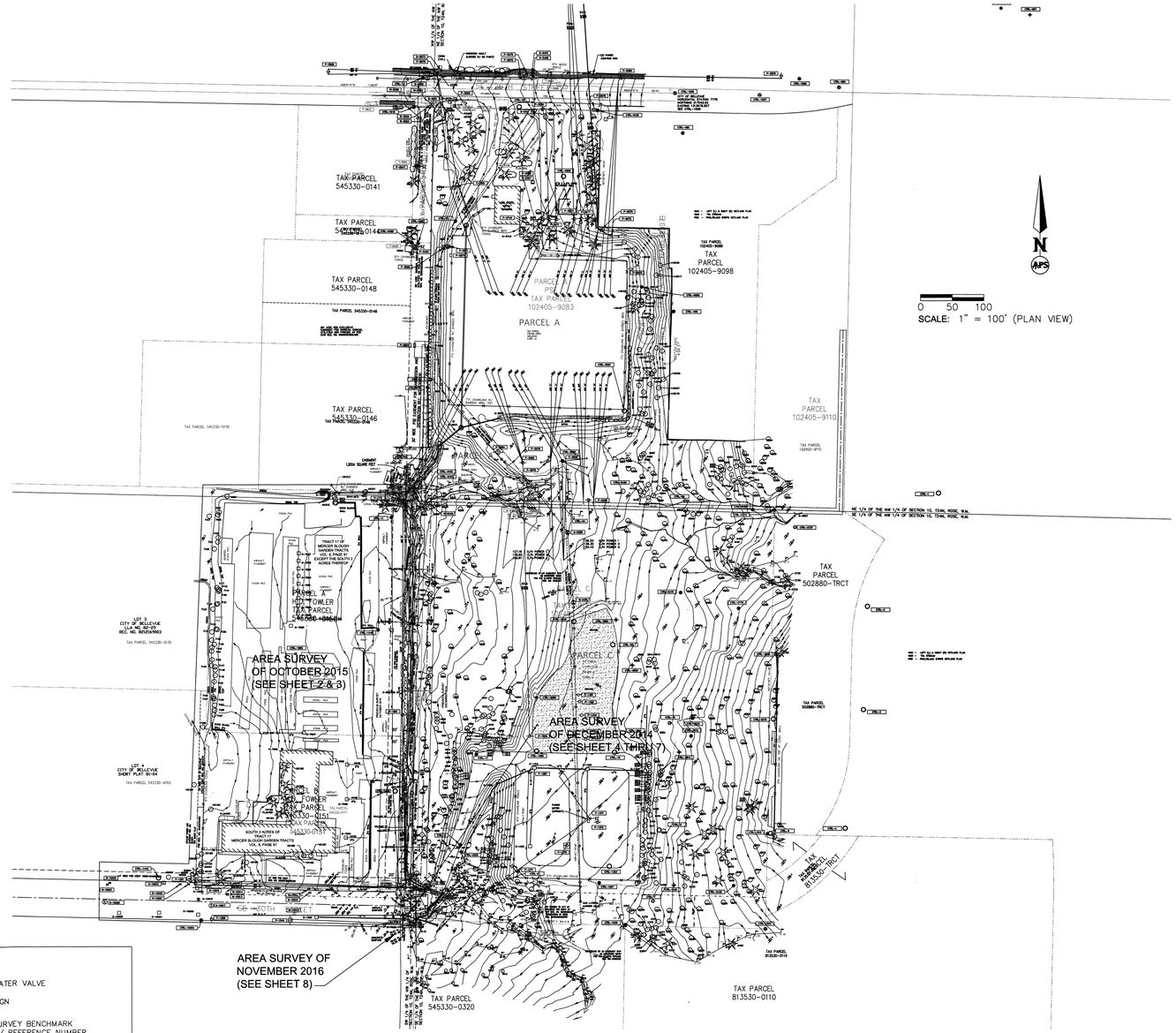
LEGAL DESCRIPTIONS - H.D. FOWLER PROPERTIES

PARCEL A (TAX PARCEL 545330-0150):

TRACT 17, MERCER SLOUGH GARDEN TRACTS, ACCORDING TO THE PLAT RECORDED IN VOLUME 8 OF PLATS, PAGE 91, IN KING COUNTY, WASHINGTON;
EXCEPT THE SOUTH 2 ACRES THEREOF;
TOGETHER WITH AN EASEMENT FOR INGRESS, EGRESS AND UTILITIES PURPOSES AS CREATED UNDER RECORDING NO. 5370143.

PARCEL B (TAX PARCEL 545330-0151):

THE SOUTH 2 ACRES OF TRACT 17, MERCER SLOUGH GARDEN TRACTS, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 8 OF PLATS, PAGE 91, IN KING COUNTY, WASHINGTON;
EXCEPT THE SOUTH 17.5 FEET AS CONVEYED BY DEED RECORDED UNDER RECORDING NUMBER 7103310534, IN KING COUNTY, WASHINGTON, FOR SOUTHEAST 30TH STREET.



DITCH LINE
GRAVELED AREA
ASPHALT PAVEMENT
FENCE LINE
CONC. ECO BLOCKS
POND
ROCKERY WALL
BUILDING
PROPERTY LINE
NEW X-SECTION LINE

SECTION LINE
1/16TH SECTION LINE
112 CONTOUR LINE (MINOR)
110 CONTOUR LINE (MAJOR)
B-1 NEW WETLAND FLAG (TWC-BLACK/PINK)
R1 NEW WETLAND FLAG (WMA-RIGHT BLUE/WHITE)
L1 NEW WETLAND FLAG (WMA-LEFT BLUE/WHITE)
A-1 NEW WETLAND FLAG
EDGE OF VEGETATION
D-1319 CB TYPE 1 W/ PIPE AND REFERENCE NUMBER
D-1409 STORM CULVERT AND REFERENCE NUMBER

100.9 GROUND SPOT ELEVATION
2840 DECIDUOUS TREE W/ REFERENCE NUMBER
2772 CONIFEROUS TREE W/ REFERENCE NUMBER
P-7701 TRANSMISSION POLE W/ REFERENCE NUMBER
① NEW WETLAND FLAG "DP-1"
② NEW WETLAND FLAG "TWL STREAM C WMCC-1R (9-17-5) FLAG"
③ NEW WETLAND FLAG "WMC-L2R FLAG"
④ NEW WETLAND FLAG "DP-2"

WATER VALVE
SIGN
CTRL-2339 SURVEY BENCHMARK W/ REFERENCE NUMBER
SURVEY WOOD HUB
SURVEY SET WOOD HUB
SURVEY FOUND REBAR AND CAP
SURVEY IRON PIPE
SURVEY SET NAIL
PLANTER
MAILBOXES
S-5062 SANITARY SEWER MANHOLE
SANITARY SEWER CLEANOUTS
BOLLARDS

STATE OF WASHINGTON SCOTT A. EDWARDS 41024 REGISTERED PROFESSIONAL LAND SURVEYOR 2/14/2017

VOSB Veteran Owned Small Business cVE

APS SURVEY & MAPPING
13221 S.E. 26TH STREET, SUITE A
BELLEVUE, WASHINGTON 98005
TEL. (425) 746-3200
FAX: (425) 746-3342

LABOR CHARGE DESCRIPTIONS	ORDER NUMBER
TRANSMISSION CONSTRUCTION	
TRANSMISSION REMOVAL	
TRANSMISSION EXPENSE	

CURRENT REVISION DESCRIPTION:
12/7/16 – UPDATED ADDED OLYMPIC PIPELINE EASEMENTS, SHEET SETUP, AND TITLE
2/14/17 –ADDED WETLAND FLAGS & PROPOSED EASEMENTST

	APPROVAL	DATE (M/D/Y)
CADD/DRAFT	MAGG	/ /
SURVEYED BY	SAE	/ /
CHKD/APRVD	SAE	/ /
FOREMAN		/ /
LOG OUT	J. HENRY	08/17/17
		/ /

JOINT FACILITIES ARRANGEMENTS – OTHER UTIL.
J.F.N. NO.

PRIOR LINE NAME:
SURVEYOR/DATE:
EASEMENT: PERMIT & FRAN.:
DISTRICT OPER: T R Sect
REGION: PSE Map
COUNTY:
MAPPED: TSG Map

RICHARDS CREEK SUBSTATION MAPPING 2014-2016

PUGET SOUND ENERGY
MAJOR PROJECTS TRANSMISSION DEPARTMENT

DRAWING NO D-19551 REV NO 0
SHEET 01 OF 02
SCALE: SEE SCALE
CLASS:
MICROFILMED: FILE NO:
CADD NO:
CODE:

DSD 002188

Plotted: DATE @ $TIME$ $USER$ REV DATE DESCRIPTION REV DATE DESCRIPTION REV DATE DESCRIPTION
DRAWING FILE NAME: P:\1005420\dwg\1005420T.dwg PLOTTED: Feb 15, 2017 - 2:38:07pm

WITHIN THE NW 1/4 OF SECTION 10, TOWNSHIP 24 NORTH, RANGE 05 EAST, W.M., IN KING COUNTY, WASHINGTON

POWER STRUCTURE TABLE - (PARCEL C)

P-1232
TRANSMISSION POLE
(POLE ID #221581/167302)
1.2' X 3.85' GLU-LAM
N=215780.80
E=1313253.08
EL=81.00
Elevation Full Desc
80.39 NW COR. GLU LAM POLE
80.43 SW COR. GLU LAM POLE
81.00 SE COR. GLU LAM POLE
81.75 DOWN GUY (E)
82.30 DOWN GUY (NNE)
131.47 POWER INSULATOR C (W.)
132.66 POWER INSULATOR C (N.)
138.68 POWER INSULATOR B (W.)
140.13 POWER INSULATOR B (N.)
146.12 POWER INSULATOR A (W.)
147.73 POWER INSULATOR A (N.)
149.63 TOP OF POLE SOUTHWEST COR.

P-1239
POWER POLE
(POLE ID #221581/167302)
18" DIA. WOOD
N=215781.30
E=1313247.43
Elevation Full Desc
80.12 BASE OF POLE
97.93 O/H COMM A (N-S)
98.56 O/H COMM B (N-S)
100.64 POWER INSULATOR Y (N-S)
105.32 TOP OF POLE

P-1240
TRANSMISSION POLE
(NO POLE ID #)
28" DIA. STEEL
N=215736.95
E=1313254.99
Elevation Full Desc
80.63 BASE OF POLE
82.56 DOWN GUY (SE)
82.59 DOWN GUY (SE)
83.01 DOWN GUY (SE)
126.88 POWER INSULATOR F (NE)
127.88 POWER INSULATOR F (W.)
134.26 POWER INSULATOR E (NE.)
134.95 POWER INSULATOR E (W.)
141.52 POWER INSULATOR D (NE)
142.26 POWER INSULATOR D (W.)
144.82 TOP OF POLE

P-1244
POWER POLE
(POLE ID #221575/167306)
18" DIA. WOOD
N=215724.17
E=1313247.37
Elevation Full Desc
80.17 POWER POLE
80.21 U/G CONDUIT 3.5 PVC EMPTY
80.82 DOWN GUY (S.)
81.86 DOWN GUY (E.)
100.33 O/H COMM B (N&W)
102.39 O/H COMM A (N&W)
105.96 POWER INSULATOR X
106.40 POWER INSULATOR Y (N&W)
107.39 TOP OF POLE

P-1249
DISTRIBUTION POLE W/ UG
(POLE ID# 221575/167292)
12" DIA. WOOD
N=215730.60
E=1313068.53
Elevation Full Desc
72.74 BASE OF POLE
94.35 O/H COMM "B"
95.58 O/H COMM "A"
99.01 POWER INSULATOR Y
105.95 TOP OF POLE

P-1250
TRANSMISSION POLE
(POLE ID #221576/167277)
18" DIA. WOOD
N=215732.36
E=1312944.16
Elevation Full Desc
68.68 TRANSMISSION POLE
122.71 POWER INSULATOR F
127.75 POWER INSULATOR E
132.75 POWER INSULATOR D
133.76 TOP OF POLE

P-1251
TRANSMISSION POLE
(POLE ID #221582/1672697)
18" DIA. WOOD
N=215788.94
E=1312918.84
Elevation Full Desc
67.63 TRANSMISSION POLE
129.70 POWER INSULATOR C
134.56 POWER INSULATOR B
139.69 POWER INSULATOR A
140.52 TOP OF POLE

P-1271
POWER POLE W/LIGHT
(NO POLE ID #)
10" DIA. WOOD
N=215808.07
E=1313426.33
Elevation Full Desc
103.77 BASE OF POLE
126.98 POWER INSULATOR X (SW)
127.24 POWER INSULATOR X (NE)
128.00 TOP OF POLE

P-1287
GUY POLE (CONNECT TO P-1290)
(POLE ID #221600/167323)
12" DIA. WOOD
N=215965.20
E=1313449.74
Elevation Full Desc
100.36 BASE OF POLE
100.56 DOWN GUY
100.74 DOWN GUY (FARTHEST)
124.58 TOP OF POLE

P-1290
TRANSMISSION POLE
(POLE ID #221605/167323)
18" DIA. WOOD
N=216022.83
E=1313448.60
EL=100.94
Elevation Full Desc
100.83 DOWN GUY (FARTHEST)
100.85 DOWN GUY
100.94 BASE OF POLE
127.77 POWER INSULATOR X
143.45 O/H POWER F (SW.)
144.85 O/H POWER F (N.)
150.38 O/H POWER E (SW.)
152.29 O/H POWER E (N.)
158.00 O/H POWER D (S.)
159.72 O/H POWER D (N
161.44 TOP OF POLE

P-1347
POWER POLE TRAINING POLE
N=216017.63
E=1313537.10
EL=102.68

P-1348
POWER POLE TRAINING POLE
N=216030.55
E=1313534.34
EL=102.45

P-1349
POWER POLE TRAINING POLE
N=216055.67
E=1313530.90
Elevation Full Desc
102.91 BASE OF POLE
133.05 TOP OF POLE

P-1350
POWER POLE TRAINING POLE
N=216077.24
E=1313527.60
Elevation Full Desc
102.56 BASE OF POLE
131.16 TOP OF POLE

P-1351
POWER POLE TRAINING POLE
N=216088.18
E=1313525.47
Elevation Full Desc
102.20 BASE OF POLE
131.48 TOP OF POLE

P-1371
POWER POLE W/LIGHT
(NO POLE ID #)
10" DIA. WOOD
N=215892.30
E=1313544.71
Elevation Full Desc
104.38 BASE OF POLE
131.07 POWER INSULATOR X
131.75 TOP OF POLE

P-1372
TRANSMISSION POLE
(NO POLE ID #)
20" DIA. STEEL
N=215886.45
E=1313555.79
EL=104.97

P-1375
TRANSMISSION POLE
(NO POLE ID#)
28" DIA. WOOD
W/ POWER VAULT W/
POLE ANCHORED IN BOTTOM
W/ PVC DRAIN.
N=215848.96
E=1313506.72
Elevation Full Desc
104.17 BASE OF POLE

P-1591
TRANSMISSION POLE
(POLE ID# 22?605/167323)
15" DIA. WOOD
N=216055.94
E=1313248.31
Elevation Full Desc
75.63 TRANSMISSION POLE
104.56 O/H POWER Y
126.52 POWER INSULATOR B
128.37 POWER INSULATOR C
131.14 POWER INSULATOR A
131.61 TOP OF POLE

TREE TABLE - (PARCEL C)

REFS.	TREE DESC.	DIA. (INCHES)
1165	ALDER	14
1222	POPLAR	10 6
1223	POPLAR	10
1224	POPLAR	8
1443	CEDAR	36
1733	ALDER	9
1769	MAPLE	10 (2)8 6 (2)4
1770	ALDER	10
1809	ALDER	14 9 8
1810	ALDER	13 11 9
1811	ALDER	8
1812	ALDER	21
1820	ALDER	24
1821	ALDER	20
1822	MAPLE	15
1823	MAPLE	24
1824	MAPLE	24
1827	MAPLE	22 (2)15
1829	MAPLE	24 21 18 13
1830	MAPLE	13
1831	MAPLE	(2)15 14
1900	ALDER	10 5
1901	ALDER	9
1902	ALDER	9
1903	ALDER	8
1904	ALDER	10
1905	ALDER	14
1906	ALDER	24
1908	ALDER	(2)12 10 9 (2)8 (2)6 CLUSTER
1909	ALDER	9
1910	ALDER	15 (2)8
1911	ALDER	10
1912	ALDER	20 9
1914	MAPLE	(2)12 11
1915	MAPLE	(2)18 11
1916	ALDER	11 5
1917	ALDER	9
1918	ALDER	9
1919	ALDER	11
1921	MAPLE	18 15 10 (2)8
1922	ALDER	13
1923	MAPLE	26 14
1924	ALDER	24
1925	ALDER	20
1926	ALDER	14
1927	ALDER	18
1928	MAPLE	9
1929	ALDER	13
1930	ALDER	13
1931	ALDER	10
1932	ALDER	12
1933	ALDER	11
1934	ALDER	22
1935	ALDER	12 9 8 (2)6 5 CLUSTER
1936	ALDER	8
1937	ALDER	8
1938	ALDER	16
1939	POPLAR	(3)12
1940	ALDER	16
1941	ALDER	9 (2)8 7
1942	ALDER	9
1943	ALDER	9
1944	ALDER	8
1945	ALDER	12
1946	ALDER	9
1947	ALDER	10
1948	ALDER	14
1949	ALDER	12
1950	ALDER	8
1951	ALDER	14
1952	ALDER	13
1953	ALDER	8
1954	ALDER	12
1955	ALDER	14
1956	ALDER	18
1957	ALDER	14
1958	ALDER	14
1959	ALDER	12
1960	ALDER	9 15
1961	POPLAR	12
1962	POPLAR	12 10
1964	ALDER	12
1965	ALDER	10 (2)9
1966	ALDER	9
1967	ALDER	9
1968	ALDER	9 10 7 5
1969	MAPLE	10
1970	ALDER	9 (2)7
1971	ALDER	9 11
1972	ALDER	9
1973	ALDER	8
1974	ALDER	10 (2)9 6
1975	MAPLE	8
1976	ALDER	11 7
1977	ALDER	9 7
1978	ALDER	11
1979	ALDER	14
1980	ALDER	10
1981	ALDER	8
1982	ALDER	9 8 7
1983	ALDER	18
1989	ALDER	12 10 6
1990	ALDER	12
1991	ALDER	12
1992	ALDER	13
1993	ALDER	8
1994	ALDER	9 5
1996	ALDER	10
1997	ALDER	8
2022	MAPLE	15
2023	ALDER	11
2024	ALDER	9 7
2025	ALDER	8
2037	ALDER	9
2038	ALDER	(3)8 6 5 CLUSTER
2072	ALDER	9
2073	ALDER	8 5
2074	ALDER	12 11
2075	ALDER	(2)8
2076	ALDER	9
2077	ALDER	9 8
2078	ALDER	10 8 6 5
2079	ALDER	8 7
2080	ALDER	9
2081	ALDER	10
2082	ALDER	9
2123	ALDER	12
2124	MAPLE	10
2125	ALDER	8
2126	ALDER	14
2127	MAPLE	9
2128	MAPLE	11
2129	ALDER	12 10 9 7
2130	ALDER	8
2131	ALDER	8
2132	ALDER	9 8
2133	ALDER	9
2134	ALDER	12
2135	ALDER	8 5
2136	ALDER	8
2137	MAPLE	8
2138	ALDER	9 4
2139	ALDER	11
2140	MAPLE	11
2141	MAPLE	(2)10
2142	MAPLE	8 5 4
2143	ALDER	10 8
2144	ALDER	14
2145	ALDER	9
2146	ALDER	9
2147	ALDER	9
2148	ALDER	10
2149	POPLAR	12 6
2150	POPLAR	14 12 10
2151	POPLAR	10
2152	POPLAR	CLUSTER 15 TREES 3"-9" (15' DIA.)
2153	POPLAR	8
2154	POPLAR	9
2256	ALDER	9
2257	ALDER	8
2258	ALDER	9
2259	ALDER	12
2260	ALDER	9
2261	ALDER	8
2262	ALDER	9
2263	ALDER	8
2264	ALDER	10 5
2270	MAPLE	18
2271	ALDER	8
2272	MAPLE	9 8
2273	ALDER	12
2274	MADRONA	10
2295	ALDER	14
2296	ALDER	8
2297	ALDER	10 9
2298	ALDER	9
2299	ALDER	15
2300	POPLAR	11
2301	ALDER	10 9 6 6
2304	POPLAR	9
2305	POPLAR	10
2306	POPLAR	8
2308	POPLAR	(2)12
2317	ALDER	9
2353	CHERRY	12
2354	CHERRY	9 7 5
2355	MAPLE	26 12 8
2356	MAPLE	20
2357	MAPLE	(2)8
2362	CEDAR	28
2363	MAPLE	12 18 9
2364	MAPLE	18
2365	MAPLE	21
2366	ALDER	8
2367	CEDAR	12
2370	MAPLE	14
2371	CEDAR	56
2372	MAPLE	18 8
2373	MAPLE	16
2374	MAPLE	16
2375	MAPLE	20 18
2376	MAPLE	14
2377	MAPLE	16
2378	MAPLE	12
2379	MAPLE	11
2382	ALDER	8
2403	ALDER	7
2404	ALDER	15
2405	ALDER	9
2406	ALDER	11
2407	ALDER	11
2408	ALDER	10
2409	ALDER	12
2410	ALDER	10
2411	ALDER	11
2412	ALDER	10
2413	ALDER	8
2414	ALDER	11 9
2415	ALDER	11 9
2416	ALDER	18
2417	MAPLE	8
2418	ALDER	16 7
2419	ALDER	10 8
2420	ALDER	9
2421	ALDER	14
2422	FIR	16
2423	FIR	10
2424	MAPLE	20 18 (2)15 10 8
2425	MAPLE	16
2426	MAPLE	18
2427	MAPLE	20
2428	MAPLE	15 14
2433	MAPLE	12
2434	MAPLE	22 13 9
2435	MAPLE	9
2436	MAPLE	15
2437	MAPLE	12
2438	MAPLE	24
2439	MAPLE	18
2440	MAPLE	18
2441	MAPLE	8
2442	MAPLE	18 14
2443	MAPLE	12
2447	MAPLE	22
2450	MAPLE	15
2451	CEDAR	26
2452	MAPLE	26 (2)18
2458	MAPLE	14
2459	MAPLE	8 6
2460	MAPLE	24
2461	MAPLE	12
2462	HEMLOCK	6 (2)5
2463	MAPLE	11
2464	MAPLE	15 12
2465	MAPLE	20 9
2466	MAPLE	8
2472	MAPLE	8
2473	MAPLE	14 4
2474	MAPLE	18
2475	MAPLE	20
2476	FIR	24
2477	MAPLE	12
2478	MAPLE	16
2479	MAPLE	15
2480	MAPLE	11
2481	MAPLE	15
2482	MAPLE	16
2483	CEDAR	9
2494	ALDER	9
2495	MAPLE	8
2496	ALDER	14
2497	ALDER	8
2498	ALDER	8 12 5 5
2499	ALDER	9
2500	ALDER	9
2501	ALDER	10 9
2502	ALDER	9 8 7
2503	ALDER	9 8
2504	ALDER	12
2505	ALDER	8
2506	ALDER	(2)14
2507	ALDER	10
2508	ALDER	15 (2)11
2509	ALDER	11
2510	ALDER	14
2511	ALDER	8
2512	ALDER	9 6
2513	ALDER	11
2514	ALDER	9
2515	ALDER	8
2516	ALDER	8
2517	ALDER	9
2518	ALDER	8
2519	ALDER	12 7
2520	ALDER	10
2524	ALDER	(2)9
2525	FIR	34
2526	FIR	18
2527	MADRONA	24
2528	MADRONA	9
2529	FIR	9
2530	MAPLE	(2)22
2531	MAPLE	10
2532	MAPLE	20
2534	MAPLE	8
2535	MAPLE	8
2536	FIR	30
2537	MAPLE	9
2547	POPLAR	18
2548	ALDER	10
2570	MAPLE	15
2571	MAPLE	27 (2)20 18 9
2572	MAPLE	24 12
2573	MAPLE	18 17
2574	MAPLE	14 7
2577	MAPLE	12 7
2578	MAPLE	14 10 7
2588	POPLAR	8
2589	ALDER	8
2590	ALDER	9
2591	MAPLE	24 8
2592	MAPLE	10
2593	MAPLE	11 9
2594	MAPLE	30 15
2595	MAPLE	24
2596	MAPLE	18 (2)15
2597	MAPLE	18
2598	MAPLE	15 14
2599	MAPLE	24 18
2600	MAPLE	20
2601	MAPLE	24 13
2602	MAPLE	24 15
2603	MAPLE	14
2605	MAPLE	20 24
2606	MAPLE	22
2627	ALDER	12 10 8
2628	MAPLE	22
2629	MAPLE	8
2630	MAPLE	CLUSTER (2)22 15 13 11 9
2632	MAPLE	24 18 16
2634	MAPLE	20 12
2635	MAPLE	10 9
2636	MAPLE	20 12
2637	MAPLE	22 15
2638	MAPLE	13
2639	MAPLE	24 9
2640	MAPLE	12
2641	POPLAR	12
2642	MAPLE	22 10
2643	MAPLE	22
2644	MAPLE	22
2645	MAPLE	(2)12 9
2649	MAPLE	24
2650	MAPLE	CLUSTER 18 16 15 15 12 12 10
2652	MAPLE	CLUSTER (2)22 (2)18 (1)9 (2)8
2653	MAPLE	30 25
2654	MAPLE	(2)20
2665	MAPLE	30
2667	CEDAR	24
2668	CEDAR	24
2669	CEDAR	9
2727	ALDER	10
2728	ALDER	9
2729	ALDER	8
2730	ALDER	10
2731	ALDER	12
2732	MAPLE	8
2733	MAPLE	24
2734	ALDER	8
2735	MAPLE	48
2738	MAPLE	24
2744	ALDER	15
2750	MAPLE	14
2751	MAPLE	24 18
2752	MAPLE	8
2753	MAPLE	16 30
2757	ALDER	(2)9
2758	FIR	10
2768	MAPLE	22 (2)20
2769	MAPLE	20 18
2835	MAPLE	CLUSTER 15 13 (2)12 10 (2)9
2836	MAPLE	15
2837	MAPLE	20
2838	MAPLE	CLUSTER 18 16 14 (2)12 10
2844	POPLAR	10
6025	DECIDUOUS	8
6026	DECIDUOUS	10 8
6229	ALDER	8
6231	MAPLE	14
6233	ALDER	10
6235	ALDER	12
6237	ALDER	10
6240	ALDER	10 8
6241	ALDER	10 12
6242	ALDER	10 8 (2)6
6411	MAPLE	14 8 10
6412	MAPLE	12 12 10 8 6
6413	DECIDUOUS	14
6420	ALDER	10 8
6421	DECIDUOUS	12
6470	ALDER	12 8
6471	ALDER	14
6472	MAPLE	26
6473	MAPLE	(2)12
6474	MAPLE	14
6475	MAPLE	18
6476	MAPLE	12 10
6478	ALDER	10
6480	MAPLE	36 20
6481	MAPLE	22
6482	MAPLE	20
6483	MAPLE	20
6485	ALDER	17
6486	ALDER	17
6487	ALDER	18 (SNAG)
6488	CEDAR	12
6489	CEDAR	34
6490	MAPLE	36
6491	ALDER	10
6492	MAPLE	26
6493	ALDER	16
6494	ALDER	10
6495	MAPLE	(2)10
6496	ALDER	16
6497	ALDER	12
6498	ALDER	12
6499	ALDER	14
6500	ALDER	12
6501	ALDER	10
6502	ALDER	12

SURVEY CONTROL MONUMENTS TABLE - (PARCEL C)

CTRL-2
SPIKE SET W/ CAP
N=216228.55
E=1313983.35
EL=174.20

CTRL-3
SPIKE SET W/ CAP
N=216064.64
E=1313976.80
EL=161.64

CTRL-4
SPIKE SET W/ CAP
N=215877.05
E=1313947.79
EL=149.26

CTRL-5
SPIKE SET W/ CAP
N=215869.01
E=1313829.62
EL=140.83

CTRL-6
SPIKE SET W/ CAP
N=215874.08
E=1313653.16
EL=114.69

CTRL-7
REBAR/CAP SET 5/8IN
N=215761.20
E=1313643.32
EL=114.62

CTRL-8
HUB FND
N=215796.04
E=1313420.82
EL=102.98

CTRL-9
NAIL FOUND MNW KC CON
N=215849.52
E=1313338.16
EL=88.27

CTRL-10
NAIL SET MNW
N=215729.61
E=1313220.25
EL=77.41

CTRL-11
NAIL SET MNW
N=216369.56
E=1313229.82
EL=75.31

CTRL-16
NAIL SET MNW
N=215734.21
E=1313230.54
EL=77.93

CTRL-17
NAIL SET MNW
N=215993.79
E=1313363.94
EL=98.64

CTRL-18
SPIKE SET W/ CAP
N=215997.26
E=1313582.59
EL=102.93

CTRL-19
REBAR/CAP SET 5/8
N=216043.34
E=1313669.78
EL=115.39

CTRL-64
HUB SET
N=216369.34
E=1313518.12
EL=94.96

CTRL-65
SPIKE SET W/CAP
N=216168.05
E=1313580.16
EL=103.63

CTRL-1006
CITY OF BELLEVUE
HORIZONTAL STATION 777R
N=217042.62
E=1313679.827
EL=118.13

CTRL-104
BENCH MARK FND COB 104
N=217042.26
E=1312020.58
EL=80.99

CTRL-1001
MON FND MIC
N=217070.02
E=1311982.80
EL=81.50

CTRL-1002
MON FND MIC
N=217083.46
E=1311972.38
EL=81.21

CTRL-1016
REBAR/CAP FND 1/2IN DEA
N=215868.11
E=1313824.58
EL=140.15

CTRL-1018
MON FND
N=215717.21
E=1313821.24
EL=128.97

CTRL-1027
REBAR/CAP FND 5/8IN
N=215789.77
E=1313558.21
EL=106.39

CTRL-1030
REBAR/CAP FND 1/2IN DEA
N=215723.21
E=1313599.46
EL=109.91

CTRL-1255
SPIKE SET W/ CAP WK PT
N=215998.83
E=1313459.30
EL=100.38

CTRL-1323
SPIKE SET W/ CAP
N=215816.25
E=1313574.34
EL=106.23

CTRL-1448
NAIL FOUND MNW
N=216190.85
E=1313208.43
EL=75.48

CTRL-1449
SPIKE SET WK PT
N=215935.14
E=1313235.28
EL=76.51

CTRL-1892
BOLT ON LIGHT POLE
W/ SPEAKER
N=216153.47
E=1313078.02
EL=84.02

CTRL-2339
LEAD/TACK FND GE 1 BORE
N=215838.84
E=1313339.73
EL=87.27

CTRL-2431
LEAD/TACK FND GE 1 BORE
N=215786.13
E=1313676.53
EL=118.20

CTRL-2432
REBAR/CAP FND 5/8 INCH
N=215785.62
E=1313771.17
EL=129.05

CTRL-2576
SPIKE SET W/ CAP
N=216049.97
E=1313834.43
EL=140.88

CTRL-2608
REBAR/CAP SET WK PT
N=216152.59
E=1313838.33
EL=138.13

CTRL-2611
REBAR/CAP FND 5/8
N=216024.92
E=1313624.08
EL=110.09

CTRL-2612
REBAR/CAP FND 5/8
N=216023.18
E=1313704.11
EL=118.77

CTRL-2613
LEAD/TACK FND G 1 BORE
N=215997.38
E=1313685.09
EL=115.88

CTRL-2633
NAIL FOUND BRASS W/ WA
N=216051.13
E=1313706.31
EL=123.06

CTRL-2737
REBAR/CAP SET 5/8 WK PT
N=216354.36
E=1313868.87
EL=132.71

CTRL-2770
REBAR/CAP FND 5/8
N=216225.54
E=1313779.41
EL=123.67

CTRL-2773
MON FND
N=216381.56
E=1313836.47
EL=127.76

CTRL-2832
SPIKE SET W/CAP
N=216204.66
E=1313518.66
EL=101.70

CTRL-2850
LEAD/TACK FND GEI BORE
N=216135.39
E=1313611.09
EL=106.39

CTRL-2851
LEAD/TACK FND GEI BORE
N=216207.40
E=1313585.43
EL=102.61

CTRL-2866
LEAD/TACK FND GEI BORE
N=216083.69
E=1313459.26
EL=100.76

CTRL-6479
REBAR/CAP FND 5/8
N=216250.48
E=1313687.73
EL=113.35

STORM DRAIN TABLE (PARCEL C)

D-1145
CB TYPE 1
RIM EL=80.36
IE 12" CONC (W)=75.06
IE 8" PVC (S)=78.63

D-1146
CULVERT (INCOMING)
IE 8" PVC (N)=78.48

D-1220
CULVERT (INCOMING)
IE 18" CMP (NW)=81.17

D-1221
CULVERT (OUTGOING)
IE 18" CMP (SE)=79.25

D-1228
STORM MANHOLE
RIM EL=87.72
WATER LEVEL EL=84.19
IE 12" CONC (SE)=83.04
IE 12" CMP (NE)=83.04
BOTTOM STRUCT.=79.09

D-1229
CULVERT (OUTGOING)
PLUGGED UNDER WATER
IE 12" CONC (NW)=82.73

D-1252
CB TYPE 1
RIM EL=73.30
IE 12" CONC (E)=69.30

D-1318
CB TYPE 1
RIM EL=102.56
IE 6" CONC (TO VAULT)=96.51
IE 6" CONC (N)=96.46

D-1319
CB TYPE 1
RIM EL=100.10
IE 6" CONC (1318)=95.81
IE 12" CMP (1320)=95.72
IE 12" CMP (1409)=95.65

D-1320
CB TYPE 1
EL=102.11
IE 12" CMP (E)=98.17
IE 12" CMP (W)=98.09
IE 6" CMP (S)=98.55

D-1324
CB TYPE 1
EL=102.76
IE 12" CMP (W)=100.21
IE 6" PVC (N)=100.53
IE 6" PVC (S)=100.60

D-1409
CULVERT (OUTGOING)
IE 12" CMP (NE)=86.61

D-2723
STORM MANHOLE
LID EL=127.66
IE 18" CONC (S)=125.29

D-2827
CULVERT (OUTGOING)
IE 18" CONC (E)=129.19

D-2926
CULVERT IN 18 CMP
N=215769.37
E=1313316.52
IE 18" CMP (W)=81.26

D-2927
CULVERT OUT 18 CMP
N=215782.06
E=1313283.06
IE 18" CMP (E)=79.29

WATER STRUCTURE TABLE (PARCEL C)

W-6239
WELL HEAD
N=216390.78
E=1313291.33
LID EL=68.60
KNUCKLE EL=66.62

GAS TABLE (PARCEL C)

G-6355
CATHODIC STATION
A 3" PVC W/ CAP
1.5'H FOR
"OLYMPIC PETROLEUM PIPELINE"
N=216346.07
E=1313508.82
EL=93.52

G-6351
CATHODIC STATION
A 3" PVC W/ CAP
1.5'H FOR
"OLYMPIC PETROLEUM PIPELINE"
N=216234.85
E=1313517.85
EL=96.29

MISCELLANEOUS TABLE (PARCEL C)

M-6300
UNKNOWN PIPE
N=216385.60
E=1313430.79
IE 12" DI (W)=71.57

M-6301
UNKNOWN PIPE
N=216384.94
E=1313445.48
IE 12" DI (E)=71.75

LEGAL DESCRIPTIONS, GENERAL NOTES - (REFER TO SHEET 1 OF 2)
SURVEY CONTROL TABLE FOR PARCEL C - (REFER TO THIS SHEET)
UTILITIES TABLE FOR PARCEL C - (REFER TO THIS SHEET)

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT A. EDWARDS
STATE OF WASHINGTON
41024
REGISTERED PROFESSIONAL LAND SURVEYOR
3-24-2015

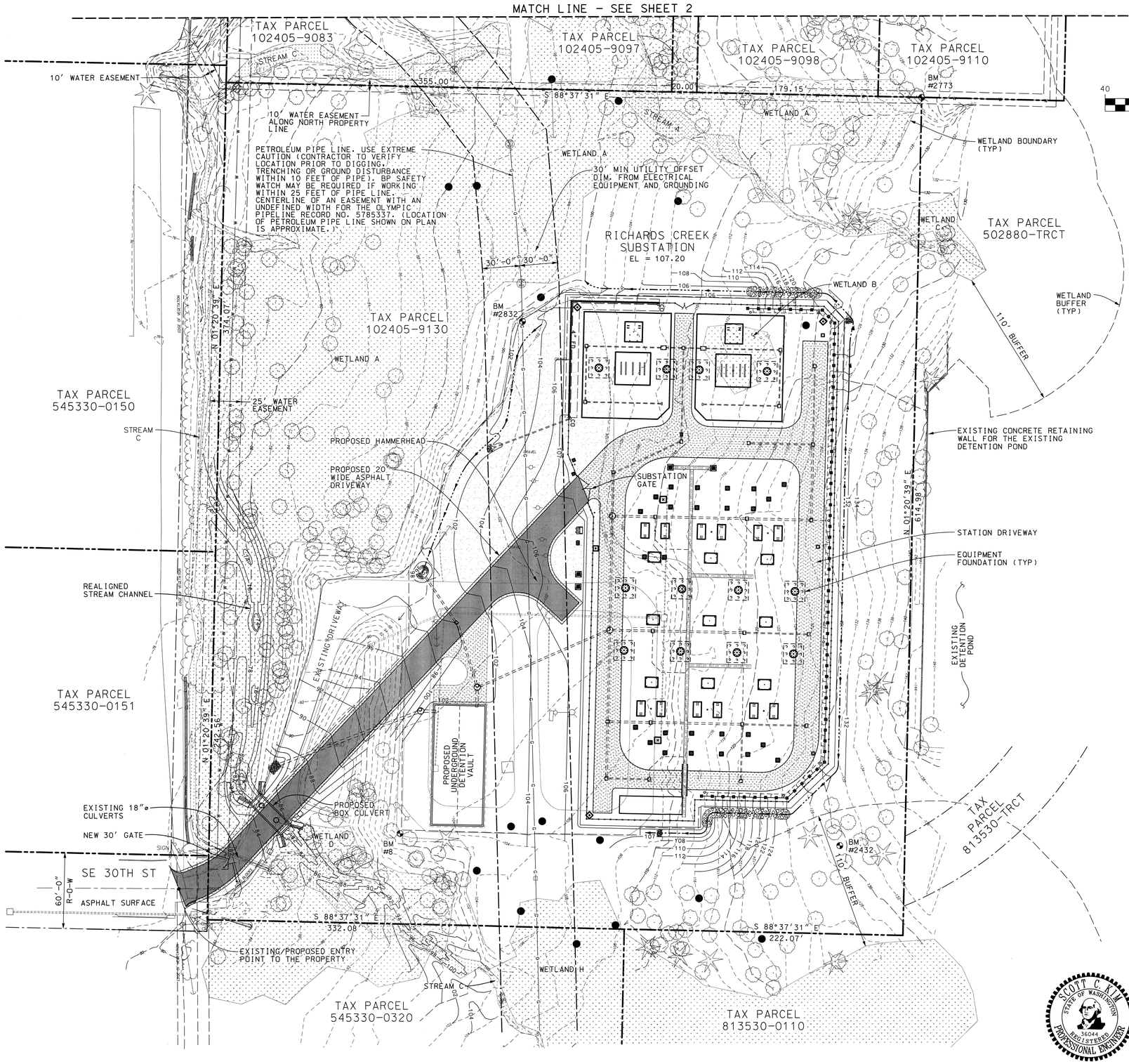
VOSB

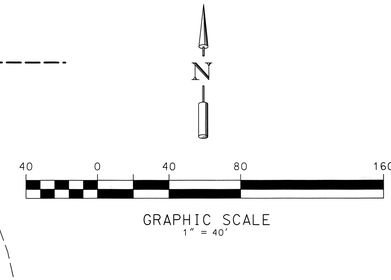
APS SURVEY & MAPPING
13221 S.E. 26TH STREET, SUITE A
BELLEVUE, WASHINGTON 98005
TEL. (425) 746-3200
FAX: (425) 746-3242
DRAWING: 1005347 / 1005347T-2015.DWG

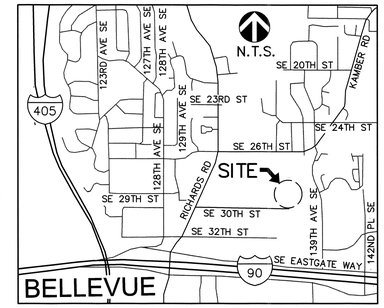
REVISION DESCRIPTION:	WO NUMBER:		RICHARDS CREEK SUBSTATION MAPPING 2014-2016
		DATE (M/D/Y)	
CAD	J. Nelson	8 / 14 / 17	PUGET SOUND ENERGY (PSE) — SUBSTATION ENGINEERING DEPARTMENT — DRAWING NO D-19551 — REV NO 0 — SHEET: 02 OF 02
ENGINEER	S. KIM	08 / 14 / 17	
REVIEWED		/ /	SCALE: 1"= 50' — CLASS: SITE — FILE NO:
APPROVED	J. HENRY	08 / 17 / 17	CADD NO: $$DGN$$ — CODE:

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

CITY OF BELLEVUE, KING COUNTY, WASHINGTON







VICINITY MAP

LEGAL DESCRIPTION:

PARCEL C:
THAT PORTION OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
BEGINNING AT THE NORTHWEST CORNER OF SAID SUBDIVISION;
THENCE SOUTHERLY ALONG THE WESTERLY MARGIN OF SAID SUBDIVISION 664.98 FEET, MORE OR LESS, TO THE NORTHWEST CORNER OF A TRACT CONVEYED TO KING COUNTY UNDER RECORDING NUMBER 5589770;
THENCE EASTERLY ALONG THE NORTH MARGIN OF SAID KING COUNTY TRACT, EXTENDED EASTERLY, A DISTANCE OF 554.152 FEET;
THENCE NORTHERLY PARALLEL TO THE WESTERLY MARGIN OF SAID SOUTHEAST QUARTER OF THE NORTHWEST QUARTER 664.98 FEET, MORE OR LESS, TO THE NORTH MARGIN OF SAID SUBDIVISION;
THENCE WESTERLY ALONG SAID NORTH MARGIN 554.152 FEET, MORE OR LESS, TO THE TRUE POINT OF BEGINNING.

SITE INFORMATION:

PROPERTY OWNER:	PUGET SOUND ENERGY
PROJECT CONTACT:	MOLLY REED PHONE NO.:425-462-3933 EMAIL: MOLLY.REED@PSE.COM
PARCEL NO:	102405-9130
ADDRESS:	13600 SE 30TH ST BELLEVUE, WA 98005
ZONING:	LI (LIGHT INDUSTRIAL)
LANDSCAPE SCREENING:	LANDSCAPE TYPE 1A
COB UDEA #:	TBD
COB UTILITY GRID #:	I-11
PROPERTY SIZE:	8.46 ACRES
TOTAL PROJECT SITE AREA:	4.0 ACRES
TOTAL IMPERVIOUS AREA:	1.1 ACRES
TOTAL PERVIOUS AREA:	2.9 ACRES

LEGEND

- PROPERTY LINE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- WETLAND BUFFER
- FENCE
- SOLDIER PILE WALL
- PROPOSED DRAINAGE PIPE
- EXISTING DRAINAGE PIPE
- PROPOSED DRAINAGE DITCH
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN, TYPE 1
- PROPOSED CATCH BASIN, TYPE 2
- PROPOSED GATE VALVE
- PROPOSED FOUNDATION
- PROPOSED VAULT
- PROPOSED STATION DRIVEWAY (GRAVEL)
- PROPOSED ACCESS DRIVEWAY (ASPHALT)
- PROPOSED TRANSMISSION POLE
- SURVEY BENCHMARK W/REFERENCE NUMBER
- PROPOSED CABLE TRENCH
- EXISTING YARD LIGHT
- EXISTING WATER VALVE

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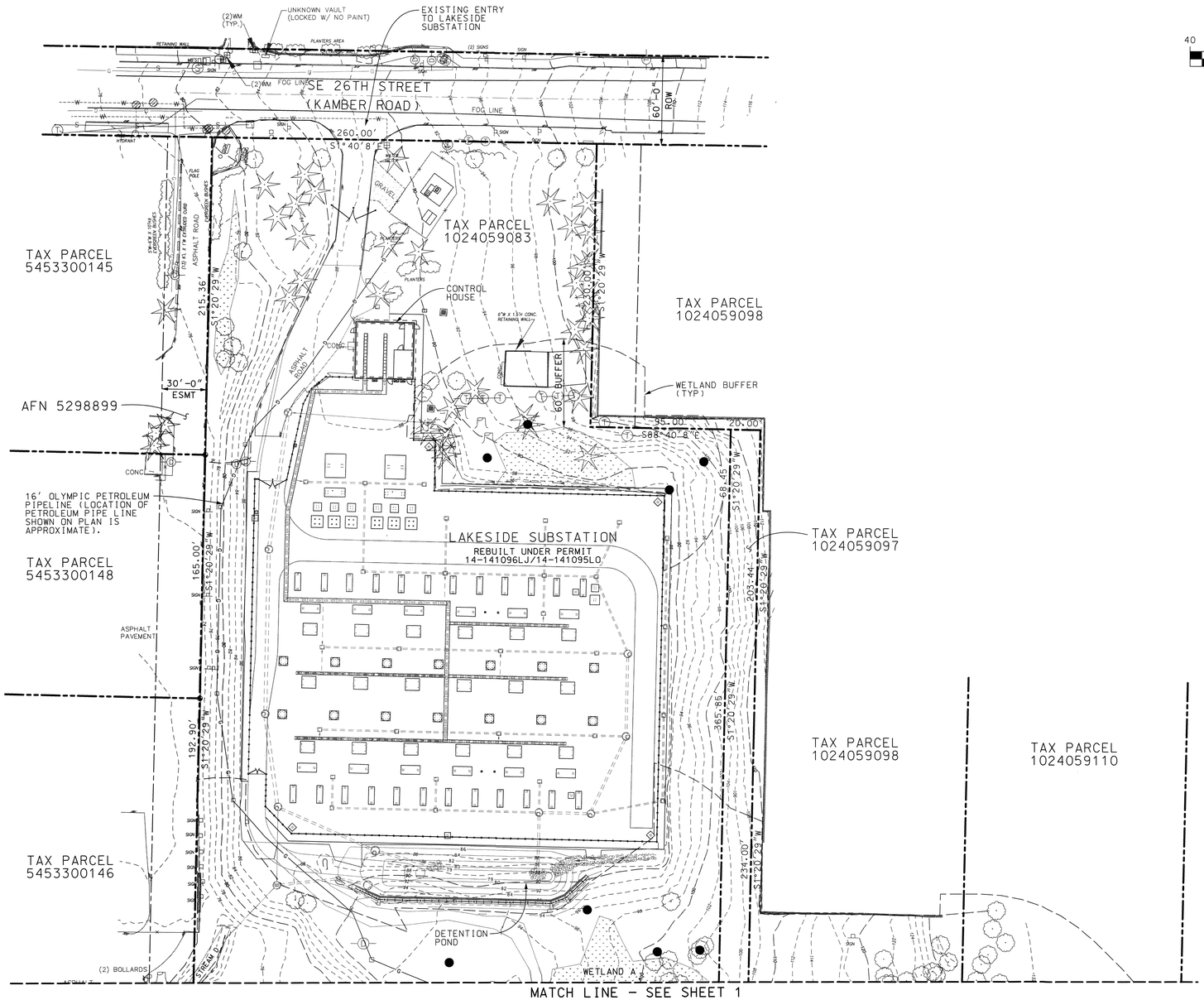
SCOTT C. KIM
STATE OF WASHINGTON
36044
REGISTERED
PROFESSIONAL ENGINEER

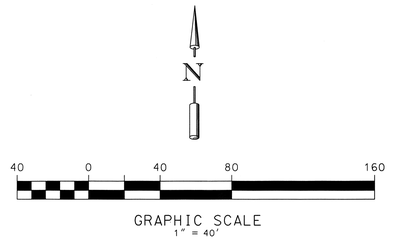
REVISION DESCRIPTION:	WO NUMBER: 111019489		PRELIMINARY SITE PLAN B RICHARDS CREEK SUBSTATION			
CUP AND CALUP SUBMITTAL						
		DATE (M/D/Y)	PUGET SOUND ENERGY	SUBSTATION ENGINEERING DEPARTMENT	DRAWING NO	REV NO
CAD	J. Nelsen	8/22/17			D-19552	0
ENGINEER		/ /			SHEET: 1 OF 2	
REVIEWED		/ /	SCALE: 1"= 40'-0"	CLASS: SITE		FILE NO:
APPROVED	J. Henry	08/22/17	CADD NO: $$DGN$$			CODE:

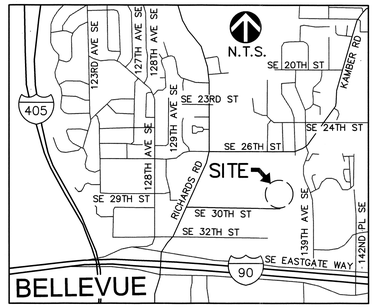
DSD 002190

$USER$ $DATE$ $FILE$

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.
CITY OF BELLEVUE, KING COUNTY, WASHINGTON







VICINITY MAP

LEGAL DESCRIPTION:

PARCEL A:
THE WEST 260 FEET OF THE NORTH 230 FEET OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER;
EXCEPT PORTION THEREOF LYING WITHIN SOUTHEAST 26TH STREET;
AND WEST 355 FEET OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER;
EXCEPT THE NORTH 230 FEET THEREOF;

ALL IN SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON.

SITE INFORMATION:

SEE SHEET 1

LEGEND

- PROPERTY LINE
- EXISTING CONTOURS
- WETLAND BUFFER
- SUBSTATION FENCE
- FENCE
- EXISTING RETAINING WALL
- EXISTING DRAINAGE PIPE
- EXISTING DRAINAGE DITCH
- EXISTING CATCH BASIN, TYPE 1
- EXISTING CATCH BASIN, TYPE 2
- EXISTING WATER VALVE
- EXISTING FOUNDATION
- EXISTING VAULT
- PROPOSED TRANSMISSION POLE
- EXISTING CABLE TRENCH

NOTES:

1. SUBSTANTIAL COMPLETION OF LAKESIDE SUBSTATION PHASE II CONSTRUCTION IS OCTOBER 2017.
2. PURPOSE OF PLAN SHEET IS TO DEPICT NEW POLE LOCATIONS.

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT C. KIM
STATE OF WASHINGTON
36044
REGISTERED PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489		PRELIMINARY SITE PLAN B RICHARDS CREEK SUBSTATION			
CUP AND CALUP SUBMITTAL						
		DATE (M/D/Y)	PUGET SOUND ENERGY	SUBSTATION ENGINEERING DEPARTMENT	DRAWING NO D-19552	REV NO 0
CAD	J. Nelson	8/17/17			SHEET: 2 OF 2	
ENGINEER	S. Kim	08/17/17				
REVIEWED		/ /	SCALE: 1"= 40'-0"	CLASS: SITE	FILE NO:	
APPROVED	J. HENRY	08/17/17	CADD NO: $$DGN$$		CODE:	

DSD 002191

$USER$
$DATE$
$FILE$

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

CITY OF BELLEVUE, KING COUNTY, WASHINGTON

TREE REMOVAL SCHEDULE

REF #	TREE DESC.	DIA (INCHES)
1222	POPLAR	10.6
1223	POPLAR	10
1224	POPLAR	8
2123	ALDER	12
2124	MAPLE	10
2125	ALDER	8
2126	ALDER	14
2127	MAPLE	9
2129	ALDER	12.10.9.7
2130	ALDER	8
2131	ALDER	8
2132	ALDER	9.8
2382	ALDER	8
2405	ALDER	9
2406	ALDER	11
2407	ALDER	11
2408	ALDER	10
2409	ALDER	12
2410	ALDER	10
2411	ALDER	11
2412	ALDER	10
2413	ALDER	8
2414	ALDER	11.9
2415	ALDER	11.9
2416	ALDER	18
2417	MAPLE	8
2418	ALDER	16.7
2419	ALDER	10.8
2420	ALDER	9
2421	ALDER	14
2422	FIR	16
2423	FIR	10
2424	MAPLE	20.18.(2)15.10.8
2425	MAPLE	16
2426	MAPLE	18
2427	MAPLE	20
2428	MAPLE	15.14
2433	MAPLE	12
2434	MAPLE	22.13.9
2474	MAPLE	18
2475	MAPLE	20
2476	FIR	24
2477	MAPLE	12
2478	MAPLE	16
2494	ALDER	9
2495	MAPLE	8
2496	ALDER	14
2497	ALDER	8
2498	ALDER	8.12.5.5
2499	ALDER	9
2500	ALDER	9
2501	ALDER	10.9
2502	ALDER	9.8.7
2503	ALDER	9.8
2504	ALDER	12
2505	ALDER	8
2506	ALDER	(2)14
2507	ALDER	10
2508	ALDER	15.(2)11
2509	ALDER	11
2510	ALDER	14
2511	ALDER	8
2512	ALDER	9.6
2513	ALDER	11
2514	ALDER	9

TREE REMOVAL SCHEDULE

REF #	TREE DESC.	DIA (INCHES)
2515	ALDER	8
2516	ALDER	8
2517	ALDER	9
2518	ALDER	8
2519	ALDER	12.7
2520	ALDER	10
2524	ALDER	(2)9
2525	FIR	34
2526	FIR	18
2530	MAPLE	(2)22
2531	MAPLE	10
2532	MAPLE	20
2534	MAPLE	8
2535	MAPLE	8
2536	MAPLE	8
2537	MAPLE	30
2577	MAPLE	12.7
2578	MAPLE	14.10.7
2595	MAPLE	24
2596	MAPLE	18.(2)15
2597	MAPLE	18
2598	MAPLE	15.14
2599	MAPLE	24.18
2600	MAPLE	20
2601	MAPLE	24.13
2603	MAPLE	14
2605	MAPLE	20.24
2606	MAPLE	22
2628	MAPLE	22
2629	MAPLE	8
2630	MAPLE	CLUSTER (2)22.15.13.11.9
2632	MAPLE	24.18.16
2634	MAPLE	20.12
2635	MAPLE	10.9
2636	MAPLE	20.12
2637	MAPLE	22.15
2638	MAPLE	13
2639	MAPLE	24.9
2640	MAPLE	12
2641	POPLAR	12
2642	MAPLE	22.10
2643	MAPLE	22
2644	MAPLE	22
2645	MAPLE	(2)12.9
2649	MAPLE	24
2650	MAPLE	CLUSTER 18.16. 15.15.12.12.10
2652	MAPLE	CLUSTER (2)22. (2)18.(1)9.(2)8
2653	MAPLE	30.25
2654	MAPLE	(2)20
2750	MAPLE	14
2751	MAPLE	24.18
2752	MAPLE	8
2753	MAPLE	16.30
2835	MAPLE	CLUSTER 15. 13.(2)12.10.(2)9
2836	MAPLE	15
2837	MAPLE	20
2838	MAPLE	CLUSTER 18.16.14.(2)12.10
2844	POPLAR	10
6482	MAPLE	20

TREE MANAGEMENT SCHEDULE

REF #	TREE DESC.	DIA (INCHES)
2460	MAPLE	24
2463	MAPLE	11
2464	MAPLE	15.12
2365	MAPLE	20.9
2466	MAPLE	8
2472	MAPLE	8
2473	MAPLE	14.4
2479	MAPLE	15
2480	MAPLE	11
2481	MAPLE	15
2482	MAPLE	16
2483	CEDAR	9
2527	MADRONA	24
2528	MADRONA	9
2529	FIR	9
2570	MAPLE	15
2571	MAPLE	27.(2)20.18.9
2572	MAPLE	24.12
2573	MAPLE	18.17
2574	MAPLE	14.7
2591	MAPLE	24.8
2592	MAPLE	10
2593	MAPLE	11.9
2594	MAPLE	30.15
2602	MAPLE	24.15
2735	MAPLE	48
2738	MAPLE	24
2768	MAPLE	22.(2)20
2769	MAPLE	20.18

LEGEND

- 2595 — EXISTING TREE (TO BE REMOVED)
- 2735 — EXISTING TREE (TO BE TRIMMED) SEE NOTE 5
- EXISTING FENCE (TO BE REMOVED)
- 12"D — EXISTING DRAINAGE (TO BE REMOVED)
- EXISTING ASPHALT (TO BE REMOVED)
- EXISTING GRAVEL (TO BE REMOVED)
- LIMITS OF VEGETATION MANAGEMENT
- LIMITS OF CLEARING
- PROPERTY LINE

DEMOLITION NOTES:

1. REMOVE EXISTING FENCING.
2. REMOVE EXISTING GRAVEL SURFACE.
3. REMOVE EXISTING ASPHALT ROAD.
4. DEMOLISH EXISTING CATCH BASIN.
5. REMOVE EXISTING STORM PIPE.

GENERAL NOTES:

1. UNLESS OTHERWISE NOTED FOR REMOVAL, CONTRACTOR SHALL PROTECT EXISTING TREES.
2. EXISTING 16" PETROLEUM PIPE LINE MUST BE PROTECTED AT ALL TIMES. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING BP COMPANY PRIOR TO CONSTRUCTION.
3. SEE SHEET D-18166, GRADING AND FENCING PLAN FOR CLEARING LIMITS.
4. DEMOLITION SHALL NOT BEGIN UNTIL TESC MEASURES ARE INSTALLED PER TESC PLAN.
5. TREES IN VEGETATION MANAGEMENT AREA SHALL BE CUT 10 TO 15 FEET ABOVE GRADE. CONTRACTOR SHALL REMOVE CUT VEGETATION.

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Call: TOLL FREE
1-800-424-5555

SCOTT C. KIM — STATE OF WASHINGTON — 16044 — REGISTERED PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489
CUP AND CALUP SUBMITTAL	

		DATE (M/D/Y)
CAD	J. Nelson	8 / 17 / 17
ENGINEER	S. Kim	08 / 17 / 17
REVIEWED		/ /
APPROVED	J. HENRY	08 / 17 / 17

PRELIMINARY CLEARING, DEMOLITION AND TREE REMOVAL PLAN RICHARDS CREEK

PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-19553 — REV NO: 0

SHEET: 1 OF 1

SCALE: 1"= 30'-0" — CLASS: SITE — FILE NO:

CADD NO: $$DGN$$ — CODE: RIC

DSD 002192

$FILE$ $DATE$ $USER$

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

CITY OF BELLEVUE, KING COUNTY, WASHINGTON

PSE PARCEL 1024059130

PARCEL 1024059110

PARCEL 1024059098

PSE PARCEL 1024059097

PSE PARCEL 1024059083

PARCEL 5453300146

LIMITS OF VEGETATION MANAGEMENT AREA

RIDGE 107.20

SLOPE 3.5:1

SOLDIER PILE WALL

5' SHOULDER (TYP AROUND SUBSTAION, SEE DET 5, SHT 7)

CLEARING LIMITS

BM #8
CTRL 2432
EL=129.05

SLOPE 2:1

SLOPE 3:1 (TYP)

STATION CB (SEE DET 7, SHT 7)

NORTH-SOUTH BASELINE
S 1°22'13" W

N = 215965.12
E = 1313667.50

STATION ELEVATION
107.20

SPCC CURB (D-18168, DETAIL 1)

PROPOSED HAMMERHEAD

STATION DRIVEWAY (SEE DET 4, SHT 7)

CB IN DRIVEWAY (SEE DET 8, SHT 7)

EXISTING 16" OLYMPIC PETROLEUM PIPELINE

GRAVEL ACCESS DRIVE (SEE DET 2, SHT 7)

DETENTION VAULT SEE DWG D-18706

PROPOSED DRIVEWAY

BM #8
CTRL 8
EL=102.98

SLOPE 2.5:1

SLOPE 2:1

QUARRY SPALLS (RIPRAP), TYP

CONSTRUCT SWALE TO DIRECT WATER TO STORM SYSTEM

LOCATION OF PETROLEUM PIPE LINE SHOWN ON PLAN IS APPROXIMATE.

EAST-WEST BASELINE
N 88°37'47" W

FOR STREAM RESTORATION AREA GRADING, REFER TO DWG D-18172, SHEETS 1 THROUGH 22

30' EASEMENT (AFN 539938)

WETLAND A

WETLAND D

WETLAND H

STREAM C

STREAM D

GRAPHIC SCALE
1" = 30'

LEGEND:

- 107.20 — FINISHED GRADE ELEVATION
- PROPERTY LINE
- STATION FENCE
- RIDGE LINE
- FOUNDATIONS (REF ONLY)
- TYPE I CATCH BASIN (SEE DRAINAGE PLAN)
- VAULT
- RIP RAP
- WETLAND BUFFER
- SETBACK FROM BUFFER

CONSTRUCTION NOTES

1. ALL RIDGES TO BE ELEVATION 107.2. GRADING WITHIN RIDGES SHALL SLOPE DOWN AT A MINIMUM OF 0.5% TO CATCH BASIN ELEVATION. SEE D-18166, SHEET 7 FOR GRADING AROUND CATCH BASINS.
2. GRADING ON STATION DRIVE WITHIN RIDGES SLOPE DOWN AT A MINIMUM OF 0.5% AND A MAXIMUM OF 2.0% TO CATCH BASIN GRATE ELEVATION.
3. SEE DRAINAGE PLAN, DRAWING D-18167, SHEET 1, FOR RIM ELEVATIONS.
4. NOTIFY BP PETROLEUM PRIOR TO ANY WORK.

GRADING NOTES

1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN THE EVENT OR DISCOVERY OF POOR SOILS, GROUNDWATER OR DISCREPANCIES IN THE EXISTING CONDITIONS AS NOTED ON THE PLANS.
2. MAXIMUM SLOPE STEEPNESS SHALL BE 2:1 ORIZONTAL:VERTICAL FOR CUT AND FILL SLOPES.
3. UNLESS OTHERWISE SPECIFIED, ALL EMBANKMENTS IN THE PLAN SET SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 2-03.3(14)B OF THE WSDOT STANDARD SPECIFICATIONS. EMBANKMENT COMPACTIONS SHALL CONFORM TO SECTION 2-03.3(14)C, METHOD B OF SAID STANDARD SPECIFICATIONS.
4. EMBANKMENTS DESIGNED TO IMPOUND WATER SHALL BE COMPACTED TO 95% MAXIMUM DENSITY PER SECTION 2-03.3 (14)C, METHOD C OF WSDOT STANDARD SPECIFICATIONS.
5. ALL AREAS RECEIVING FILL MATERIAL SHALL BE PREPARE BY REMOVING VEGETATION, NONCOMPLYING FILL, TOPSOIL AND OTHER UNSUITABLE MATERIAL, BY SCARIFYING THE SURFACE TO PROVIDE A BOND WITH THE NEW FILL, AND WHERE SLOPES ARE STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL AND THE HEIGHT IS GREATER THAN 5 FEET, BY BENCHING INTO SOUND COMPETENT MATERIAL AS DETERMINED BY A SOILS ENGINEER.
6. GRADE BREAK LINES INDICATE A TRANSITION IN GRADE SLOPES. GRADE TO DRAIN AS NOTED BY SLOPE DIRECTION SYMBOLS.
7. DISTURBED AREAS NOT RECEIVING LANDSCAPING OR CRITICAL AREA ENHANCEMENT SHALL RECEIVE HYDROSEED ONCE FINAL GRADE IS REACHED.

REFERENCE DRAWINGS

D-19551 TOPOGRAPHIC AND BOUNDARY SURVEY (PARCEL C) #102405-9130

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT C KIM
STATE OF WASHINGTON
36044
REGISTERED
PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489
CUP AND CALUP SUBMITTAL	

		DATE (M/D/Y)
CAD	J. Nelson	8 / 14 / 17
ENGINEER	S. KIM	08 / 14 / 17
REVIEWED		/ /
APPROVED	J. HENRY	08 / 17 / 17

PRELIMINARY GRADING PLAN RICHARDS CREEK SUBSTATION

PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

SCALE: 1"= 30'-0" | CLASS: SITE | CADD NO: $$DGN$$

DRAWING NO D-19554 | REV NO 0 | SHEET: 1 OF 8 | FILE NO: | CODE:

$USER$ $DATE$ $FILE$

DSD 002193

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

CITY OF BELLEVUE, KING COUNTY, WASHINGTON

PSE PARCEL 1024059130

PROJECT BOUNDARY

614.98' N01°20'39"E

PSE PARCEL 1024059098

PSE PARCEL 1024059097

PSE PARCEL 1024059083

353'-3"

241'-3"

143'-0"

112'-0"

31'-0"

43'-10½"

SOLDIER PILE WALL

16'-7½"

11'-9½"

135°

20'-0"

15'R

25'-0"

69'-2½"

N = 215965.12
E = 1313667.50

45'R

25'R

15'-0"

17'-0"

222.07'

66'-3"

74'-6"

8'-3"

86'-0"

S88°37'31"E

179.15'

85'-5½"

NORTH-SOUTH BASELINE
S 1°22'13" W

18'-3"

GATE

106

15'-0"

115'-9"

20.00'

130'-0"

120'-0"

STATION ELEVATION
107.20

CONCRETE CURB; TYP (SEE DET 1, SHT 7)

69'-3"

35'R

60'R

3'R

5'R

205°

156°

23'-0"

GATE

12'-1½"

18'-10½"

RETAINING WALL AND FOOTING

49'-6"

81'-0"

160'-0"

122'-6"

130'-6"

253'-0"

413'-0"

30.00' OFFSET

30.00' OFFSET

355.00'

DETENTION VAULT

ENTRANCE DRIVEWAY

PETROLEUM PIPE LINE. USE EXTREME CAUTION (CONTRACTOR TO VERIFY LOCATION PRIOR TO DIGGING. TRENCHING OR GROUND DISTURBANCE WITHIN 10 FEET OF PIPE). BP SAFETY WATCH MAY BE REQUIRED IF WORKING WITHIN 25 FEET OF PIPE LINE. (LOCATION OF PETROLEUM PIPE LINE SHOWN ON PLAN IS APPROXIMATE.)

EAST-WEST BASELINE
N 88°37'47" W

30' ENTRANCE / RIGHT OF WAY GATE (SEE D-13038)

LOCATE GATE AT STA 1+14.2 SEE D-18166, SHT 5)

PROJECT BOUNDARY

374.07' N01°20'39"E

H.D. FOWLER
PARCEL 5453300150

242.56' N01°20'39"E

H.D. FOWLER
PARCEL 5453300151

30' EASEMENT (AFN 539938)

SE 30TH ST

30 0 30 60 120

GRAPHIC SCALE
1" = 30'

LEGEND:

- PROPERTY LINE
- STATION FENCE
- SOLDIER PILE WALL
- FOUNDATIONS (REF ONLY)

NOTES

1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN THE EVENT OR DISCOVERY OF POOR SOILS. GROUNDWATER OR DISCREPANCIES IN THE EXISTING CONDITIONS AS NOTED ON THE PLANS.
2. NOTIFY BP PETROLEUM PRIOR TO ANY WORK.
3. CONTRACTOR SHALL COORDINATE THE LOCATION OF THE PROPOSED 30' WIDE ENTRY GATE W/PSE CONSTRUCTION MANAGER PRIOR TO INSTALLATION.

REFERENCE DRAWINGS

D-19551	TOPOGRAPHIC AND BOUNDARY SURVEY (PARCEL C) #102405-913
D-19554	PRELIMINARY GRADING PLAN (SHEET 1 OF 8)

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT C. KIM
STATE OF WASHINGTON
36044
REGISTERED
PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489	
CUP ANC CALUP SUBMITTAL		
		DATE (M/D/Y)
CAD	J. Nelson	8/14/17
ENGINEER	S. Kim	08/14/17
REVIEWED		/ /
APPROVED	J. Henry	08/17/17

PRELIMINARY FENCING AND STATION DRIVEWAY LAYOUT PLAN
RICHARDS CREEK SUBSTATION

PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

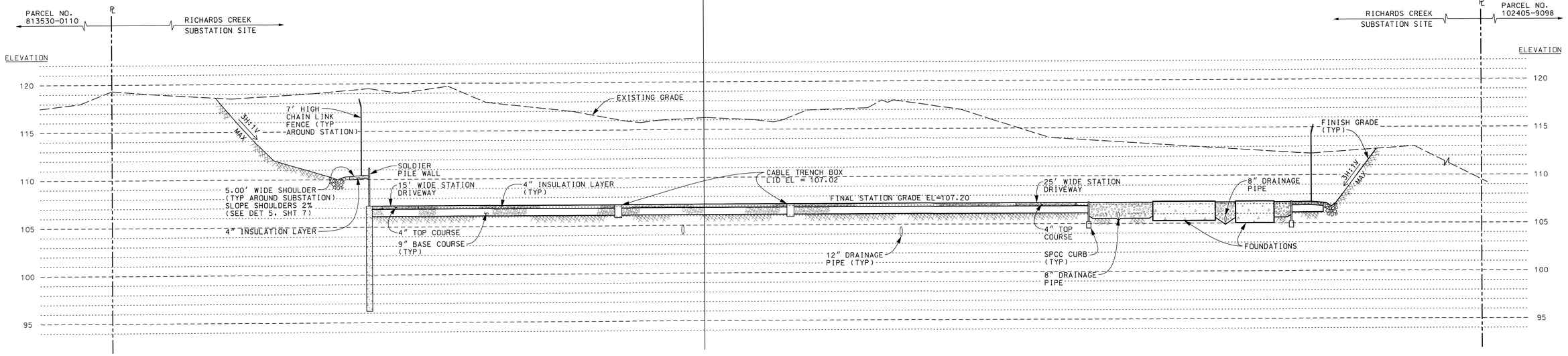
DRAWING NO: D-19554 | REV NO: 0
SHEET: 2 OF 8
SCALE: 1"= 30'-0" | CLASS: SITE
CADD NO: $$DGN$$ | FILE NO: | CODE:

DSD 002194

$USER$ $DATE$ $FILE$

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

CITY OF BELLEVUE, KING COUNTY, WASHINGTON



SITE SECTION A/1

(FACING WEST)

SCALE: HORIZ: 1"= 20'
VERT: 1"= 5'

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT C KIM
STATE OF WASHINGTON
36044
REGISTERED
PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489
CUP AND CALUP SUBMITTAL	

		DATE (M/D/Y)
CAD	J. Nelson	8/14/17
ENGINEER	S. Kim	08/14/17
REVIEWED		/ /
APPROVED	J. HENRY	08/17/17

PRELIMINARY SITE SECTION RICHARDS CREEK SUBSTATION

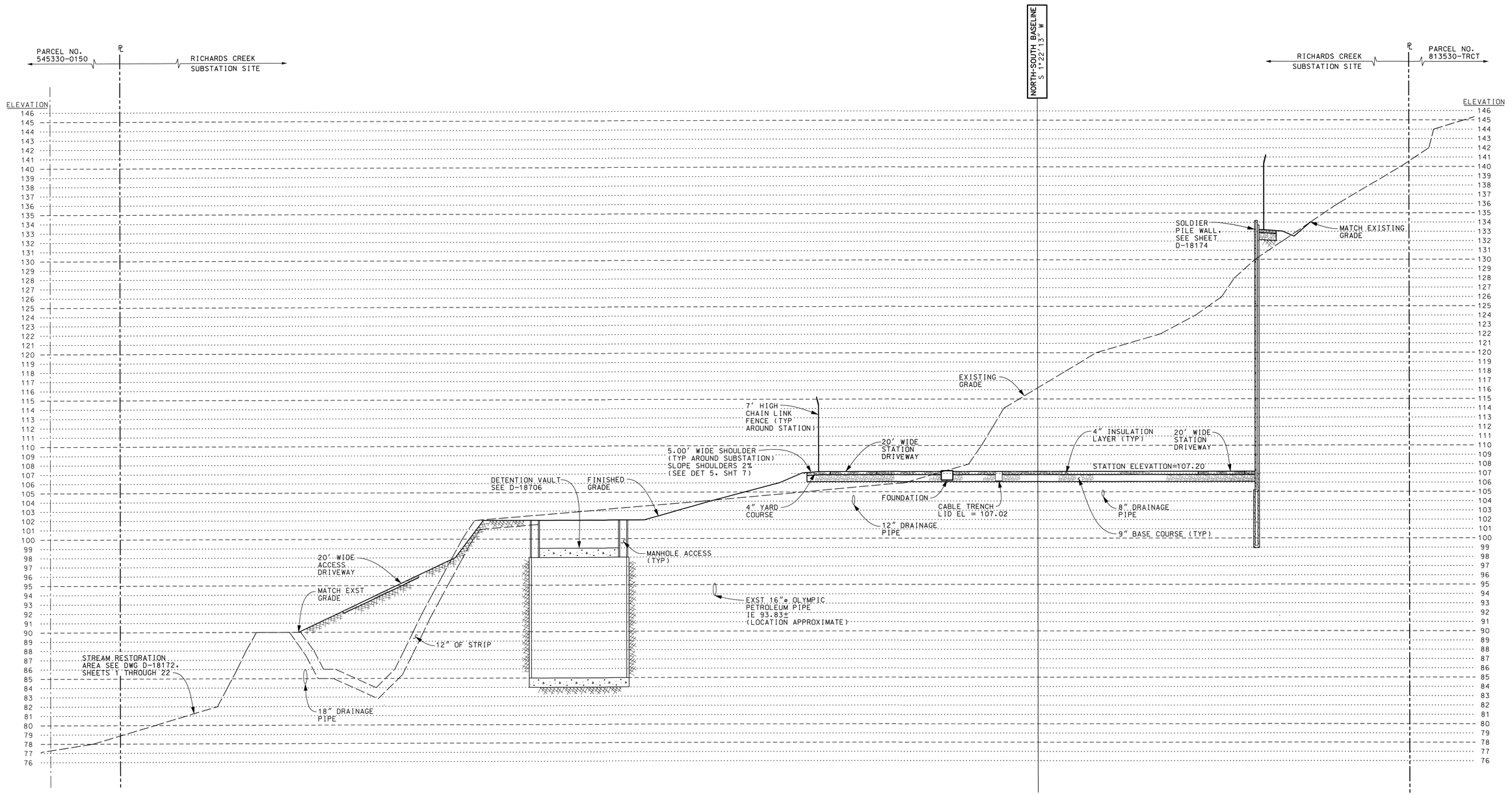
PUGET SOUND ENERGY

SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-19554
REV NO: 0
SHEET: 3 OF 8
SCALE: 1"= 20'-0"
CLASS: SITE
FILE NO:
CODE:
CADD NO: $$DGN$$

$USER$
$DATE$
$FILE$

DSD 002195



SITE SECTION B/1

(FACING NORTH)

SCALE: HORIZ: 1"= 20'
VERT: 1"= 5'

$USER$

$DATE$

$FILE$

REVISION DESCRIPTION:	WO NUMBER: 111019489
CUP AND CALUP SUBMITTAL	

		DATE (M/D/Y)
CAD	J. Nelson	8/14/17
ENGINEER	S. KIM	08/14/17
REVIEWED		/ /
APPROVED	J. HENEY	08/17/17

SCOTT C. KIM — STATE OF WASHINGTON — 36044 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY SITE SECTION RICHARDS CREEK SUBSTATION

PUGET SOUND ENERGY

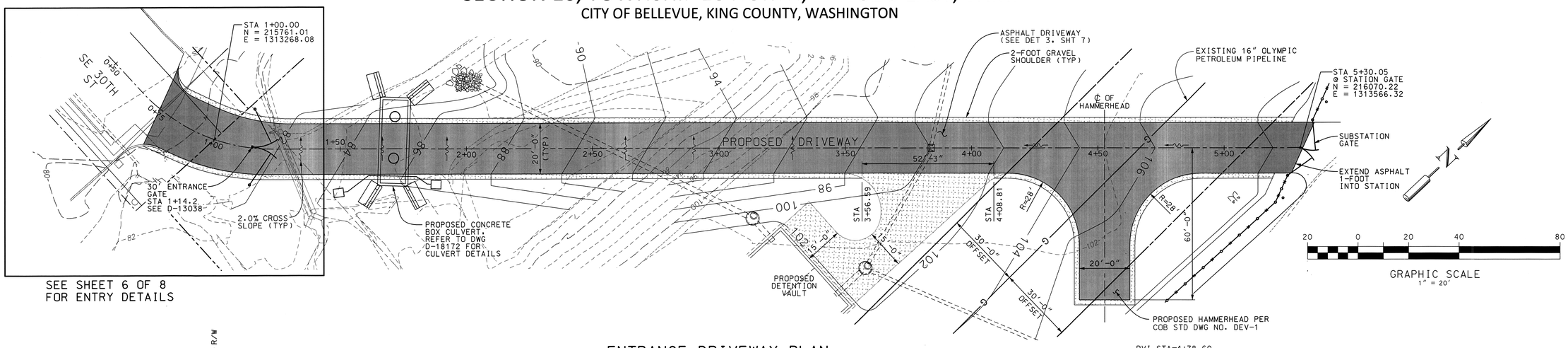
SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-19554
REV NO: 0
SHEET: 4 OF 8
SCALE: 1"= 20'-0"
CLASS: SITE
FILE NO:
CADD NO: $$DGN$$
CODE: RIC

DSD 002196

SECTION 10, TOWNSHIP 28 NORTH, RANGE 5 EAST, W.M.

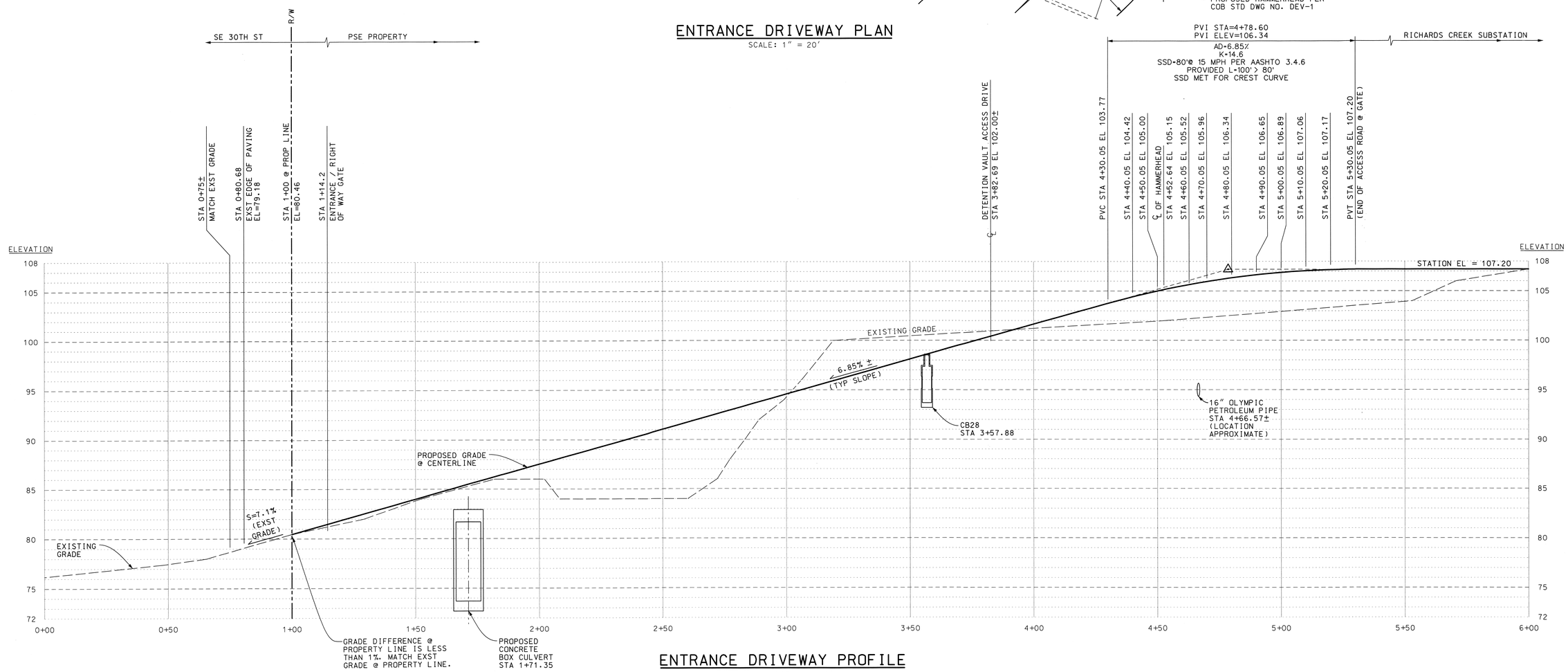
CITY OF BELLEVUE, KING COUNTY, WASHINGTON



SEE SHEET 6 OF 8
FOR ENTRY DETAILS

ENTRANCE DRIVEWAY PLAN

SCALE: 1" = 20'



ENTRANCE DRIVEWAY PROFILE

SCALE: HORIZ: 1"= 20'
VERT: 1"= 5'

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT C. KIM
STATE OF WASHINGTON
Reg. 36044
REGISTERED PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489
CUP AND CALUP SUBMITTAL	

PRELIMINARY ENTRANCE DRIVEWAY PLAN AND PROFILE RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	J. Nelsen	8/14/17
ENGINEER	S. KIM	08/14/17
REVIEWED		/ /
APPROVED	J. HENRY	08/17/17

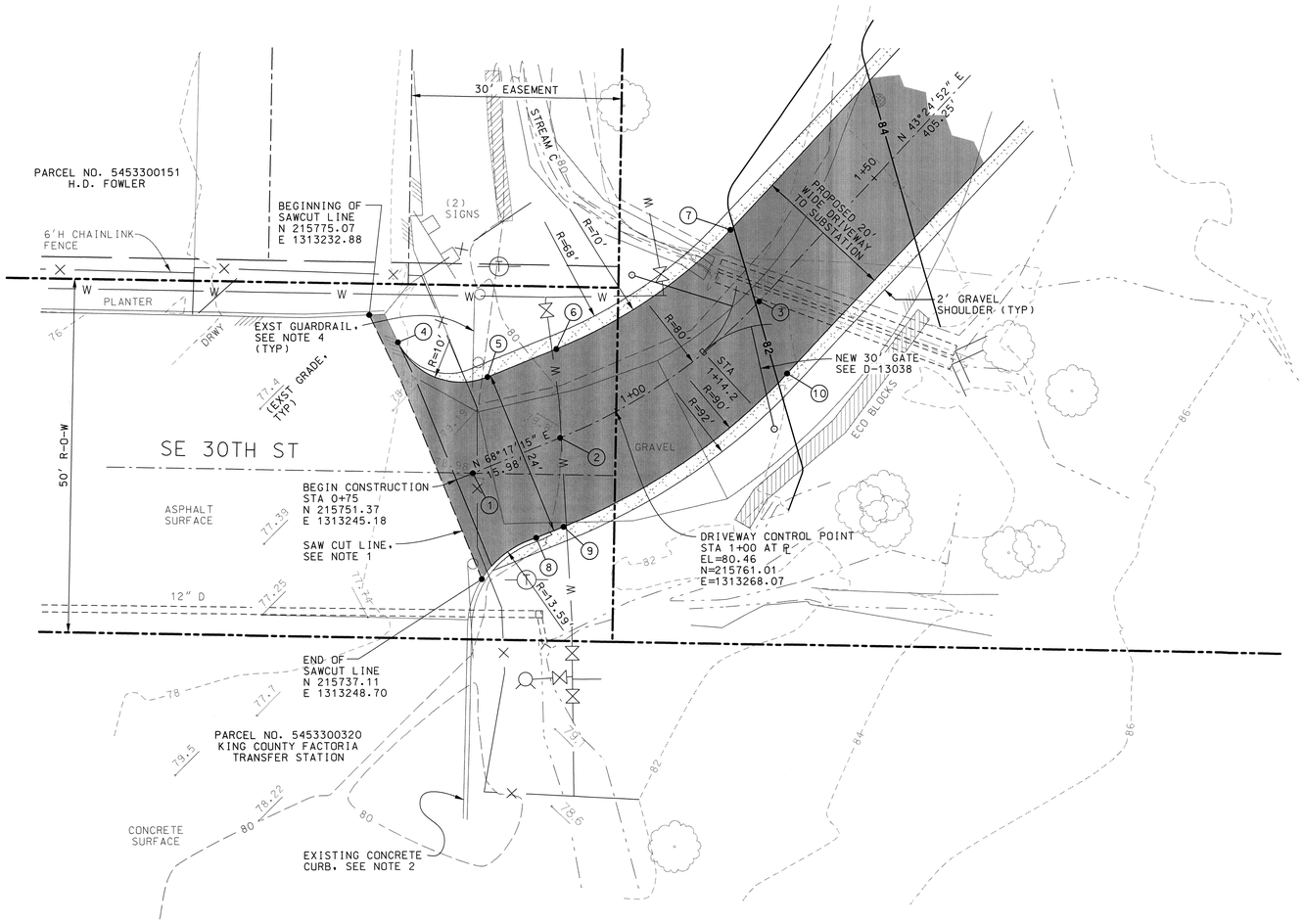
PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT

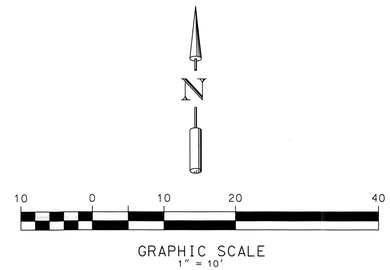
DRAWING NO: D-19554
REV NO: 0
SHEET: 5 OF 8
SCALE: NOTED
CLASS: SITE
FILE NO:
CADD NO: $$DGN$$
CODE: RIC

DSD 002197

$USER$ $DATE$ $FILE$

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.
CITY OF BELLEVUE, KING COUNTY, WASHINGTON





LEGEND

NEW PAVEMENT (SEE DETAILS 1 & 2 ON SHEET 4 OF 6)

2' WIDE GRAVEL SHOULDER

CONSTRUCTION NOTES

1. SAWCUT EXISTING PAVEMENT AND MATCH EXISTING GRADE AT THE SAWCUT LINE. FIELD VERIFY THE SAWCUT LINE PRIOR TO CONSTRUCTION AND FIELD ADJUST AS NECESSARY.
2. PROTECT EXISTING CONCRETE CURB.
3. PROTECT EXISTING UTILITY POLE.
4. REMOVE EXISTING GUARDRAIL AS NEEDED. REPLACE WITH NEW GUARDRAIL IN KIND PER PSE CONSTRUCTION MANAGEMENT.
5. REMOVE EXISTING FENCE AND INSTALL NEW FENCE IN KIND PER PSE CONSTRUCTION MANAGEMENT.
6. MINIMUM PAVEMENT RESTORATION LIMIT IS SHOWN ON THE PLAN. PSE CONSTRUCTION MANAGEMENT SHALL FIELD DETERMINE THE APPROPRIATE LIMIT OF PAVEMENT RESTORATION AND ADJUST AS NECESSARY.
7. CONTRACTOR SHALL PROTECT ADJACENT WETLANDS AND STREAMS AT ALL TIMES DURING CONSTRUCTION.
8. REMOVE SANDBAGS AND ECO BLOCKS AFTER CONSTRUCTION OF PROPOSED DRIVEWAY & CULVERT REPLACEMENT.

NORTHING – EASTING TABLE

(1) PI	N 215752.31 E 1313247.53	(6) PC	N 215770.00 E 1313259.57
(2) PC	N 215757.29 E 1313260.03	(7) PT	N 215786.93 E 1313284.52
(3) PT	N 215776.63 E 1313288.55	(8) PT	N 215742.95 E 1313256.50
(4) PT	N 215771.10 E 1313236.96	(9) PC	N 215744.52 E 1313260.43
(5) PC	N 215766.08 E 1313249.71	(10) PT	N 215766.28 E 1313292.51

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1-800-424-5555

SCOTT C. KIM
STATE OF WASHINGTON
16044
REGISTERED PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489
CUP AND CALUP SUBMITTAL	

		DATE (M/D/Y)
CAD	J. Nelson	8/14/17
ENGINEER	S. KIM	08/14/17
REVIEWED		/ /
APPROVED	J. HENRY	08/17/17

PRELIMINARY ENTRANCE DRIVEWAY DETAIL RICHARDS CREEK SUBSTATION

PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-19554 — REV NO: 0

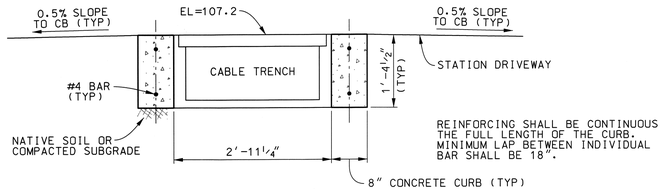
SHEET: 6 OF 8

SCALE: 1"= 10'-0" — CLASS: SITE

CADD NO: $$DGN$$ — FILE NO: — CODE: RIC

DSD 002198

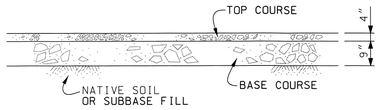
$USER$ $DATE$ $FILE$



CABLE TRENCH CURB SECTION

DETAIL 1/1

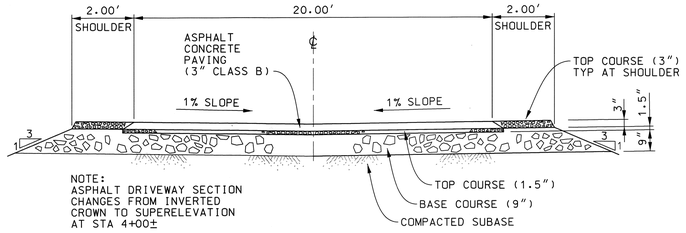
¾" = 1'-0"



MAINTENANCE ACCESS GRAVEL DRIVEWAY

DETAIL 2/1

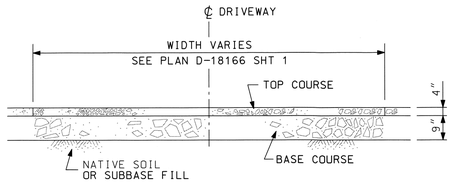
NTS



ASPHALT DRIVEWAY SECTION

DETAIL 3/5

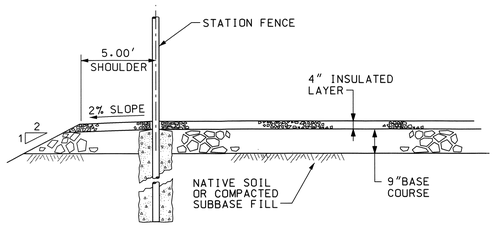
NTS



STATION DRIVEWAY

DETAIL 4/1

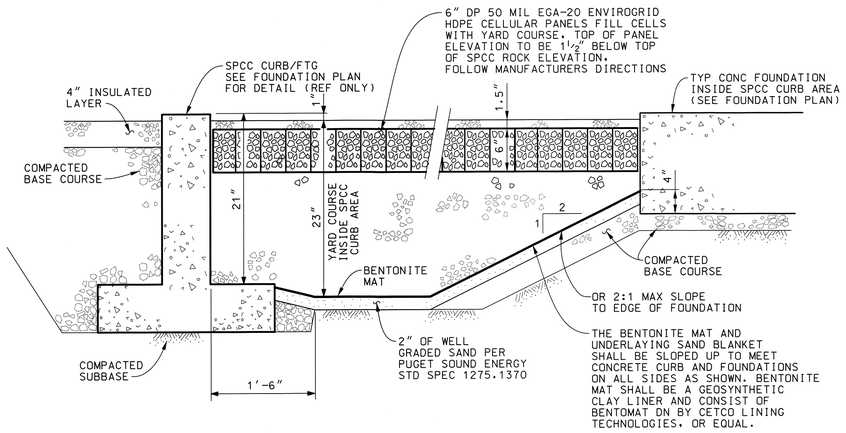
NTS



TYPICAL STATION SECTION

DETAIL 5/1

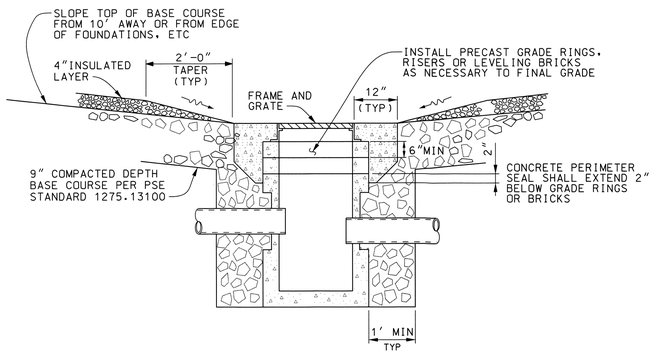
NTS



TYPICAL AREA INSIDE SPCC CURB

DETAIL 6/1

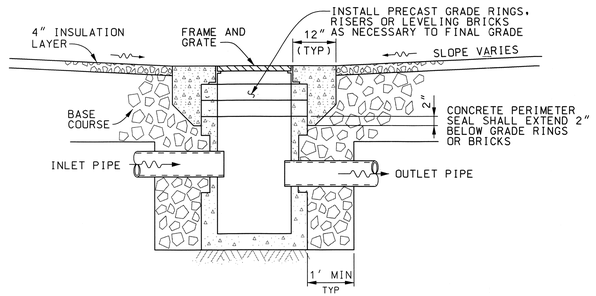
NTS



TYPICAL CATCH BASIN GRADING OUTSIDE OF SPCC AREA

DETAIL 7/1

NTS



TYPICAL GRADING FOR CATCH BASIN IN DRIVEWAY

DETAIL 8/1

NTS

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT C. KIM
STATE OF WASHINGTON
36044
REGISTERED PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489		
CUP AND CALUP SUBMITTAL			
		DATE (M/D/Y)	
CAD	J. Nelson	8/14/17	
ENGINEER	S. KIM	08/14/17	
REVIEWED		/ /	
APPROVED	J. HENLEY	08/17/17	

PRELIMINARY GRADING SECTIONS AND DETAILS RICHARDS CREEK SUBSTATION

PUGET SOUND ENERGY

SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO D-19554 | REV NO 0

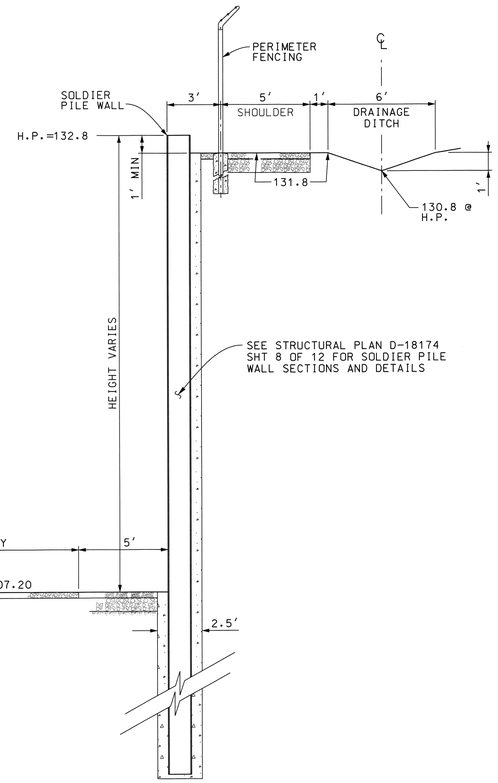
SHEET: 7 OF 8

SCALE: NOTED | CLASS: SITE | FILE NO: | CODE: RIC

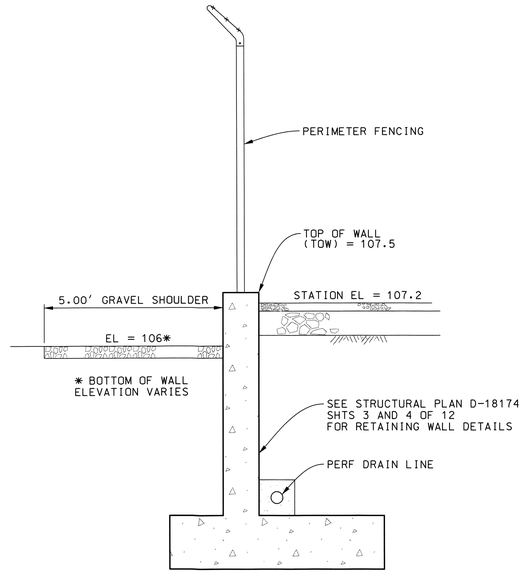
CADD NO: $$DGN$$

DSD 002199

$USER$ $DATE$ $FILE$



TYPICAL SOLDIER PILE WALL SECTION C/1



RETAINING WALL SECTION D/1

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

SCOTT C. KIM — 36044 — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

REVISION DESCRIPTION:	WO NUMBER: 111019489		
CUP AND CALUP SUBMITTAL			
		DATE (M/D/Y)	
CAD	J. Nelson	8/14/17	
ENGINEER	S. KIM	08/14/17	
REVIEWED		/ /	
APPROVED	J. HENRY	08/17/17	

PRELIMINARY FENCING SECTIONS AND DETAILS RICHARDS CREEK SUBSTATION

PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-19554 — REV NO: 0 — SHEET: 8 OF 8

SCALE: NONE — CLASS: SITE — FILE NO: — CODE: RIC

CADD NO: $$DGN$$

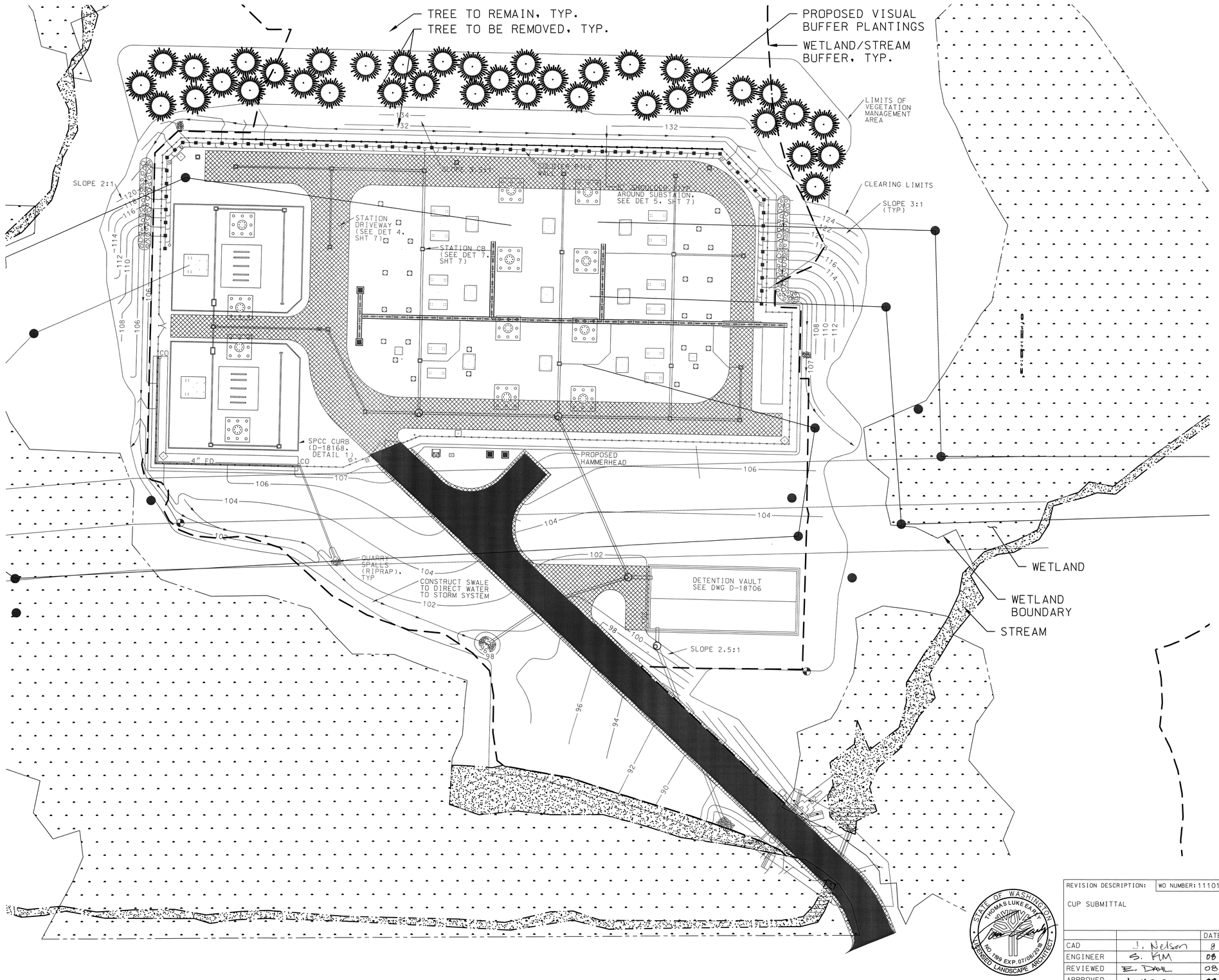
DSD 002200

$USER$ $DATE$ $FILE$

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

CITY OF BELLEVUE, KING COUNTY, WASHINGTON

PSE PARCEL 1024059130



30 0 30 60 120

GRAPHIC SCALE
1" = 30'

LEGEND:

- 107.20 — FINISHED GRADE ELEVATION
- PROPERTY LINE
- STATION FENCE
- RIDGE LINE
- FOUNDATIONS (REF ONLY)
- TYPE I CATCH BASIN (SEE DRAINAGE PLAN)
- VAULT
- RIP RAP
- WETLAND BUFFER
- SETBACK FROM BUFFER
- (38) SHORE PINE. PINUS CONTORTA VAR. CONTORTA. 6' TALL MINIMUM. EVEN BRANCHING WITH INTACT. HEALTHY LEADER. SPACE 20 FEET ON-CENTER FROM EXISTING AND NEW TREES.

CONSTRUCTION NOTES

1. ALL RIDGES TO BE ELEVATION 107.2. GRADING WITHIN RIDGES SHALL SLOPE DOWN AT A MINIMUM OF 0.5% TO CATCH BASIN ELEVATION. SEE D-18166. SHEET 7 FOR GRADING AROUND CATCH BASINS.
2. GRADING ON STATION DRIVE WITHIN RIDGES SLOPE DOWN AT A MINIMUM OF 0.5% AND A MAXIMUM OF 2.0% TO CATCH BASIN GRATE ELEVATION.
3. SEE DRAINAGE PLAN, DRAWING D-18167, SHEET 1, FOR RIM ELEVATIONS.
4. NOTIFY BP PETROLEUM PRIOR TO ANY WORK.

LANDSCAPE NOTES

1. EXISTING NATIVE SHRUBS AND GROUNDCOVER SHALL BE RETAINED AND PROTECTED WITHIN THE TREE MANAGEMENT AREA AND OUTSIDE OF THE LIMITS OF CLEARING.
2. NEW PLANTS SHALL ONLY BE INSTALLED AFTER OCTOBER 1ST AND BEFORE APRIL 1ST.
3. GRUB EXISTING VEGETATION WITHIN 3 FOOT RADIUS FROM CENTER OF NEW PLANTS.
4. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN THE EVENT OR DISCOVERY OF POOR SOILS, GROUNDWATER OR DISCREPANCIES IN THE EXISTING CONDITIONS AS NOTED ON THE PLANS.
5. NOXIOUS WEEDS SHALL BE REMOVED FROM ALL AREAS WITHIN THE LIMITS OF DISTURBANCE AND TREE MANAGEMENT AREA.
6. DISTURBED AREAS NOT RECEIVING LANDSCAPING OR CRITICAL AREA ENHANCEMENT SHALL RECEIVE HYDROSEED ONCE FINAL GRADE IS REACHED. SEE LANDSCAPE DETAILS FOR HYDROSEED SEED MIX.

REFERENCE DRAWINGS

D-18160	TOPOGRAPHIC AND BOUNDARY SURVEY (PARCEL C) #102405-9130
D-18164	TEMPORARY EROSION AND SEDIMENT CONTROL PLAN
D-18167	DRAINAGE PLAN
D-18166	GRADING PLAN

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

STATE OF WASHINGTON
THOMAS LUKE EARLY
NO. 199 EXP. 07/08/2018
LICENSED LANDSCAPE ARCHITECT

REVISION DESCRIPTION: CUP SUBMITTAL	WO NUMBER: 111019489		DRAFT LANDSCAPE PLAN 2 RICHARDS CREEK SUBSTATION		
		DATE (M/D/Y)	PUGET SOUND ENERGY	DRAWING NO D-19555	REV NO 1
CAD	J. Nelson	8/30/17	SUBSTATION ENGINEERING DEPARTMENT	SHEET: 1 OF 2	
ENGINEER	S. KIM	08/30/17		FILE NO:	
REVIEWED	E. DAHL	08/30/17	SCALE: 1"= 30'-0"	CLASS: SITE	CODE:
APPROVED	J. HENRY	08/30/17	CADD NO: $$DGN$$		

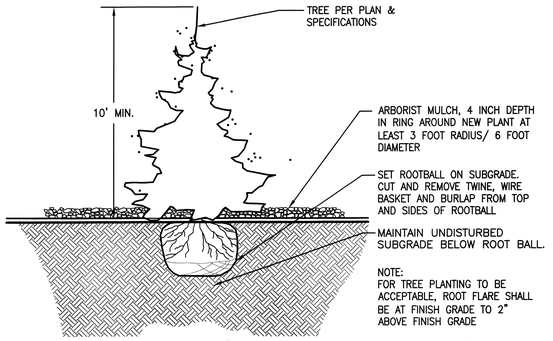
DSD 002201

$USER$
$DATE$

SECTION 10, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

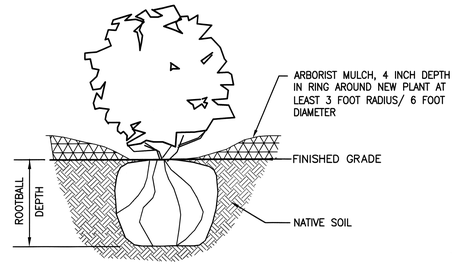
CITY OF BELLEVUE, KING COUNTY, WASHINGTON

PSE PARCEL 1024059130



CONIFEROUS TREE PLANTING DETAIL

NOT TO SCALE



NATIVE SHRUBS PLANTING DETAIL

NOT TO SCALE

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STATE OF WASHINGTON
THOMAS LUKE EARLY
NO. 199 EXP. 07/08/2018
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PUGET SOUND ENERGY

SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-19555 | REV NO: 1

SHEET: 2 OF 2

SCALE: 1"= 30'-0" | CLASS: SITE | FILE NO:

CADD NO: $$DGN$$ | CODE:

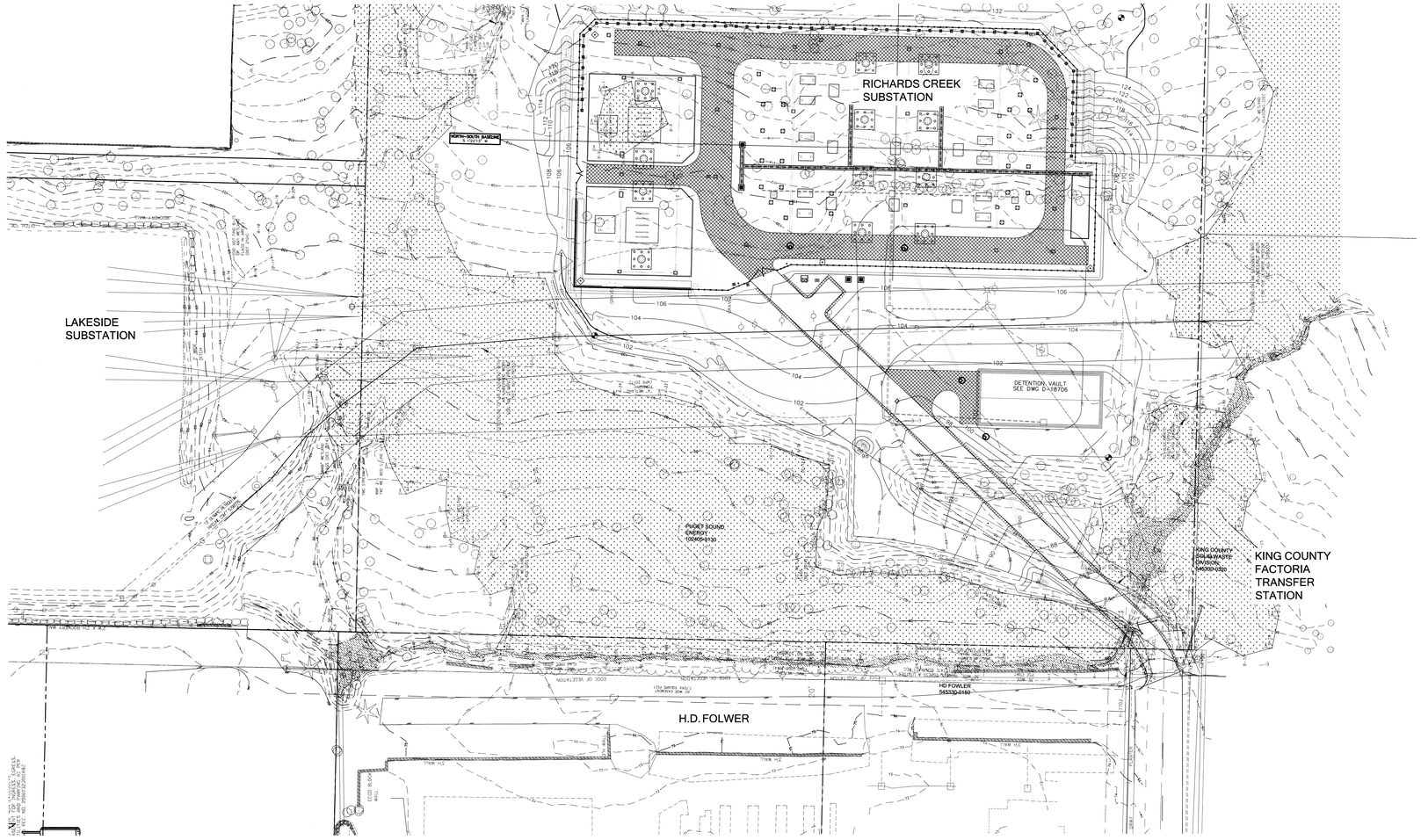
DRAFT LANDSCAPE DETAILS RICHARDS CREEK SUBSTATION

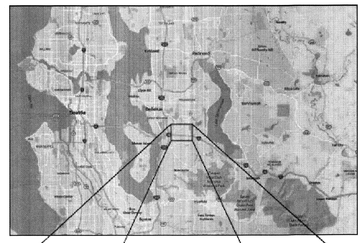
$USER$

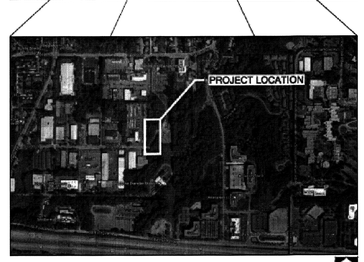
$DATE$

DSD 002202

RICHARDS CREEK SUBSTATION:
STREAM RESTORATION AND CULVERT REPLACEMENT







EXISTING CONDITIONS

MAP LEGEND

- EXISTING TREE
- EXISTING SURVEYED STREAM CHANNEL (OHWM)
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PSE PROPERTY BOUNDARY

NOTES

TOPOGRAPHIC SURVEY PROVIDED BY:
APS SURVEYING AND MAPPING
13221 SE 26TH STREET, SUITE A
BELLEVUE, WA 98005
TEL.425-746-3200

VERTICAL DATUM: CITY OF BELLEVUE
BENCHMARK 104

SHEET INDEX

1.0 COVER
2.0 GENERAL NOTES, TESC & QUANTITIES
2.1 CONSTRUCTION SEQUENCE
2.2 EXISTING CONDITIONS
3.0 CHANNEL GRADING PLAN
3.1 TESC & DEMOLITION PLAN
3.2 TESC & DEMOLITION DETAILS
4.0 PROPOSED PLAN
5.0 CULVERT DESIGN
6.0 STATIONING & CROSS-SECTIONS
6.11 STREAM CROSS-SECTIONS
6.12 STREAM CROSS-SECTIONS
6.13 STREAM CROSS-SECTIONS
6.21 LARGE WOODY DEBRIS DETAILS
6.22 LARGE WOODY DEBRIS ANCHOR DETAILS
7.0 PLANTING PLAN (1 OF 3)
7.1 PLANTING PLAN (2 OF 3)
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7.3 PLANTING NOTES & DETAILS (1 OF 2)
7.4 PLANTING NOTES & DETAILS (2 OF 2)

50 0 50 100 200
GRAPHIC SCALE
(IN FEET)

COVER SHEET
SCALE 1"=50'

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 30 / 17

PUGET SOUND ENERGY

W-1.0 COVER SHEET

DRAWING NO D-18172 REV NO 0
SHEET: 1 OF 22
FILE NO: 111103
CODE: RIC
CLASS: SITE
CADD NO:

DSD 002203

KING COUNTY STANDARD PLAN NOTES, RECOMMENDED CONSTRUCTION SEQUENCE, AND ADDITIONAL NOTES FROM KING COUNTY 2016 SURFACE WATER DESIGN MANUAL - APPENDIX D.4.1 STANDARD ESC AND SWPPS PLAN NOTES

STANDARD ESC PLAN NOTES

OMITTED TEXT HAS A STRIKE-THROUGH. TEXT ADDED BY THE WATERSHED COMPANY HAS AN UNDERLINE.

THE STANDARD ESC PLAN NOTES MUST BE INCLUDED ON ALL ESC PLANS. AT THE APPLICANT'S DISCRETION, NOTES THAT IN NO WAY APPLY TO THE PROJECT MAY BE OMITTED; HOWEVER, THE REMAINING NOTES MUST NOT BE RENUMBERED. FOR EXAMPLE, IF ESC NOTE #3 WERE OMITTED, THE REMAINING NOTES SHOULD BE NUMBERED 1, 2, 4, 5, 6, ETC.

1. APPROVAL OF THIS EROSION AND SEDIMENTATION CONTROL (ESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G., SIZE AND LOCATION OF ROADS, PIPES, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
2. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/ESC SUPERVISOR UNTIL ALL CONSTRUCTION IS APPROVED.
3. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED BY SURVEY TAPE OF FENCING, IF REQUIRED, PRIOR TO CONSTRUCTION (SWDM APPENDIX D). DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE CLEARING LIMITS SHALL BE PERMITTED. THE CLEARING LIMITS SHALL BE MAINTAINED BY THE APPLICANT/ESC SUPERVISOR FOR THE DURATION OF CONSTRUCTION.
4. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES, SUCH AS CONSTRUCTED WHEEL WASH SYSTEMS OR WASH PADS, MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN AND TRACK OUT TO ROAD RIGHT OF WAY DOES NOT OCCUR FOR THE DURATION OF THE PROJECT.
5. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED PRIOR TO OR IN CONJUNCTION WITH ALL CLEARING AND GRADING SO AS TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEMS, FLOW CONTROL BMP LOCATIONS (EXISTING AND PROPOSED), AND ADJACENT PROPERTIES IS MINIMIZED.
6. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND MODIFIED TO ACCOUNT FOR CHANGING SITE CONDITIONS (E.G. ADDITIONAL COVER MEASURES, ADDITIONAL SUMP PUMPS, RELOCATION OF DITCHES AND SILT FENCES, PERIMETER PROTECTION ETC.) AS DIRECTED BY KING COUNTY.
7. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/ESC SUPERVISOR AND MAINTAINED TO ENSURE CONTINUED PROPER FUNCTIONING. WRITTEN RECORDS SHALL BE KEPT OF WEEKLY REVIEWS OF THE ESC FACILITIES.
8. ANY AREAS OF EXPOSED SOILS, INCLUDING ROADWAY EMBANKMENTS, THAT WILL NOT BE DISTURBED FOR TWO CONSECUTIVE DAYS DURING THE WET SEASON OR SEVEN DAYS DURING THE DRY SEASON SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED ESC METHODS (E.G., SEEDING, MULCHING, PLASTIC COVERING, ETC.).
9. ANY AREA NEEDING ESC MEASURES THAT DO NOT REQUIRE IMMEDIATE ATTENTION SHALL BE ADDRESSED WITHIN SEVEN (7) DAYS.
10. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH DURING THE DRY SEASON, BY-MONTHLY DURING THE WET SEASON, OR WITHIN TWENTY FOUR (24) HOURS FOLLOWING A STORM EVENT.
11. AT NO TIME SHALL MORE THAN ONE (1) FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSTREAM SYSTEM.
12. ~~ANY PERMANENT RETENTION/DETENTION FACILITY USED AS A TEMPORARY SETTLING BASIN SHALL BE MODIFIED WITH THE NECESSARY EROSION CONTROL MEASURES AND SHALL PROVIDE ADEQUATE STORAGE CAPACITY. IF THE FACILITY IS TO FUNCTION ULTIMATELY AS AN INFILTRATION SYSTEM, THE TEMPORARY FACILITY MUST BE ROUGH GRADED SO THAT THE BOTTOM AND SIDES ARE AT LEAST THREE FEET ABOVE THE FINAL GRADE OF THE PERMANENT FACILITY. FLOW CONTROL BMP AREAS (EXISTING OR PROPOSED) SHALL NOT BE USED AS TEMPORARY FACILITIES AND SHALL BE PROTECTED FROM SEDIMENTATION AND INTRUSION.~~
13. COVER MEASURES WILL BE APPLIED IN CONFORMANCE WITH APPENDIX D OF THE KING COUNTY SURFACE WATER DESIGN MANUAL.
14. PRIOR TO THE BEGINNING OF THE WET SEASON (OCT. 1), ALL DISTURBED AREAS SHALL BE REVIEWED TO IDENTIFY WHICH ONES CAN BE SEEDED IN PREPARATION FOR THE WINTER RAINS. DISTURBED AREAS SHALL BE SEEDED WITHIN ONE WEEK OF THE BEGINNING OF THE WET SEASON. A SKETCH MAP OF THOSE AREAS TO BE SEEDED AND THOSE AREAS TO REMAIN UNCOVERED SHALL BE SUBMITTED TO THE DPER INSPECTOR.

ESC PLAN RECOMMENDED CONSTRUCTION SEQUENCE

OMITTED TEXT HAS A STRIKE-THROUGH. TEXT ADDED BY THE WATERSHED COMPANY HAS AN UNDERLINE.

A DETAILED CONSTRUCTION SEQUENCE IS NEEDED TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURES ARE APPLIED AT THE APPROPRIATE TIMES. A RECOMMENDED CONSTRUCTION SEQUENCE IS PROVIDED BELOW:

1. HOLD THE PRE-CONSTRUCTION MEETING.
2. POST SIGN WITH NAME AND PHONE NUMBER OF CSWPP/ESC SUPERVISOR (MAY BE CONSOLIDATED WITH THE REQUIRED NOTICE OF CONSTRUCTION SIGN).
3. FLAG OR FENCE CLEARING LIMITS.
4. ~~INSTALL CATCH BASIN PROTECTION, IF REQUIRED. INSTALL FLOW CONTROL BMP AREA PROTECTION, IF REQUIRED.~~
5. GRADE AND INSTALL CONSTRUCTION ENTRANCE(S).
6. INSTALL PERIMETER PROTECTION (SILT FENCE, BRUSH BARRIER, ETC.).
7. ~~CONSTRUCT SEDIMENT PONDS AND TRAPS.~~
8. GRADE AND STABILIZE CONSTRUCTION ROADS.
9. CONSTRUCT SURFACE WATER CONTROLS (INTERCEPTOR DIKES, PIPE SLOPE DRAINS, ETC.) SIMULTANEOUSLY WITH CLEARING AND GRADING FOR PROJECT DEVELOPMENT. CONSTRUCT SWPPPS IN ANTICIPATION OF SCHEDULED CONSTRUCTION ACTIVITY (E.G., CONRETE-RELATED PH MEASURES FOR UTILITY, VAULT OR ROADWAY CONSTRUCTION).
10. MAINTAIN EROSION CONTROL AND SWPPS MEASURES IN ACCORDANCE WITH KING COUNTY STANDARDS AND MANUFACTURER'S RECOMMENDATIONS.
11. RELOCATE EROSION CONTROL AND SWPPS MEASURES, OR INSTALL NEW MEASURES SO THAT AS SITE CONDITIONS CHANGE, THE EROSION AND SEDIMENT CONTROL AND POLLUTANT PROTECTION IS ALWAYS IN ACCORDANCE WITH THE KING COUNTY CONSTRUCTION STORMWATER POLLUTION PREVENTION STANDARDS.
12. COVER ALL AREAS THAT WILL BE UNWORKED FOR MORE THAN SEVEN DAYS DURING THE DRY SEASON OR TWO DAYS DURING THE WET SEASON WITH STRAW, WOOD FIBER MULCH, COMPOST, PLASTIC SHEETING, OR EQUIVALENT.
13. STABILIZE ALL AREAS WITHIN SEVEN DAYS OF REACHING FINAL GRADE.
14. SEED, SOD, STABILIZE, OR COVER ANY AREAS TO REMAIN UNWORKED FOR MORE THAN 30 DAYS.
15. UPON COMPLETION OF THE PROJECT, STABILIZE ALL DISTURBED AREAS AND REMOVE BMPS IF APPROPRIATE.

FROM KING COUNTY 2016 SURFACE WATER DESIGN MANUAL - APPENDIX D.4.2 RECOMMENDED CONSTRUCTION SEQUENCE.

GENERAL CONSTRUCTION SEQUENCE

1. INSTALL ALL BMPS INDICATED IN CONSTRUCTION PLAN SET.
2. GRADE AND INSTALL CONSTRUCTION ENTRANCE(S).
3. GRADE AND STABILIZE ALL ACCESS ROADS.
4. INSTALL TREE PROTECTION FENCING.
5. CLEAR AND GRUB AREAS WITHIN GRADING LIMITS (SHEET 3.0).
6. INSTALL SANDBAGS AND FLOW DIVERSION PIPE(S).
7. CONSTRUCT STREAM ACCORDING TO PROPOSED GRADES (SHEET 4.0).
8. INSTALL CULVERT AND BRING SURROUNDING AREA TO FINAL GRADES.
9. REPAIR ACCESS ROAD PAVING REMOVED FOR CULVERT INSTALLATION.
10. INSTALL LARGE WOODY DEBRIS (SHEETS 3.0, 6.1, AND 6.2).
11. APPLY GRAVEL/ COBBLE/ BOULDER MIX AND TOPSOIL TO BRING SITE TO FINAL GRADES (SHEET 4.0 AND 6.1).
12. APPLY TOPSOIL AND COMPOST.
13. INSTALL PLANTINGS (SHEETS 7.0 - 7.4).
14. APPLY MULCH AND SOIL STABILIZATION MATERIALS.
15. REMOVE ALL BMPS, REFUSE, AND FENCES.

CLEARING, GRADING & TEMPORARY EROSION CONTROL - GENERAL

1. ALL CLEARING AND GRADING WORK SHALL MEET THE REQUIREMENTS AS SET FORTH IN APPLICABLE CITY CODE SECTIONS.
2. TEMPORARY EROSION/SEDIMENT CONTROLS SHALL BE INSTALLED AND OPERATING PRIOR TO ANY GRADING OR CONSTRUCTION-RELATED SOIL DISTURBANCE. THESE CONTROLS MUST BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION IS COMPLETE AND ALL EXPOSED SOILS ARE STABILIZED BY HYDROSEEDING OR MULCHING.
3. ADDITIONAL EROSION-CONTROL MEASURES MAY BE REQUIRED BY CITY REPRESENTATIVES DEPENDING ON SITE AND WEATHER CONDITIONS. ANY WORK PERFORMED DURING THE RAINY SEASON, OCTOBER 1 THROUGH APRIL 30, SHALL REQUIRE A PLAN TO LIMIT THE EXTENT OF SOIL EXPOSURE.
4. AT THE DISCRETION OF THE RESPONSIBLE BUILDING OFFICIAL, WORK MAY BE SUSPENDED DURING PERIODS OF INCLEMENT WEATHER TO REDUCE ACTUAL OR POTENTIAL EROSION AND/OR SEDIMENTATION.
5. WHEN WORK IS STOPPED OR COMPLETED IN AN AREA, ADDITIONAL EROSION CONTROL MAY BE REQUIRED, INCLUDING SEEDING OR OTHER MEASURES.
6. ANY WATER RUNOFF FROM THE PROJECT AREA BEING DISCHARGED TO A STORMWATER SYSTEM DURING CONSTRUCTION SHALL NOT EXCEED TURBIDITY VALUES OF 50 NTU'S AND, IN ADDITION, SHALL MEET THE REQUIREMENTS OF THE 1972 CLEAN WATER ACT.
7. LOCATIONS SHOWN OF EXISTING UTILITIES MAY BE INCOMPLETE AND ARE APPROXIMATE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, CORRECT AND DETERMINE ANY ADDITIONAL LOCATIONS SO AS TO AVOID DAMAGE OR DISTURBANCE.
8. ALL NATIVE VEGETATION IS TO REMAIN UNDISTURBED OUTSIDE OF GRADED AREAS, ACCESS CORRIDORS, AND/OR TO-BE-REPLANTED AREAS.
9. FLOW FROM IMPERVIOUS SURFACES, INCLUDING TRAILS AND ACCESS ROADS, SHALL BE CONNECTED TO A DRAINAGE SYSTEM AS SOON AS POSSIBLE.

CLEARING, GRADING & TEMPORARY EROSION AND SEDIMENTATION - SPECIFIC

1. LOCATING AND DELINEATING THE GRADING LIMITS AND ALL EXISTING TREES AND OTHER BEGETATION TO BE PRESERVED WITHIN THE WORK AREA AS INDICATED ON THE PLAN VIEW DRAWINGS AND AS DIRECTED BY THE STREAM RESTORATION CONSULTANT.
2. INSTALLING CONSTRUCTION ACCESS PAD(S) AT LOCATION(S) IDENTIFIED ON PLAN AND PER APPROPRIATE DETAIL.
3. MAINTAINING A SWEEPER ON-STE AND IMMEDIATELY REMOVING ANY SOIL THAT IS TRACKED ONTO PAVED SURFACES AS A RESULT OF CONSTRUCTION.
4. STABILIZING ALL EXPOSED SOILS BY SUITABLE APPLICATION OF BEST MANAGEMENT PRACTICES (CMPS), INCLUDING, BUT NOT LIMITED TO, PLASTIC COVERING, MULCHING, OR SODE OR OTHER VEGETATION. SEEDING AND STRAW MULCHING (3" DEPTH) OF EXPOSED SOILS IS TO OCCUR WITHIN SEVEN DAYS OF CHANNEL WORK AND RESTORATION FEATURE COMPLETION FRO EACH DISTINCT STREAM SEGMENT OR SEPARATE WORK AREA. FROM OCTOBER 1 THROUGH APRIL 30, NO UNWORKED SOIL SHALL REMAIN EXPOSED FOR MORE THAN 48 HOURS. FROM MAY1 THROUGH SEPTEMBER 30, NO UNWORKED SOIL SHALL REMAIN EXPOSED FOR MORE THAN SEVEN DAYS.
5. PUMP SYSTEM TO TREAT OR INFILTRATE TURBID SEEPAGE WATER BEFORE DISCHARGING BACK INTO THE CREEK.
6. FUELING OF BEHICLES AT LEAST 100 FEET FROM OPEN WATER, AND SPILL KITS FOR THOSE VEHICLES.
7. POSTING A PUBLIC INFORMATION SIGN LISTIGN 24-HOUR EMERGENCY PHONE NUMBERS FOR THE CITY AND THE CONTRACTOR. THE SIGN MUST BE POSTED AT THE PROJECT SITE IN FULL VIEW OF THE PUBLIC AND THE CONTRACTORS, AND IT MUST REMAIN POSTED UNTIL FINAL SIGN OFF BY THE CITY CLEARING AND GRADING INSPECTOR OR EQUIVALENT PARTY.
8. REMOVAL OF ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPS WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED. TRAPPED SEDIMENT SHALL BE REMOVED OR STABILIZED ON SITE. DISTURBED SOIL AREAS RESULTING FROM BMP REMOVAL SHALL BE PERMANENTLY STABILIZED.

MATERIALS & QUANTITIES

ITEM	QUANTITY	UNIT
SILT AND CONSTRUCTION FENCING	750	LF
EROSION CONTROL WATTLE	1000	LF
SEDIMENT CURTAIN - INSTALLATION, REMOVAL AND MAINTENANCE	0	LF
TEMPORARY BYPASS		
SANDBAG	20	EA
BYPASS PIPE	200	LF
DEWATERING PUMP	1	
FISH EXCLUSION/ CREEK RAMPING	1	LS
LOG INSTALLATION (INCLUDING HARDWARE)		
ROOTWAD	4	EA
BARB LOG	9	EA
FILL		
GRAVEL/ COBBLE/ BOULDER MIX	225	CY
TOPSOIL, TYPE A (IMPORTED COMPOST)	100	CY
MULCH	28	CY
ACCESS ROAD ASPHALT REPAIR		
ASPHALT	600	CF
SUBGRADE (CASE COURSE, UNTREATED, 3/4")	17	CY
BOX CULVERT AND SEDIMENT VAULT	1	EA

MATERIAL SPECIFICATIONS AND DEFINITIONS

ANCHORS: ANCHORS SHALL CONSIST OF MANTA RAY MR-3 EARTH ANCHORS OR EQUIVALENT. ANCHORS TO BE DRIVEN MINIMUM 6 FEET (72 INCHES) INTO GROUND (OR PER MANUFACTURER'S RECOMMENDATIONS) AT AN ANGLE APPROXIMATELY 15 TO 30 FROM VERTICAL AIMED AWAY FROM THE CENTER OF THE CHANNEL AND UPSTREAM. ALL ANCHORS SHALL BE SET AND LOAD TESTED TO APPROXIMATELY 5,000 LBS. IF MR-3 ANCHORS ARE UNABLE TO ACHIEVE SPECIFIED LOAD RATING, THEN A LARGER ANCHOR (MR-2 OR MR-1) SHALL BE SUBSTITUTED THAT MEETS SPECIFIED LOAD RATING. ALTERNATIVELY, IF MR-3 ANCHORS ARE UNABLE TO BE DRIVEN TO DESIRED LEVEL, A SMALLER ANCHOR (MR-4 OR MR-88) SHALL BE USED AND SET TO THE SAME LOAD RATING.

VEGETABLE COMPOST: COMPOST SHALL BE CEDAR GROVE OR EQUAL PRODUCT (TYPE A) CONTAINING 100% COMPOSED VEGETABLE MATTER AND NO VIABLE WEED SEEDS OR PARTS.

WOOD CHIP MULCH: CHIPPED WOODY MATERIAL APPROXIMATELY 1 TO 4 INCHES IN MAXIMUM DIMENSION (NOT SAWDUST OR HOG FUEL). ALSO KNOWN AS ARBORIST CHIPS.

FERTILIZER: THE SLOW RELEASE, GRANULAR FERTILIZER APPLICATIONS SHOULD BEGIN AFTER THE SHRUBS AND GROUNDCOVERS HAVE HAD A YEAR OF GROWTH. EARLY APPLICATION OF FERTILIZER BENEFITS INVASIVE WEEDS TO THE DISADVANTAGE OF THE NEWLY INSTALLED NATIVE PLANTS. FOLLOW MANUFACTURERS' INSTRUCTIONS FOR APPLICATION. KEEP ALL FERTILIZERS IN WEATHER-TIGHT CONTAINERS WHILE ON SITE.

CLEARING, GRADING & TEMPORARY EROSION CONTROL - GENERAL

1. ALL CLEARING AND GRADING WORK SHALL MEET THE REQUIREMENTS AS SET FORTH IN APPLICABLE CITY CODE SECTIONS.
2. A PRECONSTRUCTION MEETING SHALL BE HELD WITH CITY, CONTRACTOR, AND DESIGNER REPRESENTATIVES PRESENT, AND ALL REQUIRED PERMITS MUST BE APPROVED PRIOR TO START OF CONSTRUCTION. CONDUCT WEEKLY PROGRESS MEETINGS WITH CONTRACTOR AND DESIGNER REPRESENTATIVES PRESENT.
3. TEMPORARY EROSION/SEDIMENT CONTROLS SHALL BE INSTALLED AND OPERATING PRIOR TO ANY GRADING OR CONSTRUCTION-RELATED SOIL DISTURBANCE. THESE CONTROLS MUST BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION IS COMPLETE AND ALL EXPOSED SOILS ARE STABILIZED BY HYDROSEEDING OR MULCHING WITH STRAW.

NOTE: GRAVEL/COBBLE/BOULDER MIX SHALL CONSIST OF WELL-GRADED, ROUNDED GRAVEL COBBLES, AND SMALL BOULDERS, AND CONFORMING TO THE BELOW SIZE GRADATION BY WEIGHT.

MIX TO BE APPLIED TO SECTION OF STREAM UPSTREAM OF THE PROPOSED CULVERT:

<3/8" (MIN 5% FINES)	10%
3/8 TO 3 INCHES	10%
3 TO 6 INCHES	15%
6 TO 12 INCHES	15%
12 TO 18 INCHES	15%
18 TO 24 INCHES	15%
24 TO 36 INCHES	10%
36 INCHES AND LARGER	10%

MIX TO BE APPLIED TO SECTION OF STREAM DOWNSTREAM OF THE PROPOSED CULVERT:

FINES <0.004" (0.1 mm)	5%
0.004" to 1/4 INCH	10%
1/4 TO 3/4 INCH	15%
3/4 to 1-1/2 INCHES	30%
1-1/2 TO 3 INCHES	25%
3 TO 5 INCHES	15%

NOTES
1. REFER TO DETAILS ON SHEET 6.3.
2. FINAL LOG STRUCTURE PLACEMENT IN FIELD SHALL TAKE PLACE AFTER FOOTING REPAIRS AND SHALL BE DIRECTED BY A STREAM RESTORATION SPECIALIST.
3. ANCHOR LOGS USING EARTH ANCHORS AS FEASIBLE.
4. IF BOULDERS ARE USED MEET ANCHORING REQUIREMENTS AS PROVIDED IN THE DETAILS AND SPECIFICATIONS.

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GENERAL NOTES, TESC & QUANTITIES

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-2.0 GENERAL NOTES, TESC & QUANTITIES

DRAWING NO: D-18172 REV NO: 0
SHEET: 2 OF 22
FILE NO: 111103
CLASS: SITE
CADD NO:
CODE: RIC

DSD 002204

CONSTRUCTION SEQUENCE

GENERAL CONSTRUCTION WORK SEQUENCE:

1. INSTALL ALL TEMPORARY EROSION CONTROL MEASURES, GENERAL AND SITE-SPECIFIC, AS NOTED ON THE PLANS AND SUPPORTING DOCUMENTS OR AS REQUIRED BY VARIOUS PERMITS AND AUTHORIZATIONS. SEE NOTES AND PLANS ON SHEET W-4.1 AND W-4.2.
2. CLEAR AND GRUB WITHIN GRADING LIMITS.
3. CONSTRUCT A TEMPORARY GRAVEL BAG DIVERSION DAM (OR APPROVED ALTERNATE) ACROSS THE STREAM CHANNEL AT OR UPSTREAM OF THE LIMIT OF THE AFFECTED IN-STREAM WORK AREA, TO CREATE A POOL. PLACE FLEXIBLE DIVERSION PIPES TO CARRY FLOW AND ANY FISH IN THE UPSTREAM POOL TO THE INDICATED POINT DOWNSTREAM OF THE WORK AREA. THE DISCHARGE IS TO BE POSITIONED TO MINIMIZE EROSION OR TURBIDITY RESULTING FROM THE DISCHARGE VELOCITY OF THE WATER.
4. CONSTRUCT A SEDIMENT TRAP WITH A SUMP PUMP AT THE DOWNSTREAM LIMIT OF THE AFFECTED WORK AREA TO RETAIN ANY SILT-LADEN WATER THAT MAY COLLECT AS A RESULT OF IMPLEMENTATION ACTIVITIES. COLLECTED SILT-LADEN WATER IS TO BE PUMPED TO UPLAND AREAS FOR DISCHARGE/DISPERSAL BY PERFORATED PIPE AND BIOFILTRATION AND/OR INFILTRATION IN WETLAND AREAS.
5. THE CONTRACTOR SHALL NOTIFY THE STREAM RESTORATION SPECIALIST 3 WORKING DAYS IN ADVANCE OF DEWATERING TO ALLOW FOR FISH REMOVAL. ANY FISH ISOLATED IN THE LOCALIZED IN-STREAM WORK AREA WILL BE REMOVED BY THE STREAM RESTORATION SPECIALIST IN THE WORK AREA. GIVEN THE SIZE AND CHARACTERISTICS OF THE EXISTING STREAM, IT IS EXPECTED THAT STRANDED FISH CAN BE LOCATED AND CAPTURED USING DIPNETS OR SMALL SEINES, FOLLOWED BY ELECTROFISHING. EFFORTS TO CAPTURE AND RELOCATE FISH BY NETTING METHODS ARE TO PRECEDE ELECTROFISHING. CAPTURED FISH ARE TO BE RELEASED IN UNAFFECTED REACHES DOWNSTREAM OF THE PROJECT AREA.
6. EXCAVATE STREAM ACCORDING TO THE GRADING PLAN, PROFILE, AND CROSS-SECTIONS. EXCAVATE THE MAIN CHANNEL (DOWN TO THE ELEVATION OF THE BENCHES). UNDER SUPERVISION OF THE STREAM RESTORATION SPECIALIST, FLAG AND THEN EXCAVATE THE LOW FLOW CHANNEL.
7. REMOVE ACCESS ROAD ASPHALT WITHIN GRADING LIMITS AND EXCAVATE ACCORDING TO SHEETS W-4.0 AND W-4.1.
8. INSTALL CULVERT ACCORDING TO SHEETS W-5.0 AND W-5.1.
9. EXCAVATE DEPRESSIONS IN THE STREAM CHANNEL BOTTOM TO ACCOMMODATE THE PLACEMENT OF THE PROPOSED LOG STRUCTURES. MATERIAL EXCAVATED FROM THE CHANNEL MAY BE RE-USED AS DIRECTED. PLACE LOG STRUCTURES IN GROUPINGS AND ACCORDING TO TYPE AND POSITIONING AS LAID OUT IN DETAIL IN THE PROJECT PLANS.
10. PLACE LOG STRUCTURES ACCORDING TO SHEETS W-3.0, W-6.1, AND W-6.2. INSTALL EARTH ANCHOR SYSTEMS AND PLACE GRAVEL/ COBBLE/ BOULDER MIX.
11. BRING STREAM TO FINAL GRADE WITH GRAVEL/ COBBLE/ BOULDER MIX (SEE SHEETS W-2.0 AND W-6.2 FOR DETAILS).
12. FOLLOWING COMPLETION OF IN-STREAM WORK, ENSURE THAT MULCH, BLANKET AND OTHER EROSION CONTROLS ARE INSTALLED AND IN GOOD CONDITION ALONG STREAMBANKS BORDERING AREAS TO BE PLANTED, AND DOWNSLOPE OF ANY OTHER DISTURBED AREAS.
13. ANY SILT-LADEN WATER COLLECTING IN THE IN-STREAM WORK AREA FOLLOWING CESSATION OF IN-WATER WORK ACTIVITIES IS TO BE ALLOWED TO SETTLE OR DISSIPATE PRIOR TO RECONNECTING THE DE-WATERED WORK AREA TO THE FLOWING STREAM BY REMOVAL OF FIRST THE DOWNSTREAM THEN THE UPSTREAM TEMPORARY GRAVEL BAG DIVERSION DAM AND ASSOCIATED BYPASS PIPING.
14. INSTALL PLANTINGS ACCORDING TO SHEETS W-7.0 - W-7.3.
15. WATER PLANTS AS NEEDED DURING DRY CONDITIONS THROUGHOUT THE FIRST YEAR POST-PLANTING.
16. REMOVE ALL REFUSE, TESC MEASURES AND BMPS.

CONSTRUCTION SEQUENCE

SCALE 1"=20'

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-2.1 CONSTRUCTION SEQUENCE

CLASS: SITE

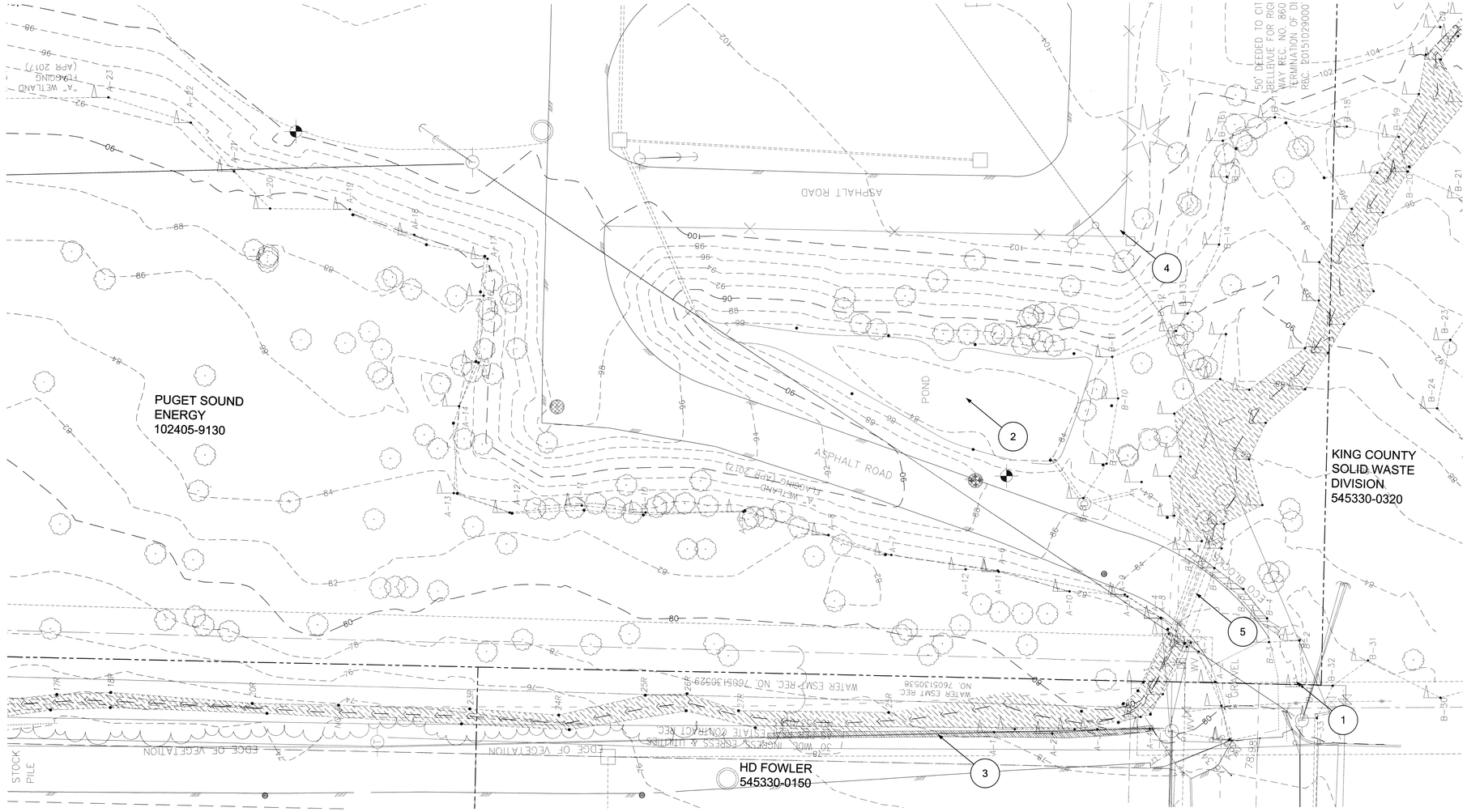
CADD NO:

DRAWING NO. D-18172 | REV NO 0

SHEET: 3 OF 22

FILE NO: 111103

CODE: RIC



LEGEND

- EXISTING TREE
- EXISTING SURVEYED STREAM CHANNEL (OHWM)
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PSE PROPERTY BOUNDARY

1. SECTION OF STREAM DAYLIGHTED FOR 15' LF BEFORE ENTERING INTO STORM DRAIN
2. STORMWATER POND
3. ECO BLOCK RETAINING WALL
4. GRAVEL EQUIPMENT STORAGE LOT
5. 2 - 18" CORRUGATED METAL PIPES

EXISTING CONDITIONS

SCALE 1"=20'

20 0 20 40 80

GRAPHIC SCALE
(IN FEET)

CALL BEFORE YOU DIG
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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KM	08 / 14 / 17

PUGET SOUND ENERGY

W-2.2 EXISTING CONDITIONS

DRAWING NO: D-18172 REV NO: 0

SHEET: 4 OF 22

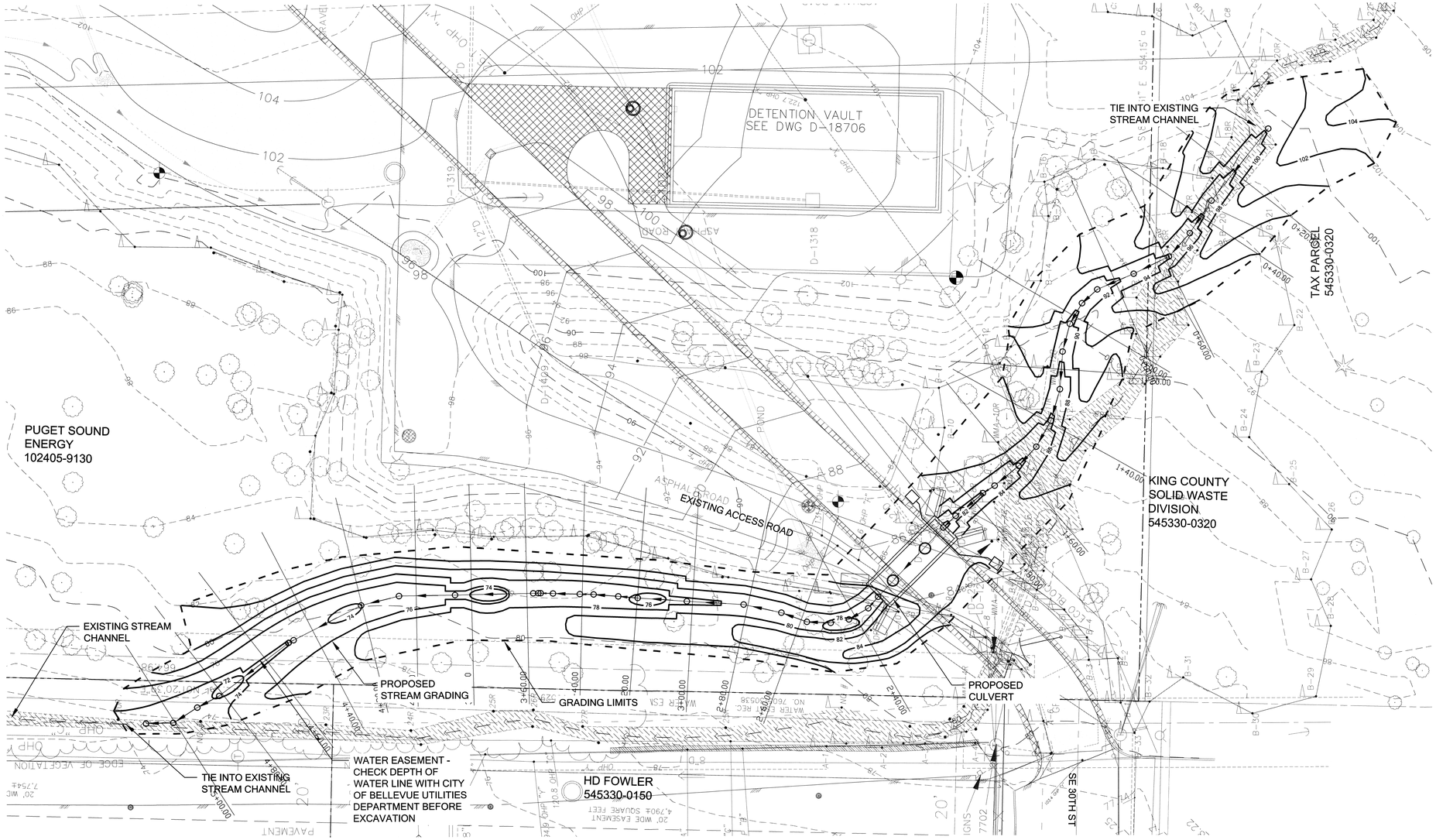
CLASS: SITE

FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002206



LEGEND

- EXISTING CHANNEL
- EXISTING TREE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOURS
- PSE PROPERTY BOUNDARY
- GRADING LIMITS
- XS STATION (SEE 6.11 - 6.13)

GRADING PLAN

SCALE 1"=20'

GRAPHIC SCALE
(IN FEET)
20 0 20 40 80

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

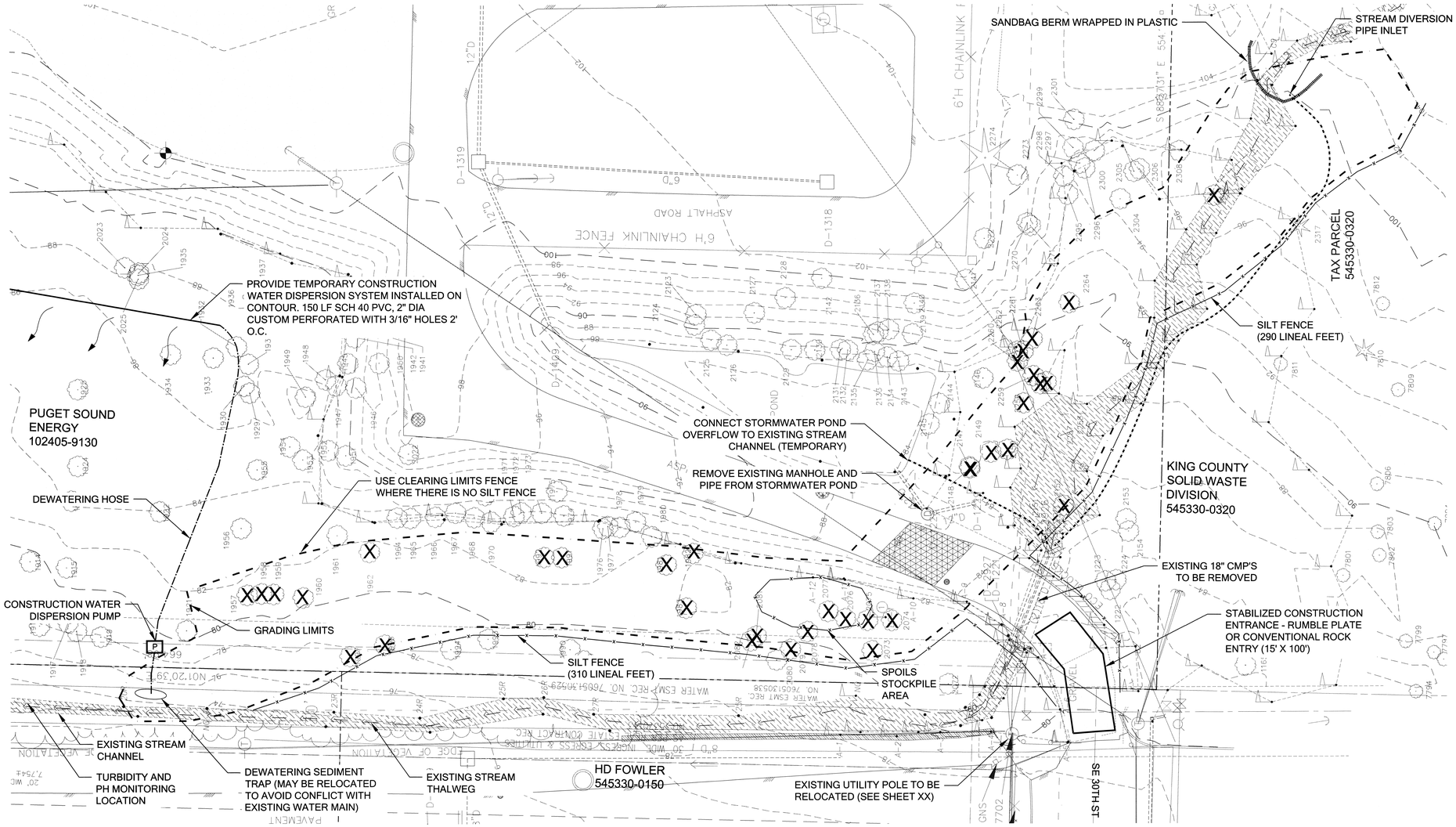
		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. EM	08 / 30 / 17

PUGET SOUND ENERGY

W-3.0 CHANNEL GRADING PLAN

DRAWING NO: D-18172 REV NO: 0
SHEET: 5 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

DSD 002207



LEGEND

- EXISTING CHANNEL
- EXISTING TREE TO BE REMOVED
- GRADING LIMITS
- DIVERSION PIPE (210 LF)
- DEWATERING HOSE AND PUMP
- ASPHALT (TO BE REMOVED)
- SILT FENCE
- SANDBAG BERM

TREE REMOVAL TABLE

REFS.	TREE DESC.	DIA. (INCHES)	REFS.	TREE DESC.	DIA. (INCHES)	REFS.	TREE DESC.	DIA. (INCHES)	REFS.	TREE DESC.	DIA. (INCHES)
1957	ALDER	14									
1958	ALDER	14	1962	POPLAR	12 10	2077	ALDER	9 8	2258	ALDER	9
1959	ALDER	12	1981	ALDER	8	2078	ALDER	10 8 6 5	2260	ALDER	9
1960	ALDER	9 15	1982	ALDER	9 8 7	2079	ALDER	8 7	2261	ALDER	8
						2081	ALDER	10	2262	ALDER	9
			1983	ALDER	18	2082	ALDER	9	2263	ALDER	8
			1991	ALDER	12				2264	ALDER	10 5
			1992	ALDER	13	2147	ALDER	9			
			1996	ALDER	10	2148	ALDER	10	2317	ALDER	9
			1997	ALDER	8	2149	POPLAR	12 6			
						2150	POPLAR	14 12 10			
			2073	ALDER	8 5	2152	POPLAR	CLUSTER 15 TREES 3"-9" (15' DIA.)			
			2074	ALDER	12 11						
			2075	ALDER	(2)8	2256	ALDER	9			
			2076	ALDER	9	2257	ALDER	8			

NOTES

1. DIVERSION SHALL BE FLEXIBLE PIPE DESIGNED TO CONVEY THE 25-YR FLOW DURING THE CONSTRUCTION WINDOW. CONVEYANCE PIPE(S) SHALL BE INSTALLED AT THE STORMWATER POND OUTLET AND DISCHARGE AT THE EXISTING CMP PIPES BENEATH THE ACCESS DRIVE.
2. CONTRACTOR SHALL COMPLY WITH ESC NOTES AND SEQUENCES ON SHEETS 2.0 AND 4.2.

TESC & DEMOLITION PLAN

SCALE 1"=20'

20 0 20 40 80

GRAPHIC SCALE (IN FEET)

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-3.1 TESC & DEMOLITION PLAN

DRAWING NO: D-18172 REV NO: 0

SHEET: 6 OF 22

CLASS: SITE

FILE NO: 111103

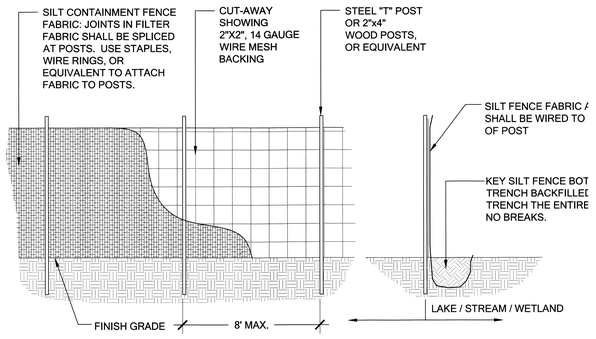
CODE: RJC

CADD NO:

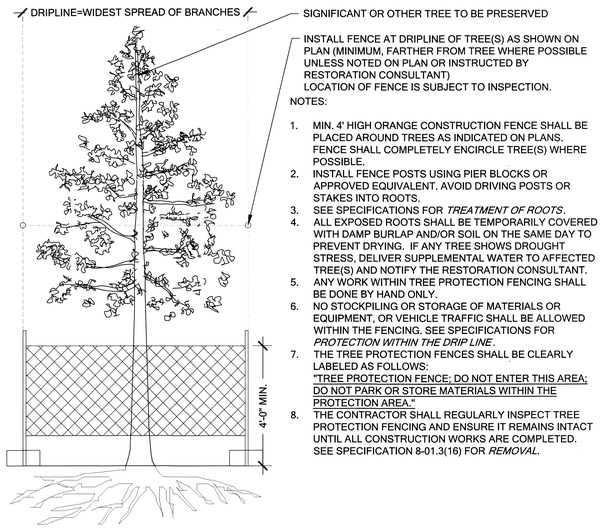
DSD 002208

1. TESC COORDINATION
   a. A Certified Erosion and Sediment Control Lead (CESCL) shall be designated by the contractor as the project's TESC supervisor and shall be responsible for the performance, maintenance, and review of TESC measures and for compliance with all permit conditions related to TESC. The TESC supervisor shall be certified by the Department of Ecology's training requirement.
   b. Contractor's Revised TESC Plans. The TESC measures shown on this plan, in the Stormwater Pollution Prevention Plan (Appendix D of the Specifications), and in Section 8.1 of the Specifications, are the minimum requirements for anticipated site conditions. The contractor may revise the TESC measures should they determine that there is a need to be modified to comply with the permit conditions or if there is a more effective and efficient way to meet the performance objectives for the duration of the project.
   c. Implementing Revised TESC Plans, The Contractor shall consult with the City prior to implementing any changes to ensure compliance with City permits, the contract, and that the changes do not negatively impact property or public safety.
   d. An onsite TESC preconstruction meeting shall be held before any work begins to review implementation of the TESC Plans and Report.
2. INITIAL TESC INSTALLATION
   a. All TESC facilities shown on the Plans shall be installed prior to or in conjunction with all clearing and grading so as to ensure that the sediment-laden water does not enter the City drainage system, surface waters, or wetlands. Adjacent properties shall be protected from sediment-laden runoff. If not specifically shown on the Plans or the TESC Report, installation shall be done in accordance with Appendix D of the King County Surface Water Design Manual, "Erosion and Sediment Control Standards", or as directed by the City.
   b. Clearing limits and tree protection boundaries shown on the Plans shall be clearly flagged by survey tape or fencing prior to construction. No disturbance beyond the clearing limits is allowed.
   c. Stabilized construction entrances shown on the Plans shall be installed at the beginning of construction and maintained for the duration of the project. Onsite roads and paved areas shall be kept clean to minimize turbidity in runoff. Additional measures, such as constructed wheel wash systems or wash pads, if shown on the Plans, are required to ensure sediment is not tracked out to city streets. Any dirt tracked onto city streets shall be swept as needed or as directed by the City of Issaquah. Street sweeping is not considered a TESC measure.
   d. Covering of exposed soils, including roadway embankments, that will not be disturbed for two consecutive days during the wet season (Oct 1 to April 30) or seven days during the dry season (May 1 to Sept 30) shall be done using approved TESC methods (e.g. seeding, mulching, plastic covering, etc.). These time limits may be modified by the City to address specific site and weather conditions.
   e. Collection and treatment of runoff using ditches, swales, or pipes is required to route stormwater to collection points where it is treated prior to infiltration or discharge offsite. When shown on the Plans, temporary storage facilities such as ponds and tanks shall be installed at the onset of construction, regardless of the time of year.
   f. Discharge to the sanitary sewer is allowed upon approval from the City or Sammamish Plateau Water and Sewer District and the King County Industrial Waste Program. Pretreatment prior to discharge is required to meet County or Sewer District standards.
   g. Working in Streams. All in-water work within waters of the state shall be conducted during the HPA-specified fish window (included in Appendix B). Any equipment working within regulated waters shall be equipped with vegetable-based (non-toxic) hydraulic fluids, and appropriate methods shall be employed to divert the stream around the working area or isolate the working area from the stream using barriers.
3. ROUTINE TESC MAINTENANCE
   a. Maintenance over duration of project. All TESC measures shall be maintained by the TESC supervisor for the duration of construction, until final landscaping or other permanent site stabilization is complete
   b. Routine inspections. The TESC facilities shall be inspected by the TESC supervisor daily or more often during rainfall, and maintained to ensure proper functioning. Written documentation is required for discharges above 25 NTUs and shall be readily available at the project site.
   c. Offsite Pumping. The TESC supervisor shall notify the City of Issaquah prior to pumping any discharge offsite or to critical areas.
   d. Inactive Sites. TESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within 24 hours following a storm event.
   b. Preparation for wet season. Prior to the beginning of the wet season (Oct 1), all disturbed areas shall be reviewed to identify which ones can be seeded or otherwise covered in preparation for the winter rains. If cover measures are not established by Oct 1, additional TESC measures shall be required.
5. TURBIDITY MONITORING
   a. Monitoring Responsibility. The City's Inspector will measure the turbidity of stormwater leaving the site at the designated monitoring point(s) to verify compliance with turbidity discharge limits for stormwater runoff per City permits, Appendix D of the Specifications, and Section 8.1 of the Specifications that are specified below. The Contractor shall monitor turbidity in Issaquah Creek upstream and downstream of the project site to verify compliance with turbidity in the stream per the Ecology Construction Stormwater General Permit and other State and Federal permits.
   b. Monitoring Location. The turbidity monitoring location, where the Inspector will measure turbidity for compliance, is shown on the TESC Plans. For project sites where designating a monitoring point is not feasible (e.g. flat sites or linear utility projects), the monitoring locations will be at the discretion of the Inspector.
   c. 25 NTU Action Level. The TESC Supervisor shall be notified of discharges above 25 NTUs. The TESC Supervisor shall review and modify the TESC measures as needed to keep discharges from the site below 25 NTUs.
   d. 100 NTU Discharge Limit. The contractor is responsible for installing and maintaining TESC measures so that discharge from the project site shall not exceed 100 NTUs at all times up to the 10 year/24 hour storm event. This event is defined as 3.5 inches of rainfall over a 24 hour period, as measured at the City's rain gage. Data from this rain gage is posted on the City's website.
   e. 5 NTU over background in Issaquah Creek. Refer to the Ecology Construction Stormwater General Permit and other State and Federal permits for compliance with State instream water quality standards.
6. OTHER POLLUTION CONTROL MEASURES
   a. Pollution Control. The contractor shall implement all requirements of the TESC Report and Stormwater Pollution Prevention Plan, including storage and handling of hazardous materials, concrete handling and wastewater disposal, spill kits and spill response, and other measures as needed.
   b. Control of Process Water. The contractor shall use the appropriate pollution control measures to ensure that no liquid products or contaminated water such as runoff from concrete slurry (known as process water) enters the storm drainage system, surface waters, or otherwise leaves the project site.
7. FINAL SITE STABILIZATION
   a. Final stabilization. The contractor shall install all TESC needed for final stabilization at completion of finish grading. This shall be done within two consecutive days during the wet season (Oct 1 to April 30), seven days during the dry season (May 1 to Sept 30) or as directed by the City.
   b. Removal of TESC Facilities. The contactor shall remove all TESC facilities, except those that will remain (such as seed and mulch) after final stabilization of the site.
8. ENFORCEMENT
   a. Non-compliance with contract requirements, performance objectives and permits. Failure to provide and maintain approved TESC facilities, discharges that exceed the 100 NTU turbidity limit, or other failures to comply with the contract or permits are considered violations of the contract and may be subject to suspension of work and monetary penalties.
   b. Maintenance of TESC during suspension. If work is ordered to be suspended, the contractor shall continue to control erosion, pollution, and runoff during the shutdown and working days will be continued to be counted.

SILT FENCE MAINTENANCE STANDARDS:
1. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY.
2. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION EXCEEDS 6" IN DEPTH.



1 SILT FENCE
Scale: NTS



INSTALL FENCE AT DRIPLINE OF TREE(S) AS SHOWN ON PLAN (MINIMUM, FARTHER FROM TREE WHERE POSSIBLE UNLESS NOTED ON PLAN OR INSTRUCTED BY RESTORATION CONSULTANT)
LOCATION OF FENCE IS SUBJECT TO INSPECTION.

NOTES:
1. MIN. 4' HIGH ORANGE CONSTRUCTION FENCE SHALL BE PLACED AROUND TREES AS INDICATED ON PLANS. FENCE SHALL COMPLETELY ENCIRCLE TREE(S) WHERE POSSIBLE.
2. INSTALL FENCE POSTS USING PIER BLOCKS OR APPROVED EQUIVALENT. AVOID DRIVING POSTS OR STAKES INTO ROOTS.
3. SEE SPECIFICATIONS FOR *TREATMENT OF ROOTS*.
4. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP AND/OR SOIL ON THE SAME DAY TO PREVENT DRYING. IF ANY TREE SHOWS DROUGHT STRESS, DELIVER SUPPLEMENTAL WATER TO AFFECTED TREE(S) AND NOTIFY THE RESTORATION CONSULTANT.
5. ANY WORK WITHIN TREE PROTECTION FENCING SHALL BE DONE BY HAND ONLY.
6. NO STOCKPILING OR STORAGE OF MATERIALS OR EQUIPMENT, OR VEHICLE TRAFFIC SHALL BE ALLOWED WITHIN THE FENCING. SEE SPECIFICATIONS FOR *PROTECTION WITHIN THE DRIP LINE*.
7. THE TREE PROTECTION FENCES SHALL BE CLEARLY LABELED AS FOLLOWS: "TREE PROTECTION FENCE; DO NOT ENTER THIS AREA; DO NOT PARK OR STORE MATERIALS WITHIN THE PROTECTION AREA."
8. THE CONTRACTOR SHALL REGULARLY INSPECT TREE PROTECTION FENCING AND ENSURE IT REMAINS INTACT UNTIL ALL CONSTRUCTION WORKS ARE COMPLETED. SEE SPECIFICATION 8-01.3(16) FOR *REMOVAL*.

2 TREE PROTECTION
Scale: NTS

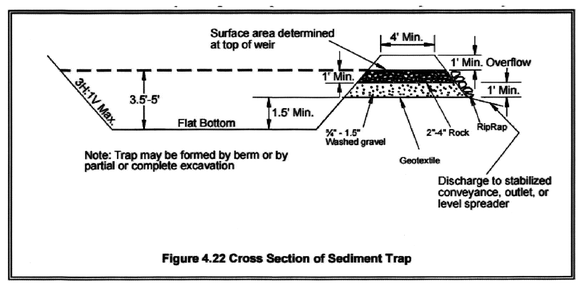


Figure 4.22 Cross Section of Sediment Trap

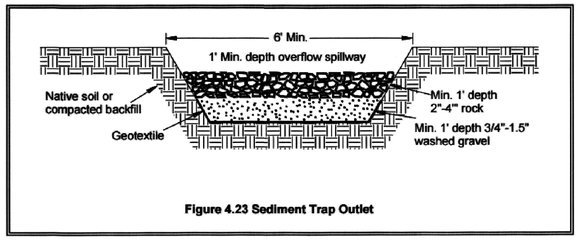


Figure 4.23 Sediment Trap Outlet

3 SEDIMENT TRAP (CITY OF BELLEVUE BMP C240)
Scale: NTS

TESC & DEMOLITION NOTES & DETAILS

CALL BEFORE YOU DIG
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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

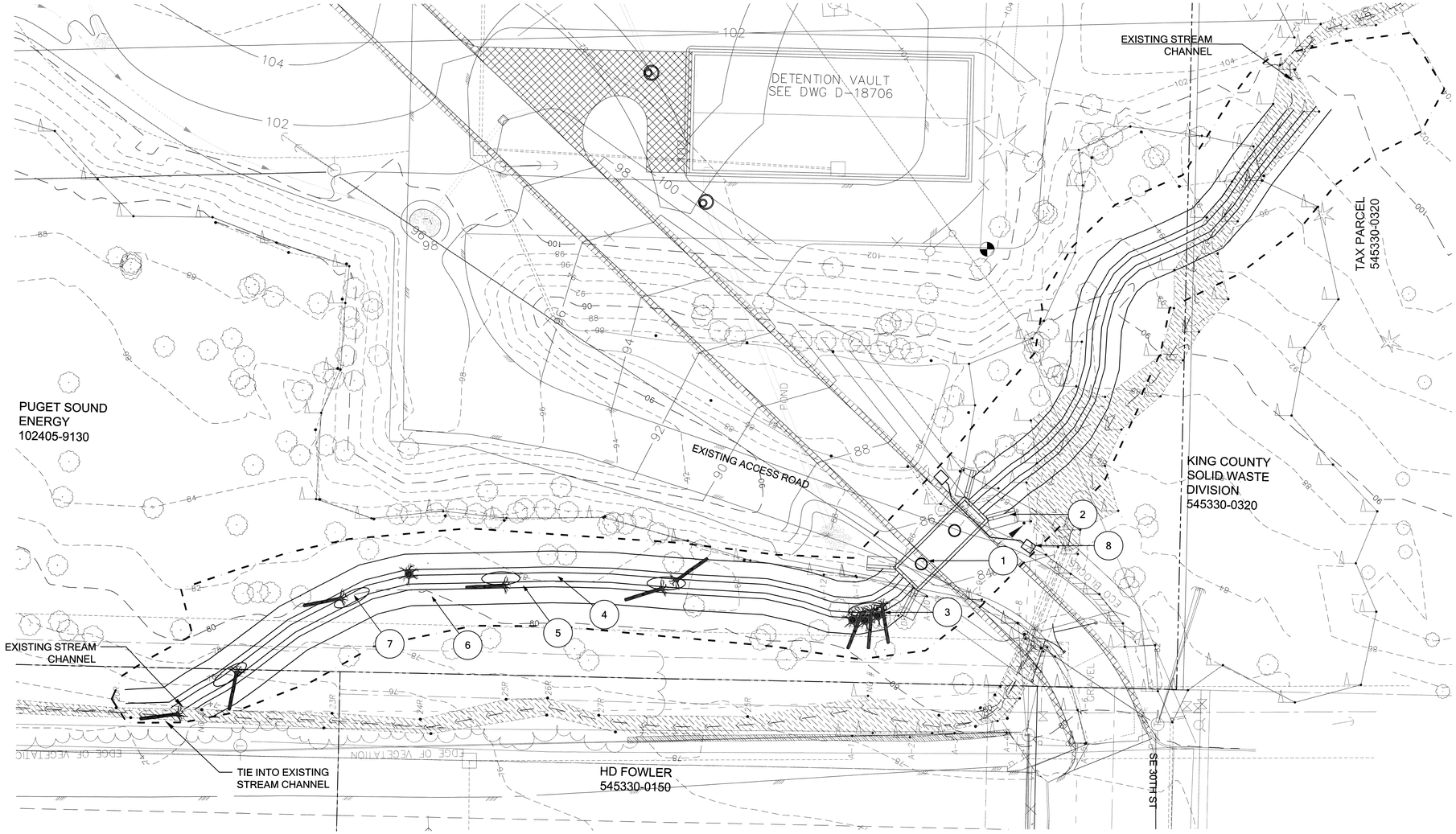
		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-3.2 TESC & DEMOLITION DETAILS

DRAWING NO: D-18172 | REV NO: 0
SHEET: 7 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RJC
CADD NO:

DSD 002209



LEGEND

- EXISTING CHANNEL
- EXISTING TREE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PSE PROPERTY BOUNDARY
- GRADING LIMITS

1. BOX CULVERT WITH LID
2. WINGWALLS
3. WOODY DEBRIS
4. LOW-FLOW CHANNEL
5. 2' WIDE STREAM BENCHES
6. 3:1 STREAM BANK
7. POOL
8. UTILITY HANDHOLE BELOW CULVERT

- LOG WITH ATTACHED ROOTS
- KEY MEMBER LOG WITH ATTACHED ROOTS
- UPRIGHT ROOT WAD

NOTES

1. NOT ALL SURVEYED OBJECTS ARE DISPLAYED IN THIS DRAWING
2. EXISTING CHANNEL OUTSIDE CONSTRUCTION LIMITS WILL NOT BE GRADED AND IS ANTICIPATED TO REMAIN OR BECOME WETLAND
3. FUTURE SUBSTATION NOT SHOWN

PROPOSED PLAN

SCALE 1"=20'

20 0 20 40 80

GRAPHIC SCALE
(IN FEET)

CALL BEFORE YOU DIG
Call: TOLL FREE
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REVISION DESCRIPTION:	WO NUMBER: 141003252
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RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 30 / 17

PUGET SOUND ENERGY

W-4.0 PROPOSED PLAN

DRAWING NO: D-18172 REV NO: 0

SHEET: 8 OF 22

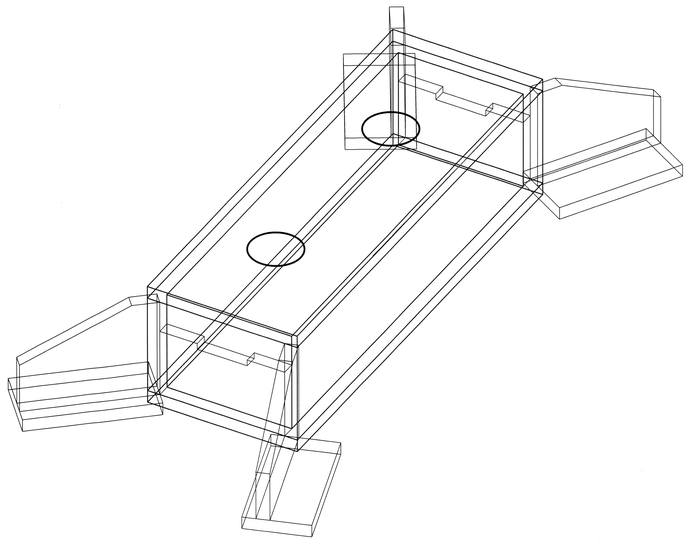
CLASS: SITE

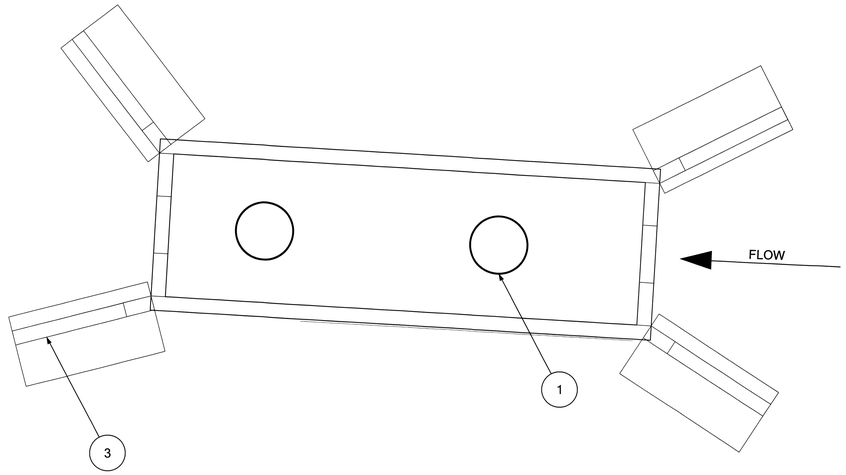
FILE NO: 111103

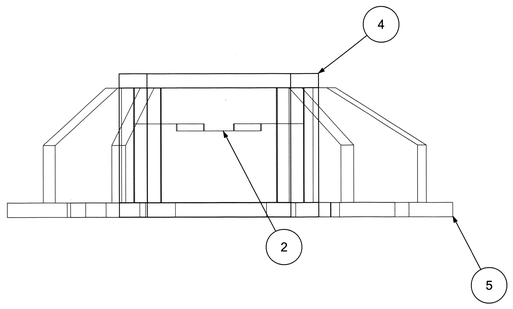
CODE: RIC

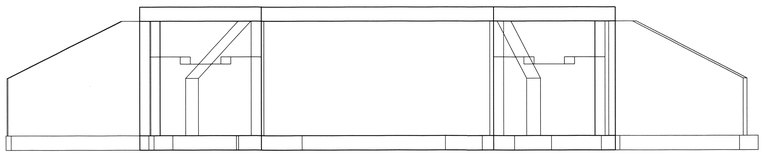
CADD NO:

DSD 002210









REPLACEMENT CULVERT DIMENSIONS - CONCRETE BOX

UPSTREAM SILL INVERT ELEVATION:	80.2'
UPSTREAM NOTCH ELEVATION:	79.7'
DOWNSTREAM SILL INVERT ELEVATION:	79.7'
DOWNSTREAM NOTCH ELEVATION:	79.2'
INTERNAL BOTTOM ELEVATION:	74.7'
INTERNAL DIMENSIONS:	10'W x 35'L x 8'H
WALL THICKNESS:	1.0'
SEDIMENT STORAGE DEPTH:	5'
SEDIMENT STORAGE VOLUME:	56 CY

NOTES

1. CULVERT WILL BE PRECAST CONCRETE AND ASSEMBLED ONSITE DURING CONSTRUCTION.
2. FINAL CULVERT DESIGN TO INCLUDE INTERNAL FLOW AND FISH BYPASS FOR USE DURING SEDIMENT VAULT CLEANOUT.

(1) MANHOLE CLEANOUT ACCESS

(2) LOW-FLOW SILL CUTOUT

(3) WINGWALL

(4) LID

(5) BASE PAD

CULVERT DESIGN

SCALE 1"=5'

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KM	08 / 14 / 17

PUGET SOUND ENERGY

W-5.0 CULVERT DESIGN

DRAWING NO: D-18172 | REV NO: 0

SHEET: 9 OF 22

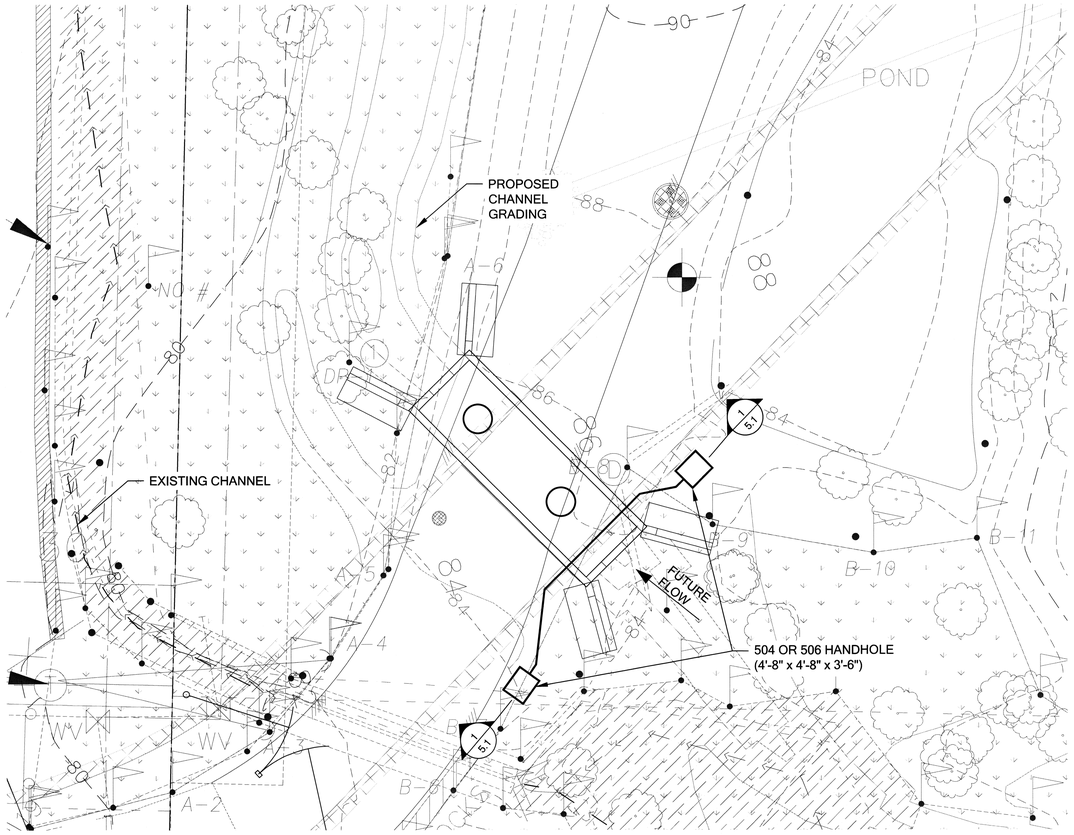
CLASS: SITE

FILE NO: 111103

CODE: RIC

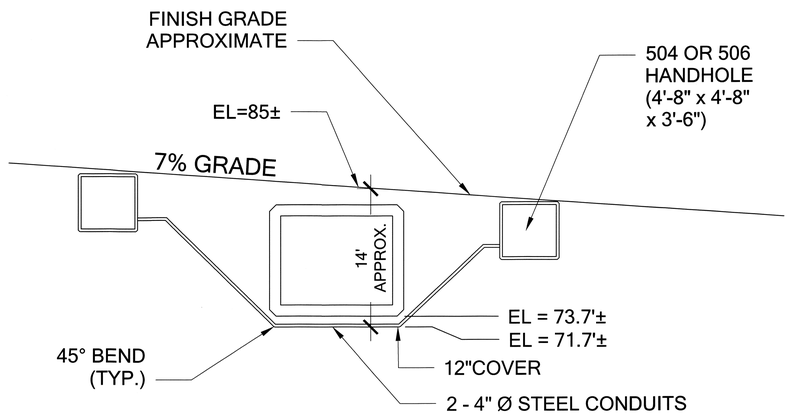
CADD NO:

DSD 002211



NOTES
1. HANDHOLE AND CONDUIT LOCATIONS ARE APPROXIMATE

NOTE:
SEE PSE PLANS FOR DETAILS AND ELEVATIONS



1 SECTION A-A HANDHOLE DETAIL
Scale: NTS

CULVERT & UTILITY CROSS-SECTION

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

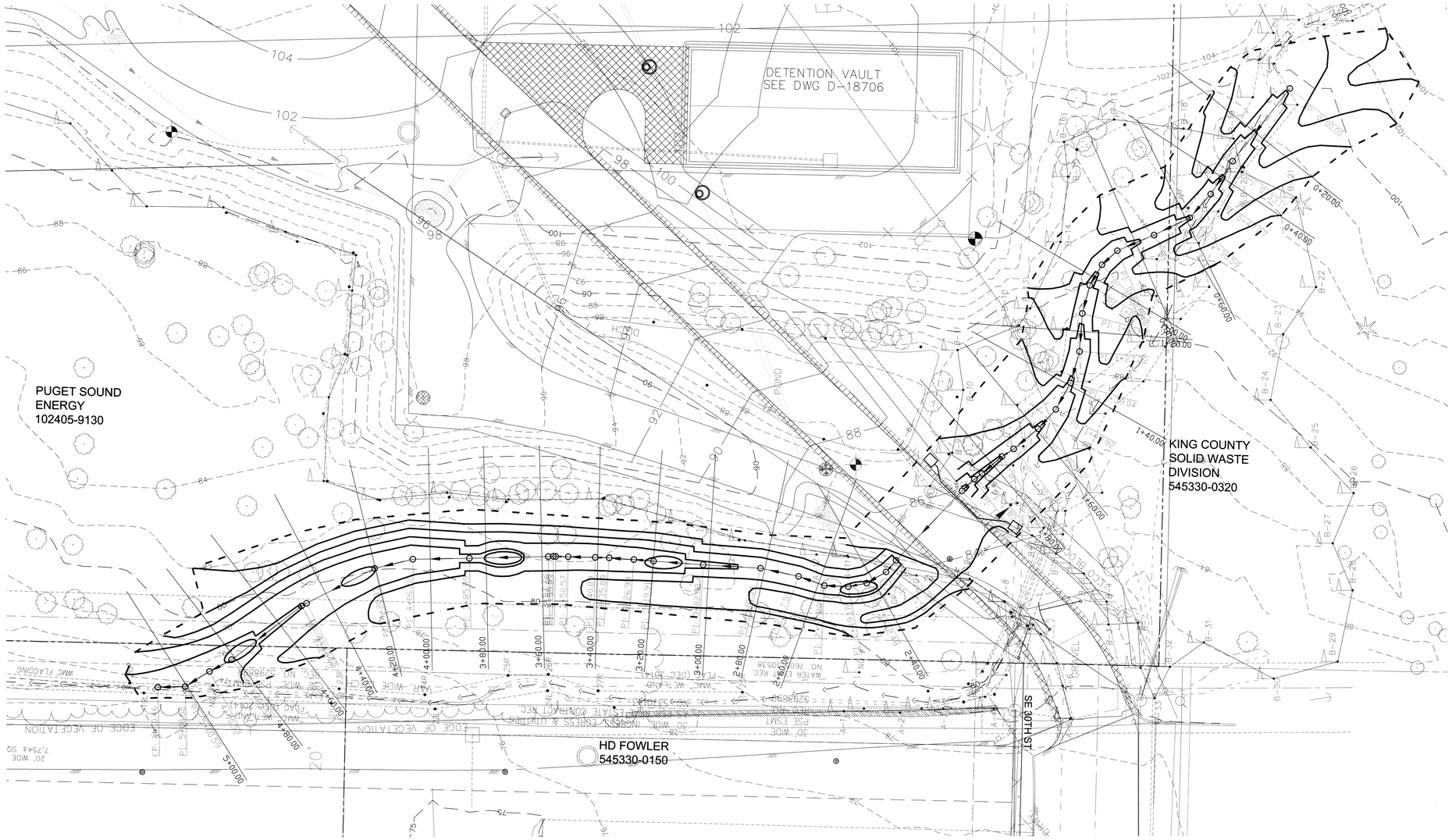
		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-5.1 CULVERT & UTILITY CROSS-SECTION

DRAWING NO: D-18172 REV NO: 0
SHEET: 10 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

DSD 002212



LEGEND

- EXISTING TREE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PSE PROPERTY BOUNDARY
- GRADING LIMITS
- STREAM CENTERLINE

STATIONING & CROSS-SECTIONS

SCALE 1"=20'

GRAPHIC SCALE
(IN FEET)
20 0 20 40 80

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1-800-424-5555

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 30 / 17

PUGET SOUND ENERGY

W-6.0 STATIONING & CROSS-SECTIONS

DRAWING NO: D-18172 REV NO: 0

SHEET: 11 OF 22

CLASS: SITE

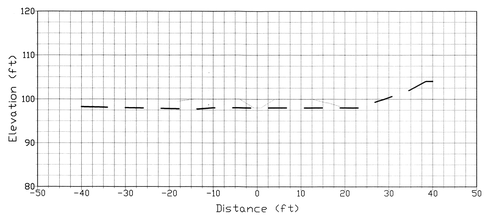
FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002213

0+20.00



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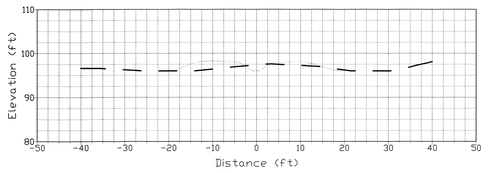

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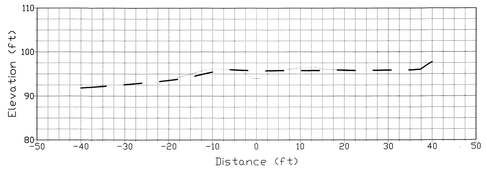

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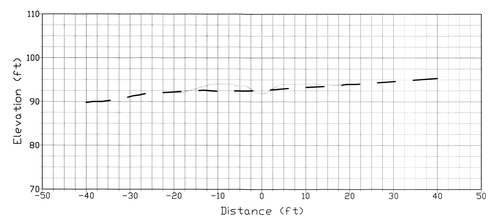

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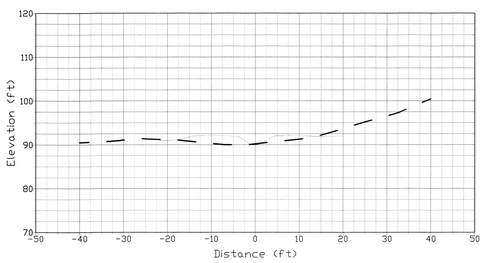

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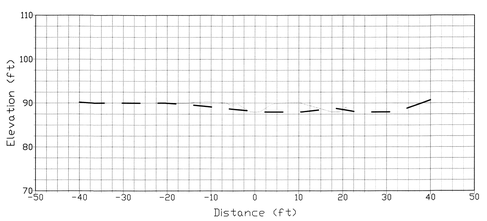

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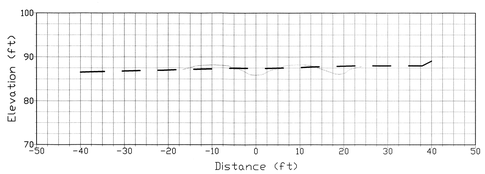

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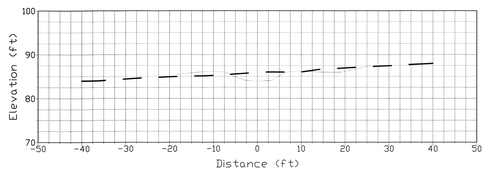

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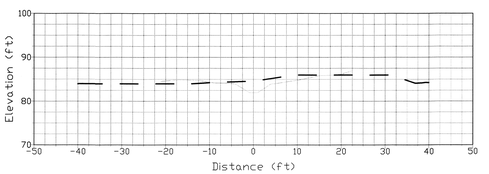

LEGEND

EXISTING GRADE

PROPOSED GRADE

STREAM CROSS-SECTIONS (1 OF 3)

SCALE: AS SHOWN

CALL BEFORE YOU DIG

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-6.11 STREAM CROSS-SECTIONS

DRAWING NO: D-18172

REV NO: 0

SHEET: 12 OF 22

CLASS: SITE

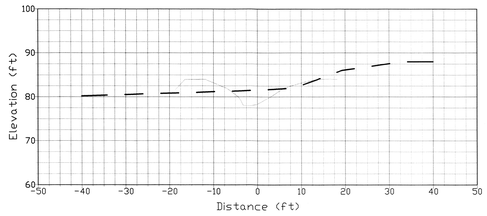
FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002214

2+40.00



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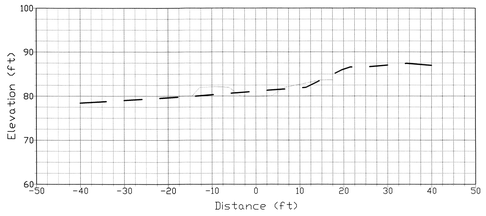

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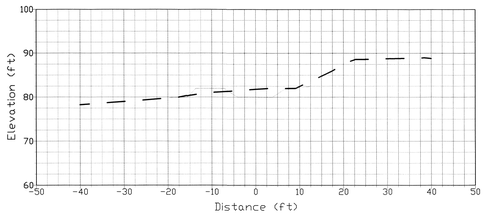

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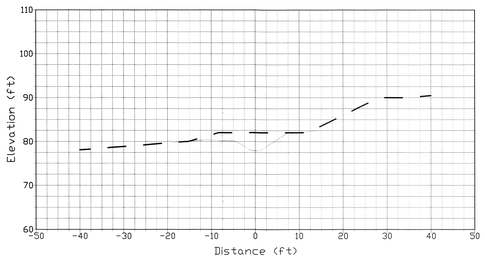
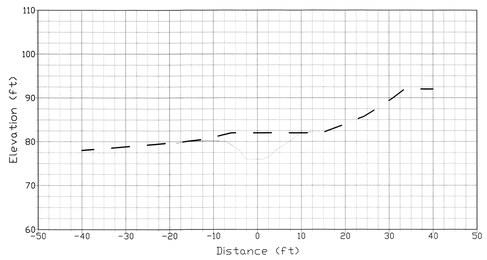


3+20.00



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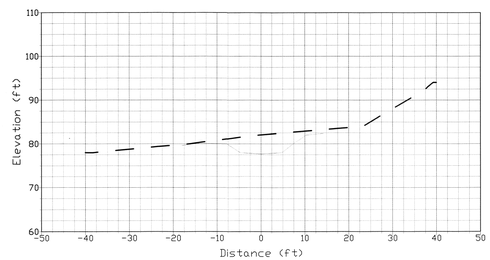

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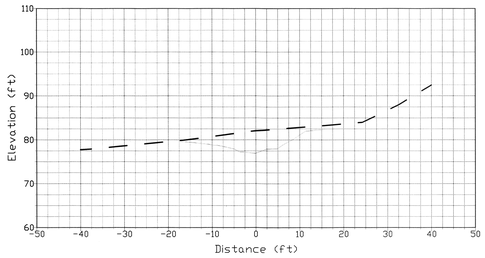

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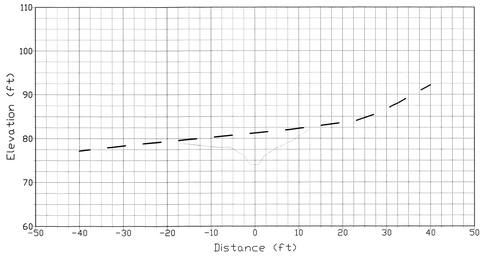

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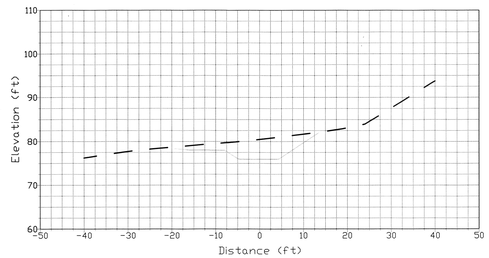

LEGEND

EXISTING GRADE

PROPOSED GRADE

STREAM CROSS-SECTIONS (2 OF 3)

SCALE: AS SHOWN

CALL BEFORE YOU DIG
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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-6.12 STREAM CROSS-SECTIONS

DRAWING NO: D-18172

REV NO: 0

SHEET: 13 OF 22

CLASS: SITE

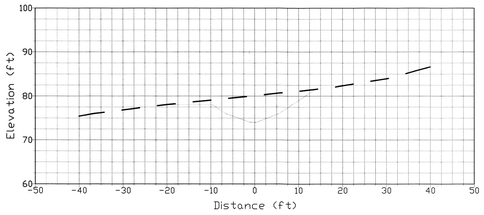
FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002215

4+20.00



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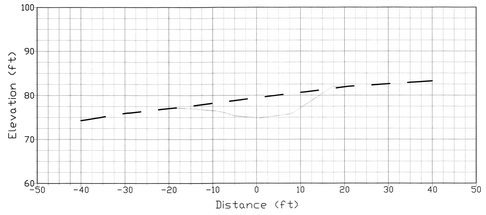

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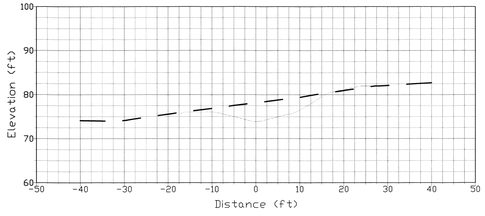

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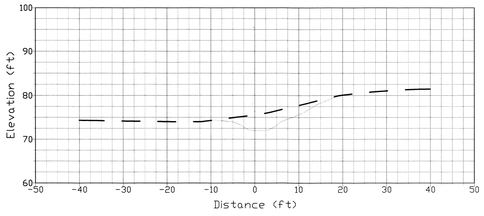
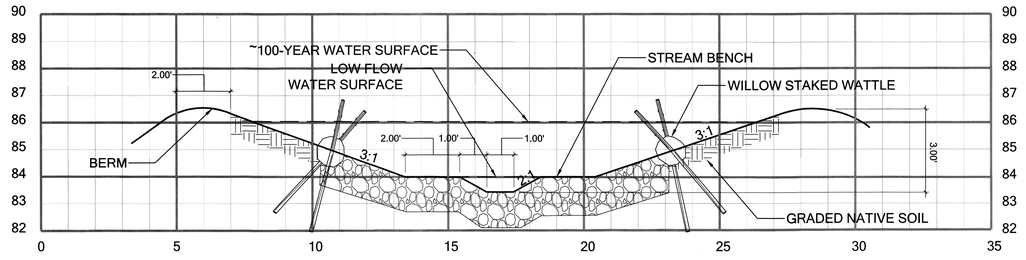


LEGEND

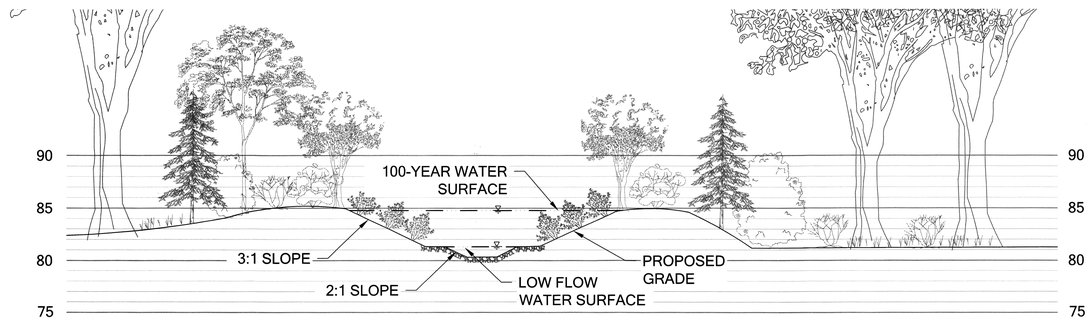
EXISTING GRADE

PROPOSED GRADE



1 STREAM TYPICAL CROSS-SECTION (STA 2+40 - 5+00)

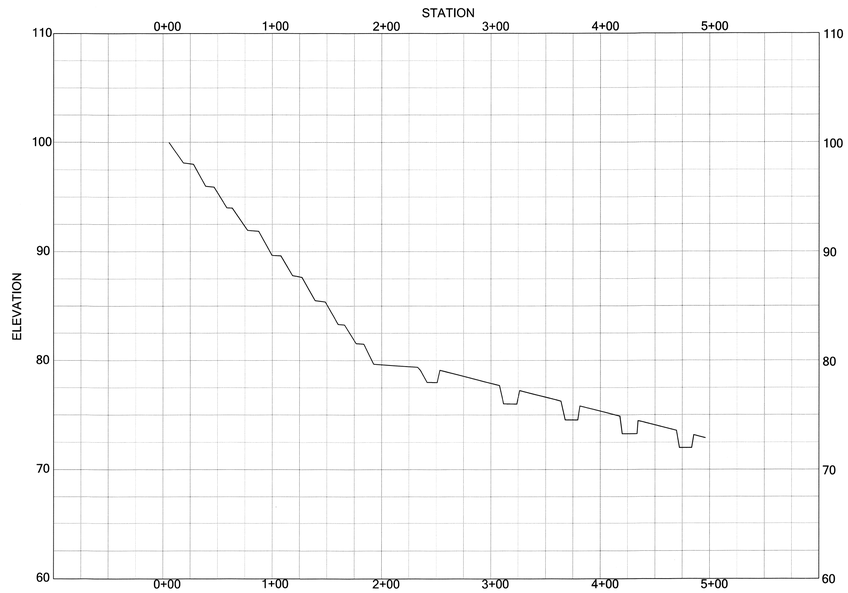
Scale: NTS



2 STREAM TYPICAL CROSS-SECTION WITH PLANTINGS

Scale: NTS

STREAM ALIGNMENT PROFILE



3 STREAM ALIGNMENT PROFILE

NOTE: REFER TO W-6.0 FOR CENTERLINE

Scale: NTS

STREAM CROSS-SECTIONS (3 OF 3) & PROFILE

SCALE NTS

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-6.13 STREAM CROSS-SECTIONS

DRAWING NO: D-18172 REV NO: 0

SHEET: 14 OF 22

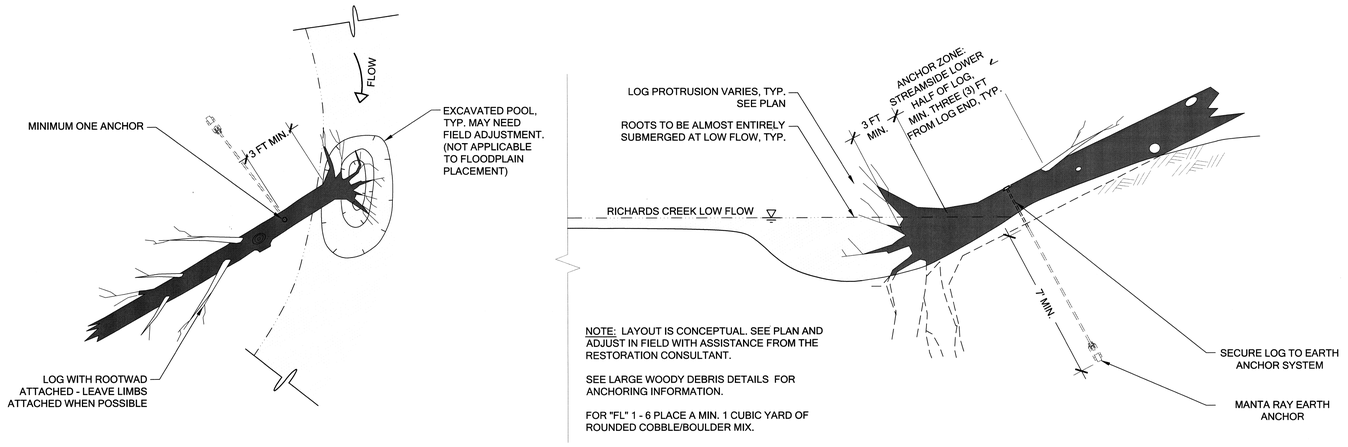
CLASS: SITE

FILE NO: 111103

CODE: PIC

CADD NO:

DSD.002216

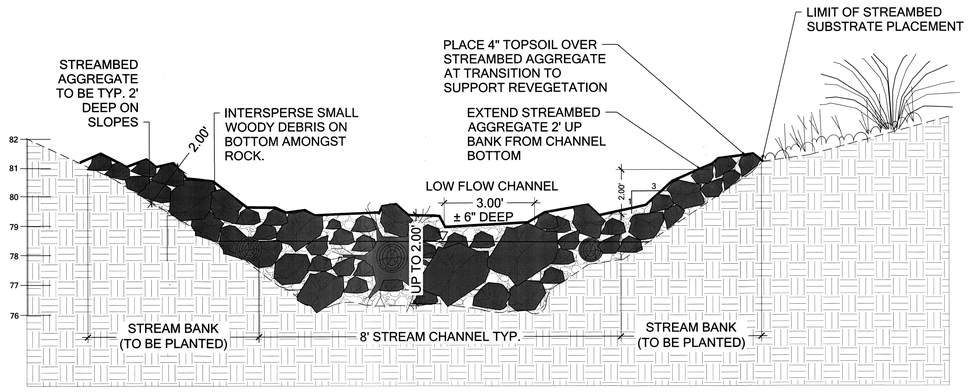


PLAN

SECTION: ON-GRADE FALLEN LOG

1 FALLEN LOG (TYP.)

Scale: NTS



2 ROCK MIXED WITH WOOD CROSS-SECTION (TYP.) - UPSTREAM OF CULVERT (STA 0+00 - 1+80)

Scale: NTS

MATERIALS SPECIFICATIONS

1) ROOT WADS (QTY - 4): SHALL BE NATIVE WESTERN REDCEDAR OR DOUGLAS-FIR, FREE OF ROT, MINIMUM 50% CEDAR, SUPPLIED WITH ATTACHED TRUNKS 4 TO 7 FEET IN LENGTH ABOVE THE GROUND LINE AS THE TREE GREW AND A MINIMUM OF 12 INCHES IN DIAMETER 4 FEET ABOVE THE GROUND LINE. ROOT MASSES SHALL BE FULL AND DENSE TO A MINIMUM OF 4 FEET IN DIAMETER. HEMLOCK, SPRUCE AND DECIDUOUS TREE SPECIES WILL NOT BE ACCEPTED.
2) LOGS WITH ATTACHED ROOTS (QTY - 5): SHALL BE NATIVE WESTERN REDCEDAR OR DOUGLAS-FIR, MINIMUM 50% CEDAR, A MINIMUM OF 10 INCHES IN DIAMETER AT BREAST HEIGHT (DBH). ATTACHED ROOT WADS ARE TO BE FULL AND DENSE TO A MINIMUM OF 6 FEET IN DIAMETER.
3) KEY MEMBER LOGS (QTY - 3): SHALL BE NATIVE WESTERN REDCEDAR OR DOUGLAS-FIR, MINIMUM 50% CEDAR, A MINIMUM OF 18 INCHES IN DIAMETER AT BREAST HEIGHT (DBH). ATTACHED ROOT WADS ARE TO BE FULL AND DENSE TO A MINIMUM OF 4 FEET IN DIAMETER.
4) LOGS MAY BE TRIMMED TO FIT IN-PLACE, BUT ONLY AT THE DIRECTION OF THE STREAM RESTORATION CONSULTANT. HEMLOCK, SPRUCE AND DECIDUOUS TREE SPECIES WILL NOT BE ACCEPTED. ALL ROOT WADS, REGARDLESS OF LENGTH OF LOG ATTACHED, ARE TO BE THOROUGHLY POWER-WASHED FREE OF SOIL AND SEDIMENT AT AN UPLAND LOCATION WHERE ALL OF THE GENERATED RUNOFF CAN INFILTRATE PRIOR TO THE LOGS BEING PLACED WITHIN THE STREAM CHANNEL.

LARGE WOODY DEBRIS DETAILS

CALL BEFORE YOU DIG
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1-800-424-5555

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

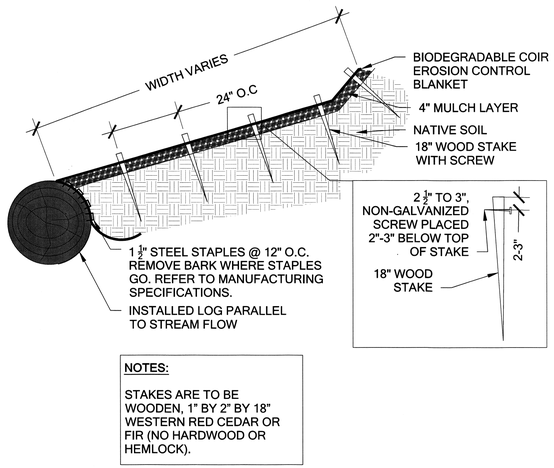
		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 14 / 17

PUGET SOUND ENERGY

W-6.21 LARGE WOODY DEBRIS DETAILS

DRAWING NO: D-18172 REV NO: 0
SHEET: 15 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

DSD 002217

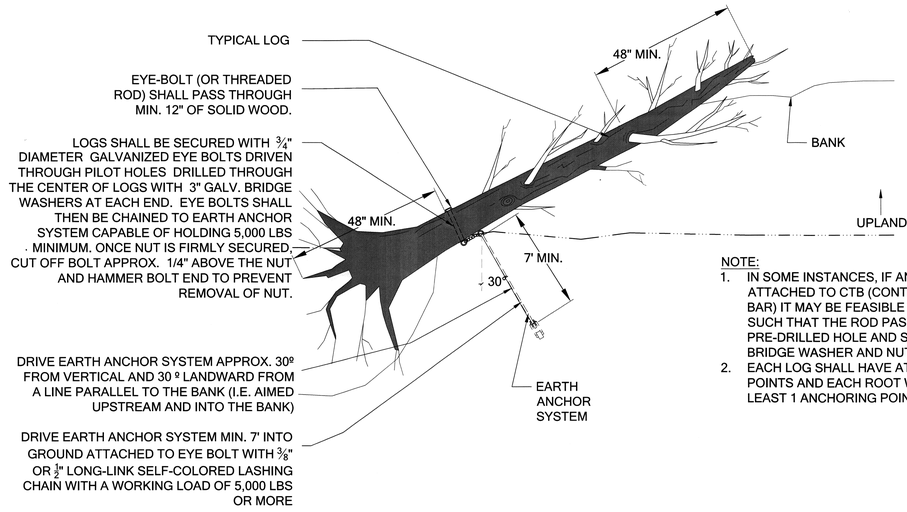


NOTES:

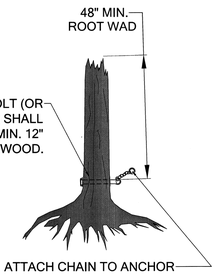
STAKES ARE TO BE WOODEN, 1" BY 2" BY 18" WESTERN RED CEDAR OR FIR (NO HARDWOOD OR HEMLOCK).

1 BIODEGRADABLE EROSION CONTROL BLANKET

Scale: NTS

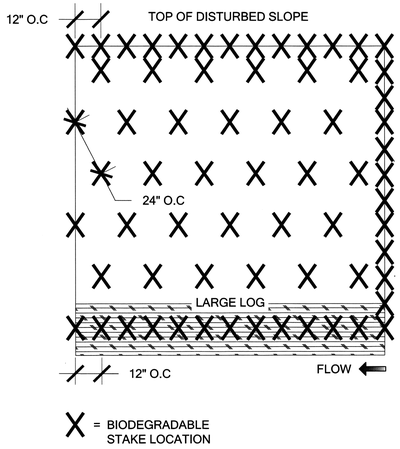


NOTE:
1. IN SOME INSTANCES, IF ANCHORING SYSTEM IS ATTACHED TO CTB (CONTINUOUSLY THREADED BAR) IT MAY BE FEASIBLE TO PLACE THE LOG SUCH THAT THE ROD PASSES THROUGH THE PRE-DRILLED HOLE AND SECURED USING A BRIDGE WASHER AND NUT AS DESCRIBED ABOVE.
2. EACH LOG SHALL HAVE AT LEAST 2 ANCHORING POINTS AND EACH ROOT WAD SHALL HAVE AT LEAST 1 ANCHORING POINT.



3 LOG ANCHORING OPTIONS

Scale: NTS



NOTES:
1. BIODEGRADABLE COIR EROSION CONTROL BLANKET SHALL PROVIDE EROSION PROTECTION FOR 24-36 MONTHS
2. BLANKET SHALL BE CUT LARGER THAN THE INSTALLATION AREA SHOWN ON THE CONTRACT DRAWINGS IN ORDER TO EXTEND BEYOND THE EDGES AND STAKE INTO THE SUBGRADE AS SHOWN.
3. CLEAR ANY WEEDS OR DEBRIS FROM THE INSTALLATION AREA BEFORE INSTALLING THE BLANKET.
4. SECURE THE BLANKET AT THE TOP WITH A ROW OF STAKES PLACED 12" APART ACROSS THE WIDTH OF THE BLANKET.
5. ROLL THE BLANKET ACROSS SLOPE AS DIRECTED BY RESTORATION SPECIALIST
6. THE EDGES OF ALL HORIZONTAL AND VERTICAL SEAMS MUST BE SECURED WITH A MIN. 12" OF OVERLAP, SHINGLE STYLE IN THE DIRECTION OF WATER FLOW. PLACE STAKES MIN. 6" APART ALONG THE OVERLAPPING SEAMS.
7. STAPLE BOTTOM OF COIR TO LARGE LOG OR ROOT WAD WITH STAPLES AT 12" O.C. IN ROWS OF 4 STAPLES.
8. ENDS OF COIR ON UPSTREAM SIDE SHALL BE INSTALLED WITH A VERTICAL ROW OF STAKES 12" O.C.
9. STAKING PATTERN: YIELDS ROUGHLY 8.25 STAKES PER SQUARE YARD.

2 BIODEGRADABLE EROSION CONTROL BLANKET

Scale: NTS

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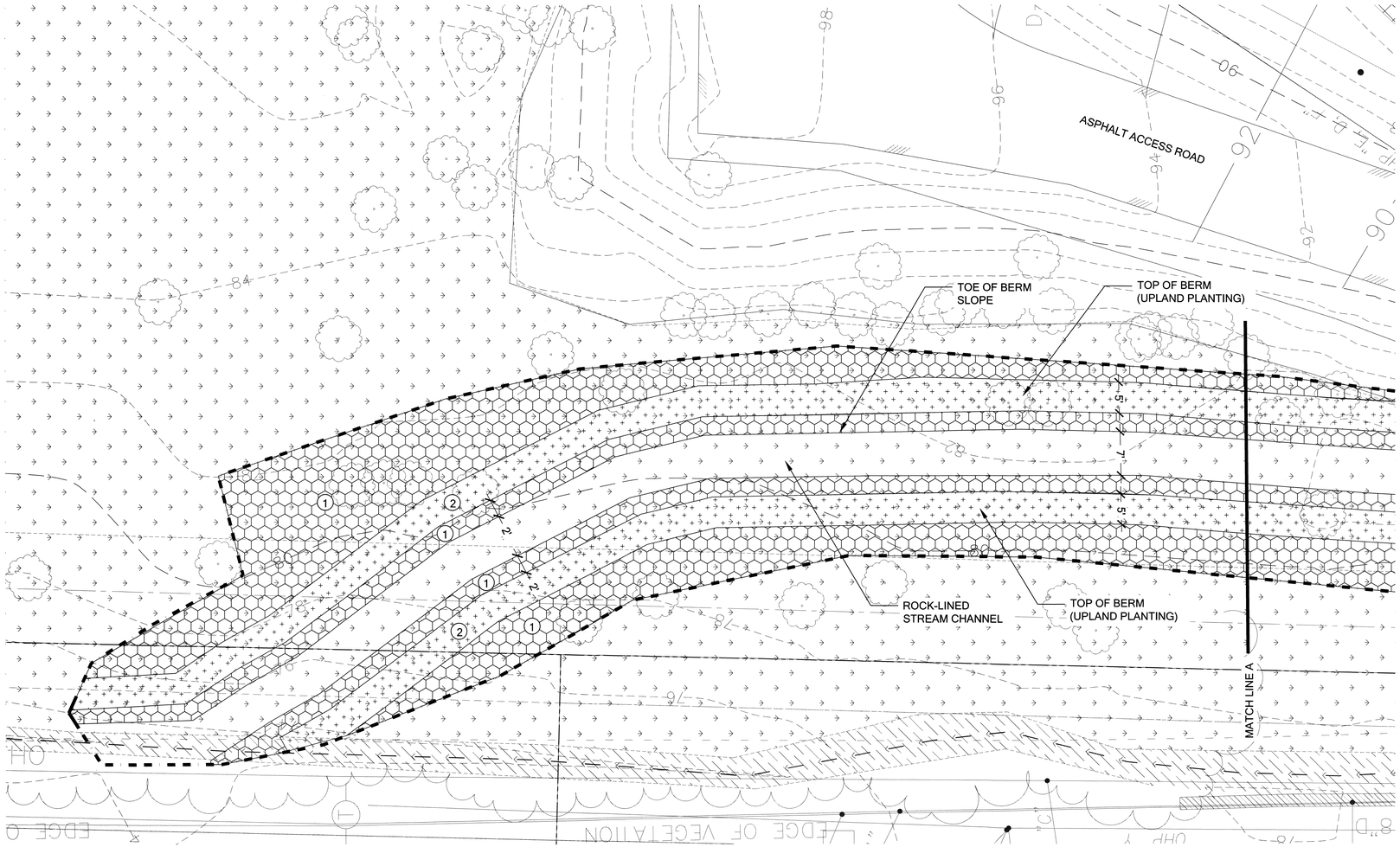
LARGE WOODY DEBRIS DETAILS

REVISION DESCRIPTION:	WO NUMBER: 141003252		RICHARDS CREEK SUBSTATION		
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL					
		DATE (M/D/Y)	PUGET SOUND ENERGY	W-6.22 LARGE WOODY DEBRIS ANCHOR DETAILS	DRAWING NO. D-18172 / REV NO 0
CAD	LM	06 / 13 / 17			SHEET: 16 OF 22
ENGINEER	EM	/ /			
REVIEWED	EM	/ /		CLASS: SITE	FILE NO: 111103
APPROVED	S. KIM	08 / 14 / 17	CADD NO:		CODE: RIC

DSD-002218



LEGEND

(1) WETLAND/RIPARIAN PLANTINGS (SEE W-7.3)

(2) UPLAND PLANTINGS (SEE W-7.3)

PLANTING PLAN (1 OF 3)

SCALE 1"=10'

10 0 10 40 80

GRAPHIC SCALE
(IN FEET)

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. FIM	08 / 14 / 17

PUGET SOUND ENERGY

W-7.0 PLANTING PLAN (1 OF 3)

CLASS: SITE

CADD NO:

DRAWING NO. D-18172 REV NO 0

SHEET: 17 OF 22

FILE NO: 111103

CODE: RIC

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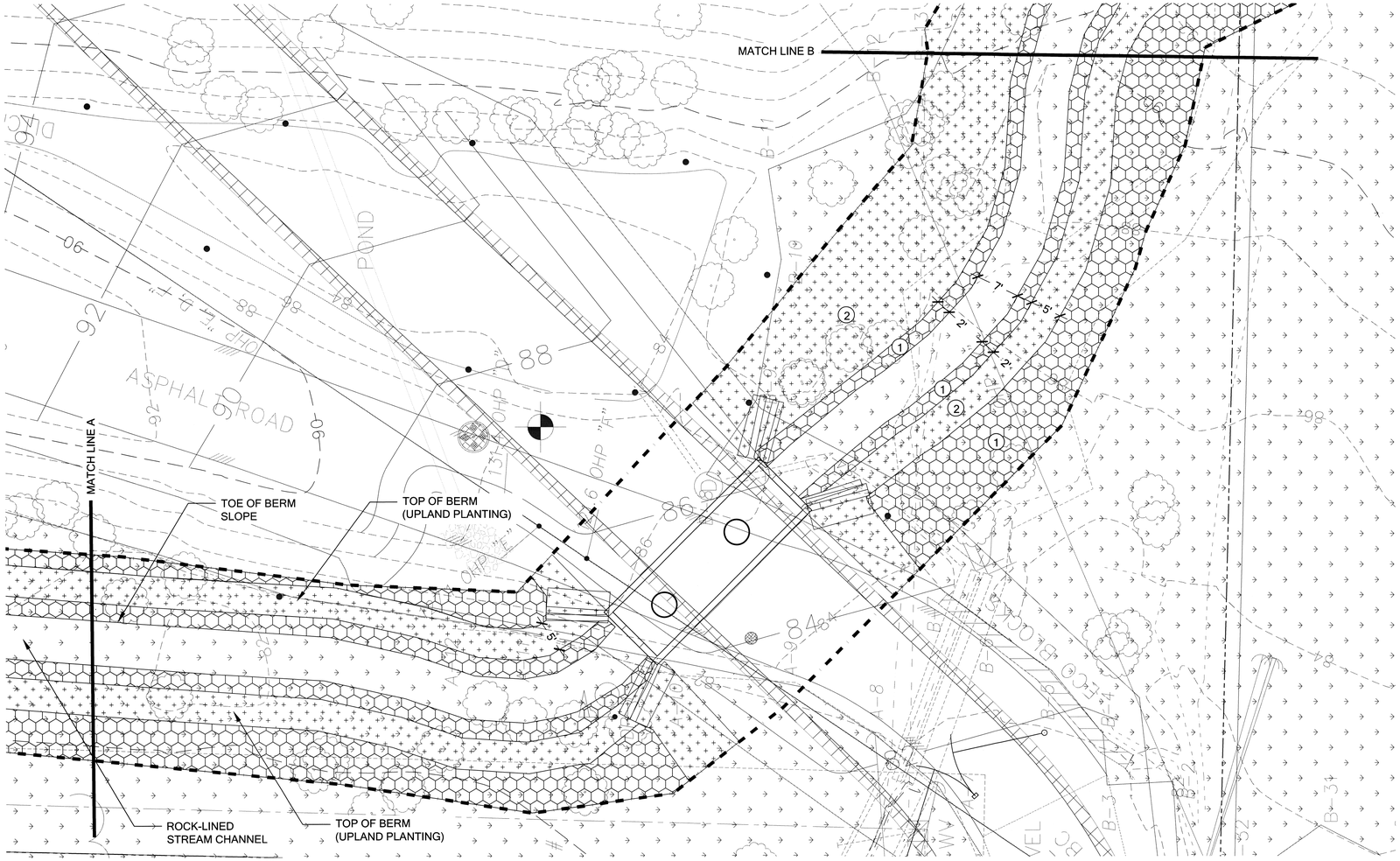

LEGEND

(1) WETLAND/RIPARIAN PLANTINGS (SEE W-7.3)

(2) UPLAND PLANTINGS (SEE W-7.3)

PLANTING PLAN (2 OF 3)

SCALE 1"=10'

10 0 10 40 80

GRAPHIC SCALE
(IN FEET)

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W-7.1 PLANTING PLAN (2 OF 3)

DRAWING NO D-18172 REV NO 0

SHEET: 18 OF 22

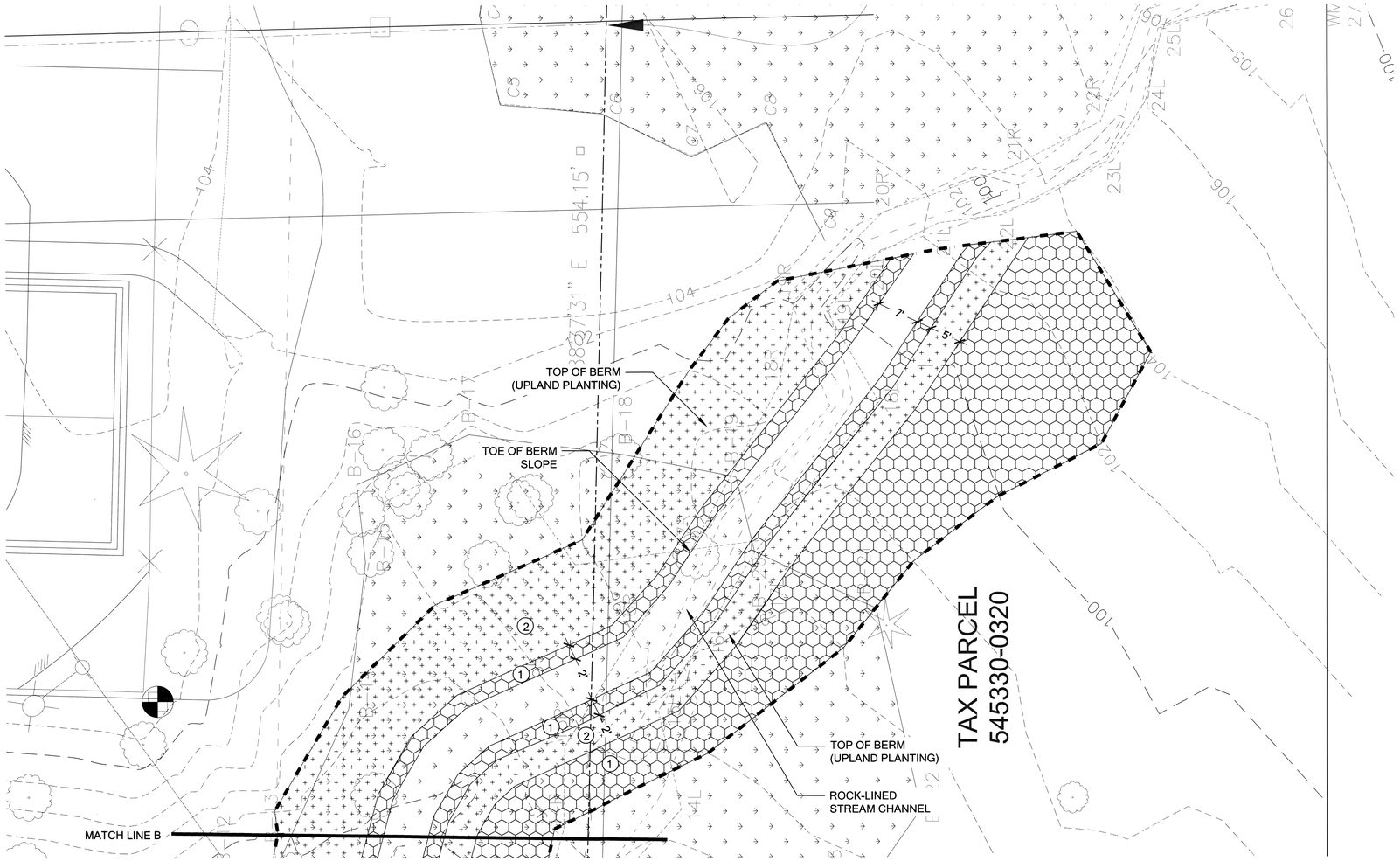
CLASS: SITE

FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002220



LEGEND

(1) WETLAND/RIPARIAN PLANTINGS (SEE W-7.3)

(2) UPLAND PLANTINGS (SEE W-7.3)

CALL BEFORE YOU DIG
Call: TOLL FREE
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PLANTING PLAN (3 OF 3)

SCALE 1"=10'

10 0 10 40 80
GRAPHIC SCALE
(IN FEET)

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
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ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED	S. KIM	08 / 30 / 17

PUGET SOUND ENERGY

W-7.2 PLANTING PLAN (3 OF 3)

DRAWING NO: D-18172 REV NO: 0

SHEET: 19 OF 22

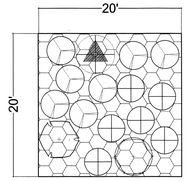
CLASS: SITE

FILE NO: 111103

CODE: RIC

CADD NO:

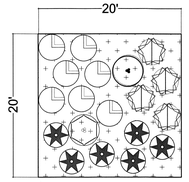
DSD 002221



1 WETLAND/RIPARIAN PLANTINGS
Scale: NTS

	QTY	SPACING	SIZE
TREES (66)			
ALNUS RUBRA / RED ALDER	12	ALL TREES TO BE SPACED PER PLAN	2 GAL.
FRAXINUS LATIFOLIA / OREGON ASH	10		2 GAL.
THUJA PLICATA / WESTERN RED CEDAR	12		2 GAL.
SALIX LUCIDA / PACIFIC WILLOW	12		2 GAL.
PICEA SITCHENSIS / SITKA SPRUCE	10		2 GAL.
SALIX SITCHENSIS / SITKA WILLOW	10		2 GAL.
SHRUBS (600)			
CORNUS SERICEA / RED-OSIER DOGWOOD	150	4' O.C.	1 GAL.
ROSA NUTKANA / NOOTKA ROSE	150		1 GAL.
RUBUS SPECTABILIS / SALMONBERRY	150		1 GAL.
PHYSOCARPUS CAPITATUS/ PACIFIC NINEBARK	150		1 GAL.
GROUNDCOVER (3600) **ALL SPECIES TO BE SPACED TRIANGULARLY*		18" O.C.	
ATHYRIUM FILIX-FEMINA/ LADY FERN (NO INUNDATION)	900		1 GAL
TOLMIEA MENZIESII /PIGGYBACK PLANT (NO INUNDATION)	900		1 GAL
SCIRPUS MICROCARPUS / SMALL FRUITED BULRUSH	900		1 GAL.
CAREX OBNUPTA/ SLOUGH SEDGE (BACKWATER AREAS)	900		1 GAL.

(PLANT BY SPECIES IN ODD GROUPS OF 9-15)



2 UPLAND/BUFFER PLANTS
Scale: NTS

	QTY	SPACING	SIZE
TREES (48)			
PSEUDOTSUGA MENZIESII / DOUGLAS-FIR	8	ALL TREES TO BE SPACED PER PLAN	2 GAL
THUJA PLUCATA / WESTERN RED CEDAR	8		2 GAL
ARBUTUS MENZIESII / PACIFIC MADRONE (PLANT NEXT TO DOUGLAS-FIR)	8		2 GAL
PRUNUS EMARGINATA / BITTER CHEERY	8		2 GAL
SALIX SCOULERIANA / SCOULER'S WILLOW	8		2 GAL
ACER MACROPHYLLUM / BIG LEAF MAPLE (AWAY FROM ACCESS DRIVE)	8		2 GAL
SHRUBS (240)		4' O.C.	
RUBUS SPECTABILIS / SALMONBERRY	40		1 GAL
SYMPHORICARPUS ALBUS / SNOWBERRY	40		1 GAL
OEMLERIA CERASIFORMIS / OSOBERRY	40		1 GAL
MAHONIA NERVOSA / LOW OREGON GRAPE	40		1 GAL
MAHONIA AQUIFOLIUM / TALL OREGON GRAPE	40		1 GAL
ACER CIRCINATUM / VINE MAPLE	40		1 GAL
GROUNDCOVER (3290) **ALL SPECIES TO BE SPACED TRIANGULARLY*		18" O.C.	
POLYSTICHUM MUNITUM / SWORD FERN	1645		1 GAL
BLECHNUM SPICANT / DEER FERN	1645		1 GAL

(PLANT BY SPECIES IN ODD GROUPS OF 9-15)

PLANTING TYPICALS & SCHEDULE

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PUGET SOUND ENERGY

W-7.3 PLANTING TYPICALS & SCHEDULE

CLASS: SITE

CADD NO:

DRAWING NO: D-18172
REV NO: 0
SHEET: 20 OF 22
FILE NO: 111103
CODE: RIC

DSD 002222

PLANT INSTALLATION SPECIFICATIONS

QUALITY ASSURANCE

1. PLANTS SHALL MEET OR EXCEED THE SPECIFICATIONS OF FEDERAL, STATE, AND LOCAL LAWS REQUIRING INSPECTION FOR PLANT DISEASE AND INSECT CONTROL.
2. PLANTS SHALL BE HEALTHY, VIGOROUS, AND WELL-FORMED, WITH WELL DEVELOPED, FIBROUS ROOT SYSTEMS, FREE FROM DEAD BRANCHES OR ROOTS. PLANTS SHALL BE FREE FROM DAMAGE CAUSED BY TEMPERATURE EXTREMES, LACK OR EXCESS OF MOISTURE, INSECTS, DISEASE, AND MECHANICAL INJURY. PLANTS IN LEAF SHALL BE WELL FOLIATED AND OF GOOD COLOR. PLANTS SHALL BE HABITUATED TO THE OUTDOOR ENVIRONMENTAL CONDITIONS INTO WHICH THEY WILL BE PLANTED (HARDENED-OFF).
3. TREES WITH DAMAGED, CROOKED, MULTIPLE OR BROKEN LEADERS WILL BE REJECTED. WOODY PLANTS WITH ABRASIONS OF THE BARK OR SUN SCALD WILL BE REJECTED.
4. NOMENCLATURE: PLANT NAMES SHALL CONFORM TO *FLORA OF THE PACIFIC NORTHWEST* BY HITCHCOCK AND CRONQUIST, UNIVERSITY OF WASHINGTON PRESS, 1973 AND/OR TO *A FIELD GUIDE TO THE COMMON WETLAND PLANTS OF WESTERN WASHINGTON & NORTHWESTERN OREGON*, ED. SARAH SPEAR COOKE, SEATTLE AUDUBON SOCIETY, 1997.

DEFINITIONS

1. PLANTS/PLANT MATERIALS. PLANTS AND PLANT MATERIALS SHALL INCLUDE ANY LIVE PLANT MATERIAL USED ON THE PROJECT. THIS INCLUDES BUT IS NOT LIMITED TO CONTAINER GROWN, B&B OR BAREROOT PLANTS; LIVE STAKES AND FASCINES (WATTLES); TUBERS, CORMS, BULBS, ETC..; SPRIGS, PLUGS, AND LINERS.
2. CONTAINER GROWN. CONTAINER GROWN PLANTS ARE THOSE WHOSE ROOT BALLS ARE ENCLOSED IN A POT OR BAG IN WHICH THAT PLANT GREW.

SUBSTITUTIONS

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN SPECIFIED MATERIALS IN ADVANCE IF SPECIAL GROWING, MARKETING OR OTHER ARRANGEMENTS MUST BE MADE IN ORDER TO SUPPLY SPECIFIED MATERIALS.
2. SUBSTITUTION OF PLANT MATERIALS NOT ON THE PROJECT LIST WILL NOT BE PERMITTED UNLESS AUTHORIZED IN WRITING BY THE PROJECT LANDSCAPE ARCHITECT.
3. IF PROOF IS SUBMITTED THAT ANY PLANT MATERIAL SPECIFIED IS NOT OBTAINABLE, A PROPOSAL WILL BE CONSIDERED FOR USE OF THE NEAREST EQUIVALENT SIZE OR ALTERNATIVE SPECIES, WITH CORRESPONDING ADJUSTMENT OF CONTRACT PRICE.
4. SUCH PROOF WILL BE SUBSTANTIATED AND SUBMITTED IN WRITING TO THE CONSULTANT AT LEAST 30 DAYS PRIOR TO START OF WORK UNDER THIS SECTION.

INSPECTION

1. PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE PROJECT LANDSCAPE ARCHITECT FOR CONFORMANCE TO SPECIFICATIONS, EITHER AT TIME OF DELIVERY ON-SITE OR AT THE GROWER'S NURSERY. APPROVAL OF PLANT MATERIALS AT ANY TIME SHALL NOT IMPAIR THE SUBSEQUENT RIGHT OF INSPECTION AND REJECTION DURING PROGRESS OF THE WORK.
2. PLANTS INSPECTED ON SITE AND REJECTED FOR NOT MEETING SPECIFICATIONS MUST BE REMOVED IMMEDIATELY FROM SITE OR RED-TAGGED AND REMOVED AS SOON AS POSSIBLE.
3. THE PROJECT LANDSCAPE ARCHITECT MAY ELECT TO INSPECT PLANT MATERIALS AT THE PLACE OF GROWTH. AFTER INSPECTION AND ACCEPTANCE, THE PROJECT LANDSCAPE ARCHITECT MAY REQUIRE THE INSPECTED PLANTS BE LABELED AND RESERVED FOR PROJECT. SUBSTITUTION OF THESE PLANTS WITH OTHER INDIVIDUALS, EVEN OF THE SAME SPECIES AND SIZE, IS UNACCEPTABLE.

MEASUREMENT OF PLANTS

1. PLANTS SHALL CONFORM TO SIZES SPECIFIED UNLESS SUBSTITUTIONS ARE MADE AS OUTLINED IN THIS CONTRACT.
2. HEIGHT AND SPREAD DIMENSIONS SPECIFIED REFER TO MAIN BODY OF PLANT AND NOT BRANCH OR ROOT TIP TO TIP. PLANT DIMENSIONS SHALL BE MEASURED WHEN THEIR BRANCHES OR ROOTS ARE IN THEIR NORMAL POSITION.
3. WHERE A RANGE OF SIZE IS GIVEN, NO PLANT SHALL BE LESS THAN THE MINIMUM SIZE AND AT LEAST 50% OF THE PLANTS SHALL BE AS LARGE AS THE MEDIAN OF THE SIZE RANGE. (EXAMPLE: IF THE SIZE RANGE IS 12" TO 18", AT LEAST 50% OF PLANTS MUST BE 15" TALL.).

SUBMITTALS

PROPOSED PLANT SOURCES

1. WITHIN 45 DAYS AFTER AWARD OF THE CONTRACT, SUBMIT A COMPLETE LIST OF PLANT MATERIALS PROPOSED TO BE PROVIDED DEMONSTRATING CONFORMANCE WITH THE REQUIREMENTS SPECIFIED. INCLUDE THE NAMES AND ADDRESSES OF ALL GROWERS AND NURSERIES.

PRODUCT CERTIFICATES

4. PLANT MATERIALS LIST - SUBMIT DOCUMENTATION TO CONSULTANT AT LEAST 30 DAYS PRIOR TO START OF WORK UNDER THIS SECTION THAT PLANT MATERIALS HAVE BEEN ORDERED. ARRANGE PROCEDURE FOR INSPECTION OF PLANT MATERIAL WITH CONSULTANT AT TIME OF SUBMISSION.
5. HAVE COPIES OF VENDOR'S OR GROWERS' INVOICES OR PACKING SLIPS FOR ALL PLANTS ON SITE DURING INSTALLATION. INVOICE OR PACKING SLIP SHOULD LIST SPECIES BY SCIENTIFIC NAME, QUANTITY, AND DATE DELIVERED (AND GENETIC ORIGIN IF THAT INFORMATION WAS PREVIOUSLY REQUESTED).

DELIVERY, HANDLING, & STORAGE

NOTIFICATION

CONTRACTOR MUST NOTIFY CONSULTANT 48 HOURS OR MORE IN ADVANCE OF DELIVERIES SO THAT CONSULTANT MAY ARRANGE FOR INSPECTION.

PLANT MATERIALS

1. TRANSPORTATION - DURING SHIPPING, PLANTS SHALL BE PACKED TO PROVIDE PROTECTION AGAINST CLIMATE EXTREMES, BREAKAGE AND DRYING. PROPER VENTILATION AND PREVENTION OF DAMAGE TO BARK, BRANCHES, AND ROOT SYSTEMS MUST BE ENSURED.
2. SCHEDULING AND STORAGE - PLANTS SHALL BE DELIVERED AS CLOSE TO PLANTING AS POSSIBLE. PLANTS IN STORAGE MUST BE PROTECTED AGAINST ANY CONDITION THAT IS DETRIMENTAL TO THEIR CONTINUED HEALTH AND VIGOR.
3. HANDLING - PLANT MATERIALS SHALL NOT BE HANDLED BY THE TRUNK, LIMBS, OR FOLIAGE BUT ONLY BY THE CONTAINER, BALL, BOX, OR OTHER PROTECTIVE STRUCTURE, EXCEPT BAREROOT PLANTS SHALL BE KEPT IN BUNDLES UNTIL PLANTING AND THEN HANDLED CAREFULLY BY THE TRUNK OR STEM.
4. LABELS - PLANTS SHALL HAVE DURABLE, LEGIBLE LABELS STATING CORRECT SCIENTIFIC NAME AND SIZE. TEN PERCENT OF CONTAINER GROWN PLANTS IN INDIVIDUAL POTS SHALL BE LABELED. PLANTS SUPPLIED IN FLATS, RACKS, BOXES, BAGS, OR BUNDLES SHALL HAVE ONE LABEL PER GROUP.

WARRANTY

PLANT WARRANTY

PLANTS MUST BE GUARANTEED TO BE TRUE TO SCIENTIFIC NAME AND SPECIFIED SIZE, AND TO BE HEALTHY AND CAPABLE OF VIGOROUS GROWTH.

REPLACEMENT

1. PLANTS NOT FOUND MEETING ALL OF THE REQUIRED CONDITIONS MUST BE REMOVED FROM SITE AND REPLACED IMMEDIATELY AT THE CONSULTANT'S DISCRETION.
2. PLANTS NOT SURVIVING AFTER ONE YEAR TO BE REPLACED.

PLANT MATERIAL

GENERAL

1. PLANTS SHALL BE NURSERY GROWN IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICES UNDER CLIMATIC CONDITIONS SIMILAR TO OR MORE SEVERE THAN THOSE OF THE PROJECT SITE.
2. PLANTS SHALL BE TRUE TO SPECIES AND VARIETY OR SUBSPECIES. NO CULTIVARS OR NAMED VARIETIES SHALL BE USED UNLESS SPECIFIED AS SUCH.

QUANTITIES

SEE PLANT LIST ON ACCOMPANYING PLANS AND PLANT SCHEDULES.

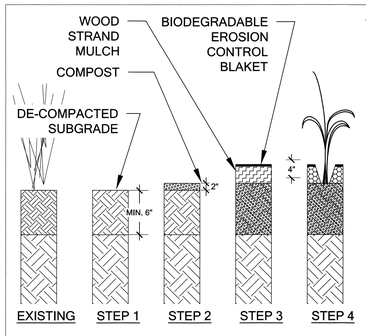
ROOT TREATMENT

1. CONTAINER GROWN PLANTS (INCLUDES PLUGS): PLANT ROOT BALLS MUST HOLD TOGETHER WHEN THE PLANT IS REMOVED FROM THE POT, EXCEPT THAT A SMALL AMOUNT OF LOOSE SOIL MAY BE ON THE TOP OF THE ROOT BALL.
2. PLANTS MUST NOT BE ROOT-BOUND; THERE MUST BE NO CIRCLING ROOTS PRESENT IN ANY PLANT INSPECTED.
3. ROOT BALLS THAT HAVE CRACKED OR BROKEN WHEN REMOVED FROM THE CONTAINER SHALL BE REJECTED.

GENERAL PLANTING SEQUENCE:

1. NATIVE PLANT INSTALLATION SHALL OCCUR DURING FROST-FREE PERIODS ONLY. PREFERRED MONTHS FOR INSTALLATION ARE BETWEEN SEPTEMBER 15TH AND APRIL 15, PRIOR TO HOT, DRY WEATHER. PLANTS MAY ONLY BE INSTALLED DURING HOT WEATHER IF THE APPLICANT AGREES TO IRRIGATION OF THE ENTIRE PLANTING AREA, DELIVERING AT LEAST 2" OF WATER PER WEEK FROM JUNE 1 THROUGH SEPTEMBER 15TH.
2. PROCURE PLANTS IN LEGEND AND ENSURE THAT MATERIAL MEETS THE MINIMUM REQUIREMENTS OUTLINED IN THE PLANT LEGEND AND PLANTING DETAILS.
3. LOCATE ALL EXISTING UTILITIES WITHIN THE LIMIT OF WORK.
4. REMOVE ALL INVASIVE WEEDS WITHIN THE PROJECT AREA, PARTICULARLY ENGLISH IVY. AMEND SOILS WITH COMPOST IF NEEDED.
5. ENSURE THAT NO ADVERSE DRAINAGE CONDITIONS EXIST THAT MAY AFFECT PROPER PLANT GROWTH AND ESTABLISHMENT.
6. LAYOUT PLANT MATERIAL PER PLAN FOR INSPECTION BY THE LANDSCAPE ARCHITECT. PLANT SUBSTITUTIONS WILL NOT BE ALLOWED WITHOUT AGENCY APPROVAL.
7. INSTALL PLANTS PER PLANTING DETAILS.
8. WATER EACH PLANT THOROUGHLY TO REMOVE AIR POCKETS.
9. INSTALL A 4" DEEP, COARSE WOOD-CHIP MULCH RING THROUGHOUT ENTIRE PROJECT AREA.
10. INSTALL A TEMPORARY OR PERMANENT IRRIGATION SYSTEM CAPABLE OF DELIVERING 2" OF WATER PER WEEK TO THE ENTIRE PLANTED AREA. MAINTAIN IRRIGATION SYSTEM IN WORKING CONDITION FOR TWO (2) SUMMERS AFTER INITIAL PLANT INSTALLATION.

THE APPLICANT SHALL MAINTAIN ALL PLANT MATERIAL UNTIL FINAL INSPECTION AND APPROVAL AS SET FORTH IN THE PERMIT CONDITIONS. IF THE OWNER OR APPLICANT CHOOSES TO HIRE A LANDSCAPE CONTRACTOR, THEN ALL PLANTINGS AND WORKMANSHIP SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING FINAL OWNER ACCEPTANCE.



NATIVE PLANTINGS SOIL PREP
SEQUENCE OF WORK - NOT TO SCALE

PLANTING AREA PREPARATION

STEP 1
REMOVE INVASIVE SPECIES. COMPACTED SOILS OUTSIDE OF FORESTED AREAS SHALL BE DE-COMPACTED TO A DEPTH OF 6". CLEARING AND GRUBBING WITHIN ANY NATIVE PLANT ROOT ZONE SHALL BE DONE BY HAND.

STEP 2
PLACE TWO (2) INCHES COMPOST AND AMEND WITH DE-COMPACTED TOPSOIL

STEP 3
INSTALL WOOD STRAND MULCH 4" DEEP. THEN PLACE BIODEGRAABLE EROSION CONTROL BLANKET OVER THE TOP.

STEP 4
CUT "X" SLITS IN BIODEGRADABLE EROSION CONTROL BLAKET AND INSTALL PLANTS. SEE PLANTING PLAN SHEET W-08.

PLANTING NOTES & DETAILS (1 OF 2)

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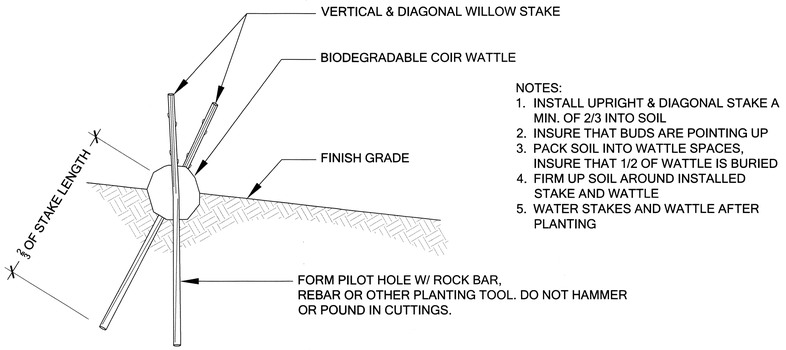
REVISION DESCRIPTION:	WO NUMBER: 141003252		
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL		RICHARDS CREEK SUBSTATION	
		DATE (M/D/Y)	PUGET SOUND ENERGY
CAD	LM	06 / 13 / 17	W-7.4 PLANTING NOTES & DETAILS (1 OF 2)
ENGINEER	EM	/ /	DRAWING NO: D-18172
REVIEWED	EM	/ /	REV NO: 0
APPROVED	S. KIM	08 / 14 / 17	SHEET: 21 OF 22
			CLASS: SITE
		CADD NO:	FILE NO: 111103
			CODE: RIC

DSD 002223



NOTES:
1. INSTALL UPRIGHT & DIAGONAL STAKE A MIN. OF 2/3 INTO SOIL
2. INSURE THAT BUDS ARE POINTING UP
3. PACK SOIL INTO WATTLE SPACES, INSURE THAT 1/2 OF WATTLE IS BURIED
4. FIRM UP SOIL AROUND INSTALLED STAKE AND WATTLE
5. WATER STAKES AND WATTLE AFTER PLANTING

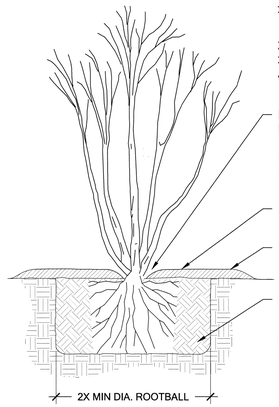
1 WILLOW WATTLE PLANTING

Scale: NTS

NOTES:
1. PLANT GROUNDCOVER AT SPECIFIED DISTANCE ON-CENTER (O.C.) USING TRIANGULAR SPACING, TYP.
2. LOOSEN SIDES AND BOTTOM OF PLANTING PIT AND REMOVE DEBRIS
3. LOOSEN ROOTBOUND PLANTS BEFORE INSTALLING
4. SOAK PIT BEFORE AND AFTER INSTALLING PLANT

2 GROUNDCOVER PLANTING

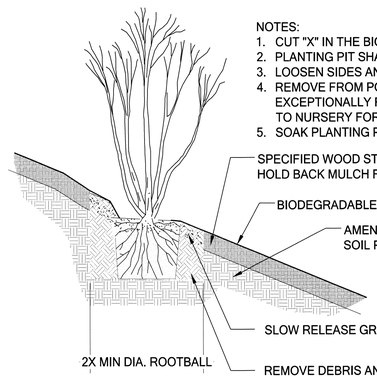
Scale: NTS



NOTES:
1. PLANTING PIT SHALL NOT BE LESS THAN (2) TIMES THE WIDTH OF THE ROOT BALL DIA.
2. LOOSEN SIDES AND BOTTOMS OF PLANTING PIT
3. SOAK PLANTING PIT AFTER PLANTING
4. PLANT AT SPECIFIED DISTANCE ON-CENTER (O.C.) PER PLAN USING TRIANGULAR SPACING, TYP.

3 TREE/SHRUB CONTAINER PLANTING

Scale: NTS



NOTES:
1. CUT "X" IN THE BIODEGRADABLE EROSION CONTROL FABRIC TO MAKE WAY FOR PLANTING.
2. PLANTING PIT SHALL NOT BE LESS THAN (2) TIMES THE WIDTH OF THE ROOT BALL DIA.
3. LOOSEN SIDES AND BOTTOM OF PLANT PIT
4. REMOVE FROM POT & ROUGH-UP ROOT BALL BEFORE INSTALLING. IF PLANT IS EXCEPTIONALLY ROOT-BOUND OR CONTAINS CIRCLING ROOTS, DO NOT PLANT AND RETURN TO NURSERY FOR AN ACCEPTABLE ALTERNATIVE.
5. SOAK PLANTING PIT AFTER PLANTING

4 SLOPE CONTAINER PLANTING

Scale: NTS

PLANTING NOTES & DETAILS (2 of 2)

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PUGET SOUND ENERGY

W-7.5 PLANTING NOTES & DETAILS (2 OF 2)

CLASS: SITE

CADD NO:

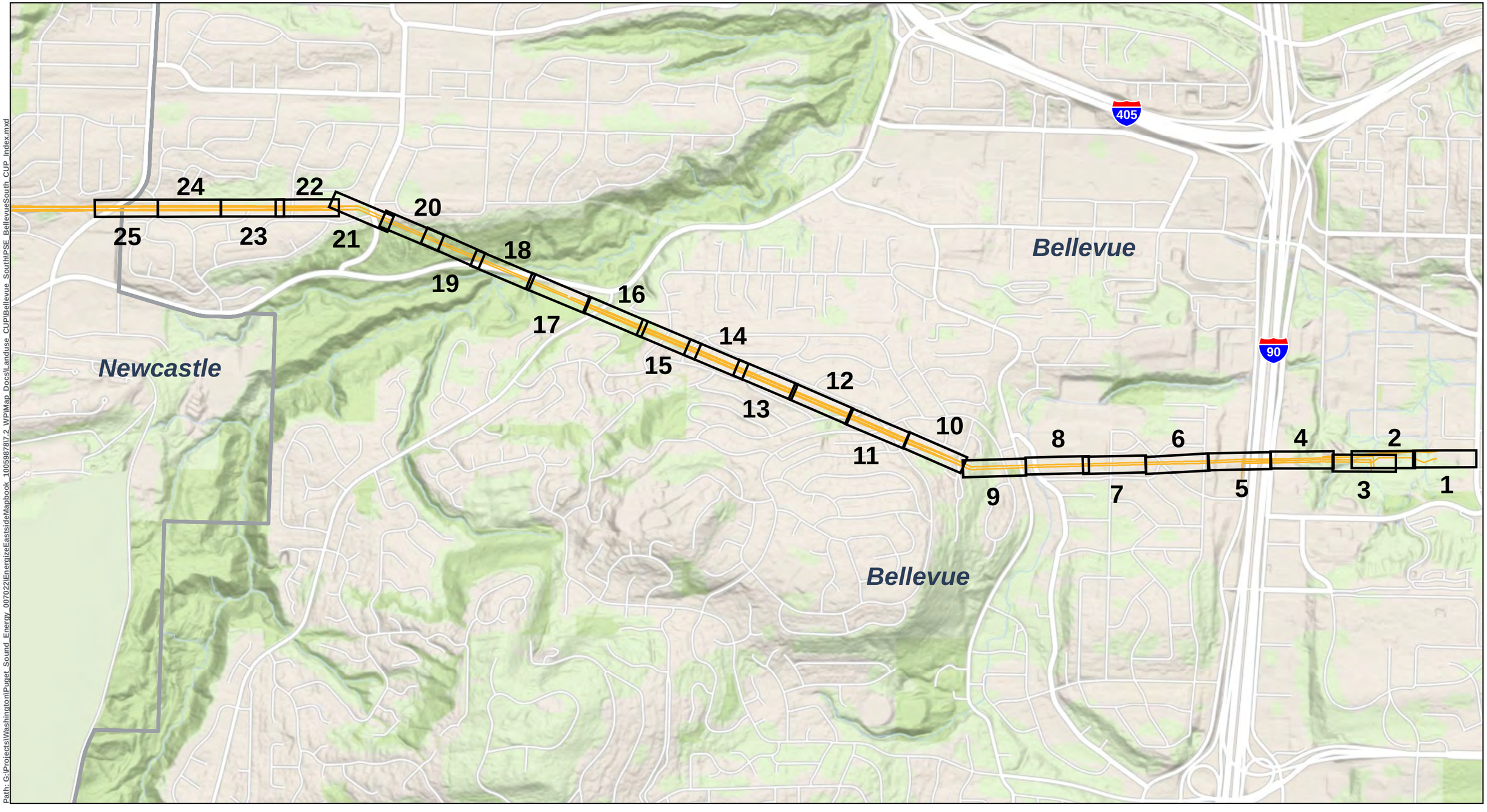
DRAWING NO: D-18172 REV NO: 0

SHEET: 22 OF 22

FILE NO: 111103

CODE: RIC

DSD 002224



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0 0.25 0.5 Mile

MAP CREATED BY: HDR

SOURCES:
Topo Basemap - ESRI Online,Transmission Line - PSE

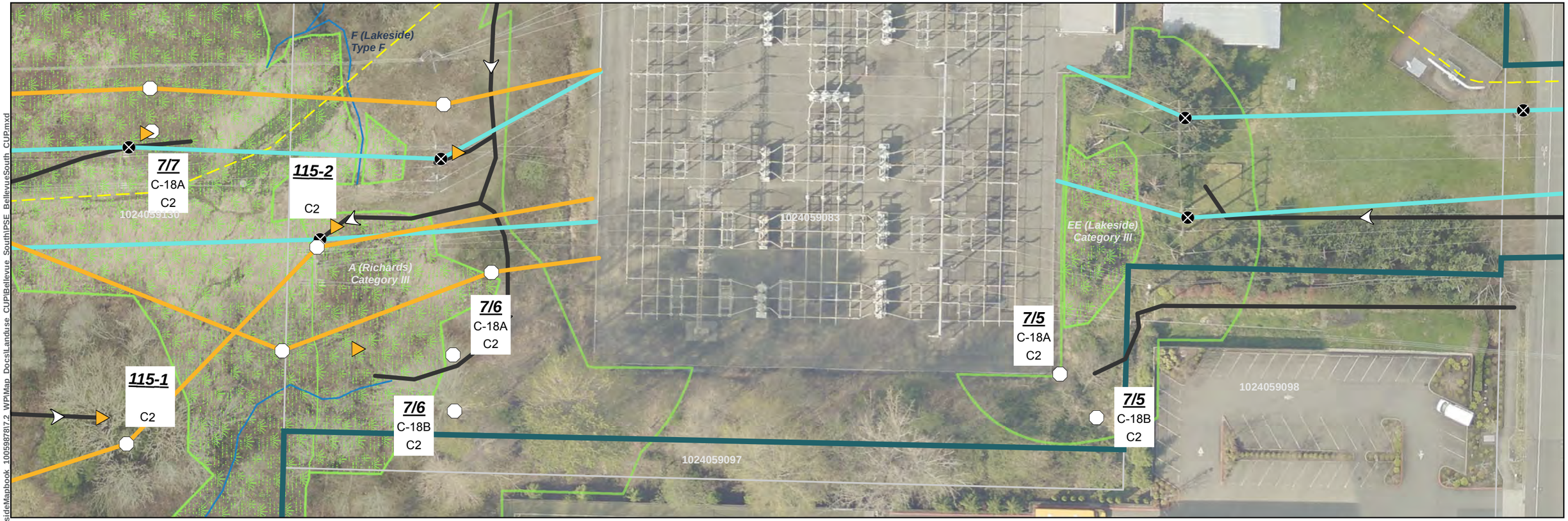
energizeEASTSIDE

CONDITIONAL USE PERMIT INDEX / CRITICAL AREAS LAND USE PERMIT

SOUTH BELLEVUE

Date: 8/29/2017

DSD 002225



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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
- Olympic Underground Pipeline (Approx. Location)
- Underground Power Utility Line
- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
- Wetland
- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

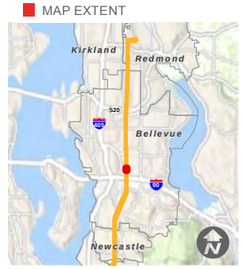
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

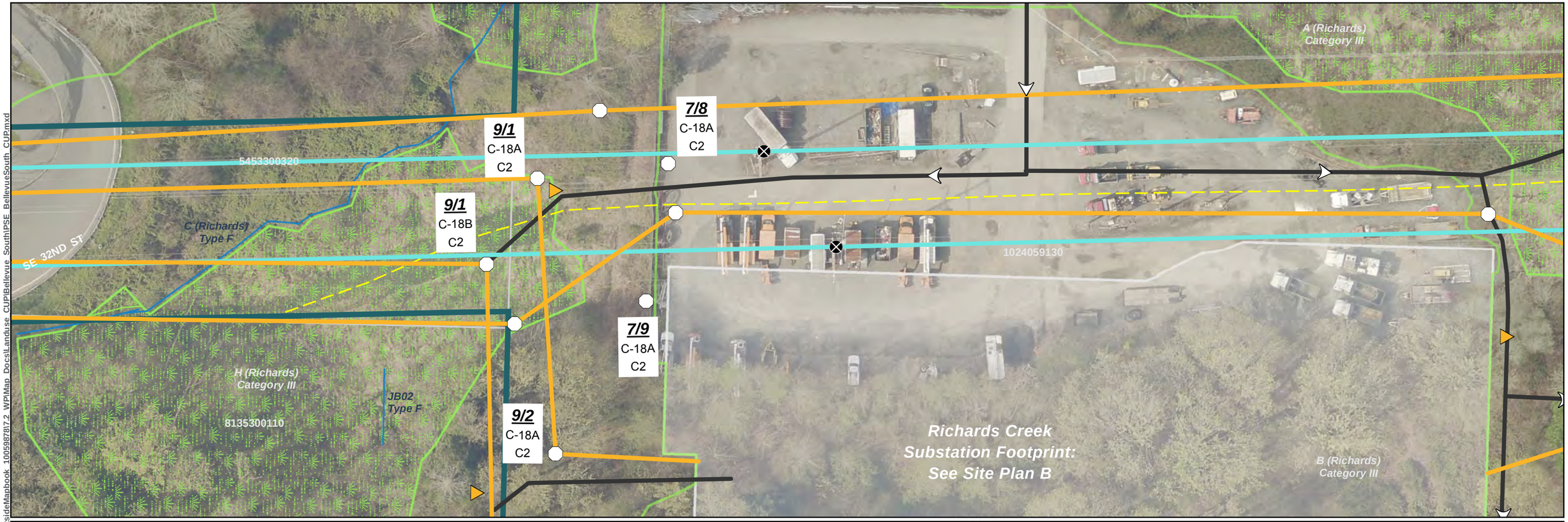
SOUTH BELLEVUE

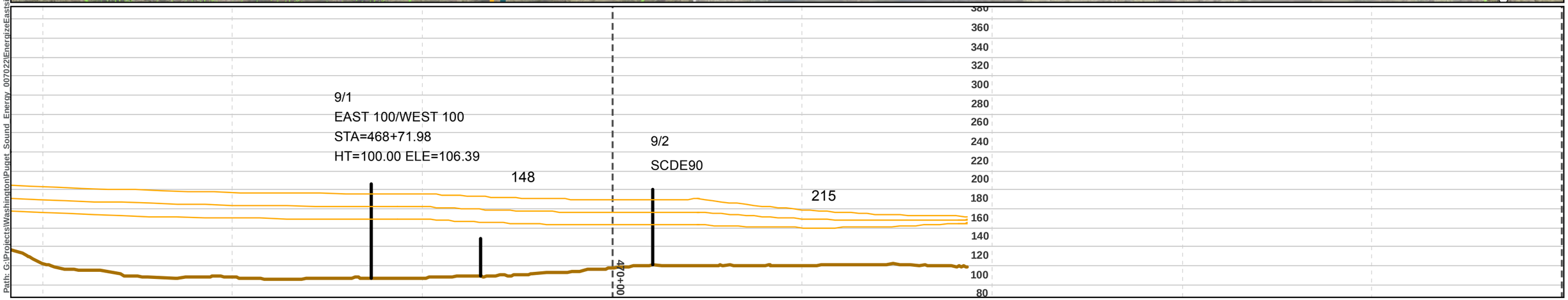
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 1 of 25

Date: 8/29/2017

DSD 002226





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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
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- Underground Power Utility Line
- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
- Wetland
- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

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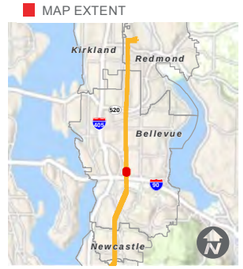
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

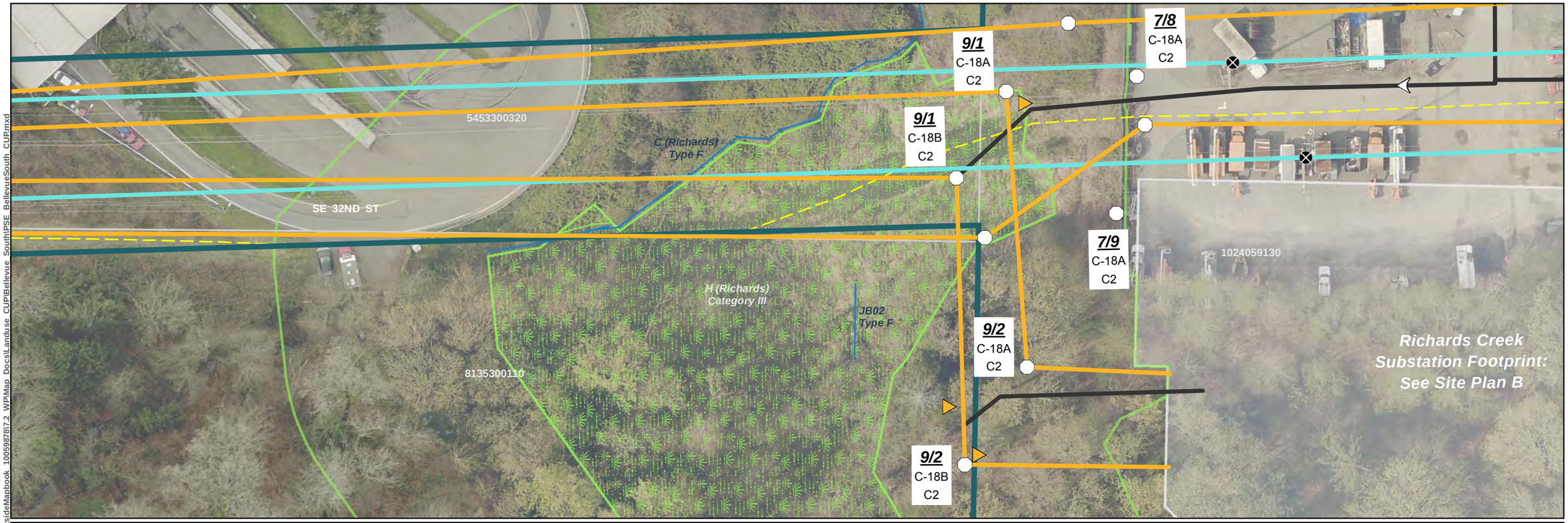
SOUTH BELLEVUE

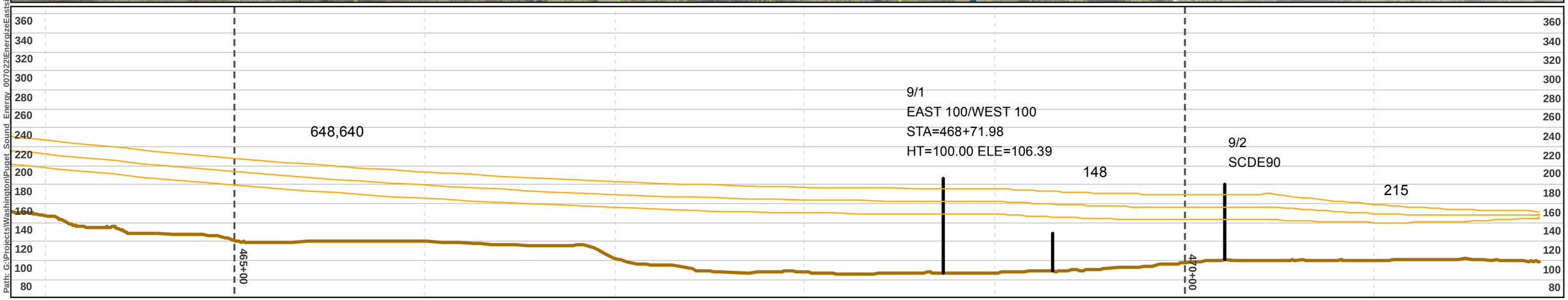
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 2 of 25

Date: 8/29/2017

DSD 002227





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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
- Olympic Underground Pipeline (Approx. Location)
- Underground Power Utility Line
- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
- Wetland
- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

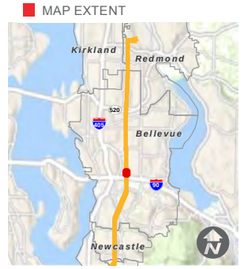
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

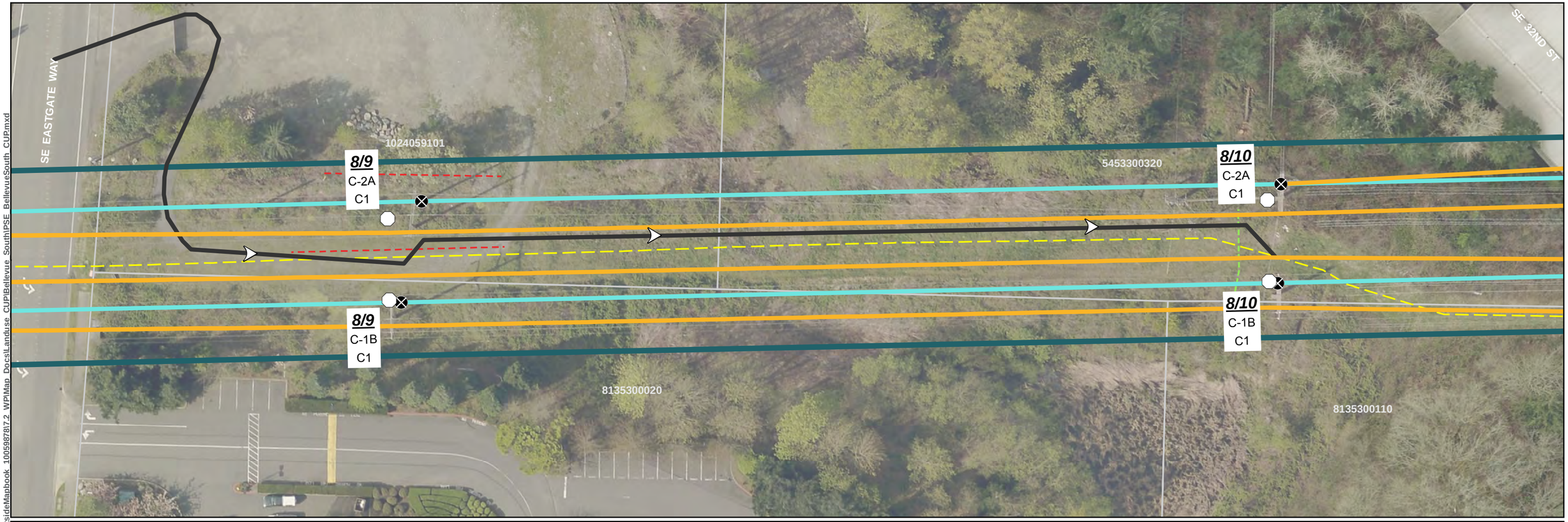
SOUTH BELLEVUE

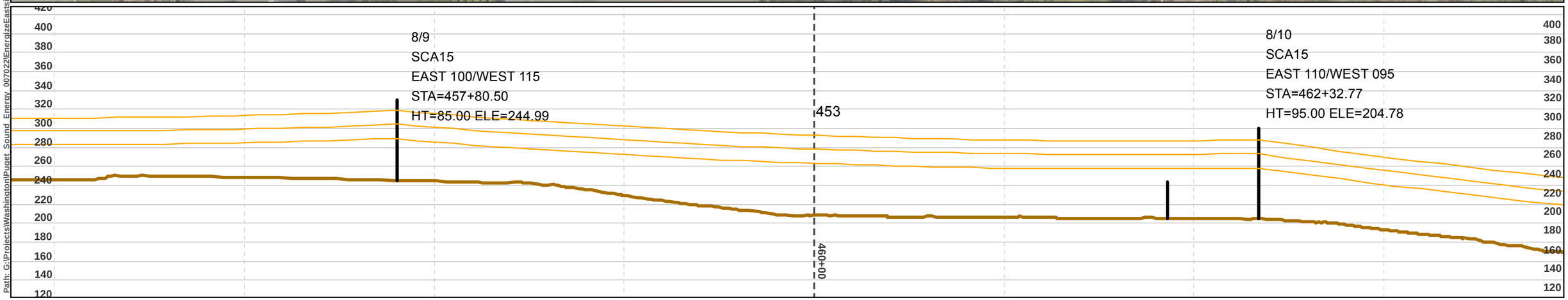
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 3 of 25

Date: 8/29/2017

DSD 002228





Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

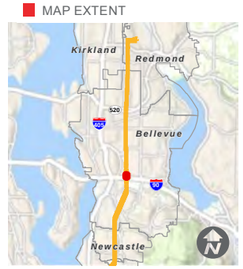
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 4 of 25

Date: 8/29/2017

DSD 002229

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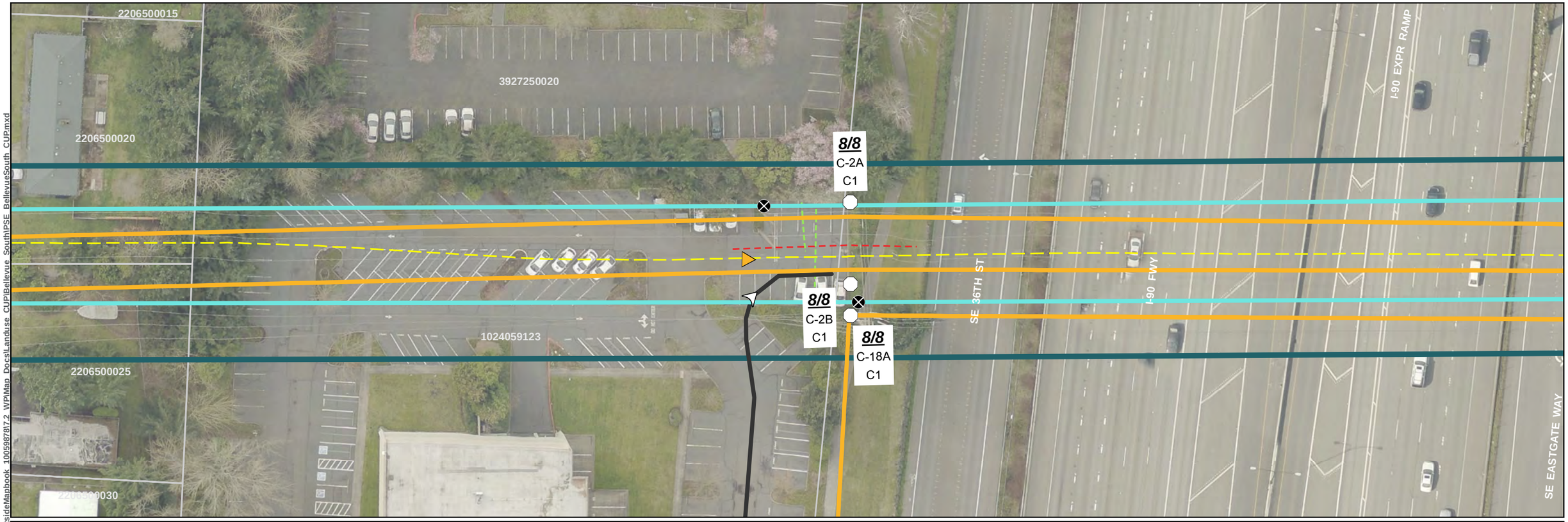

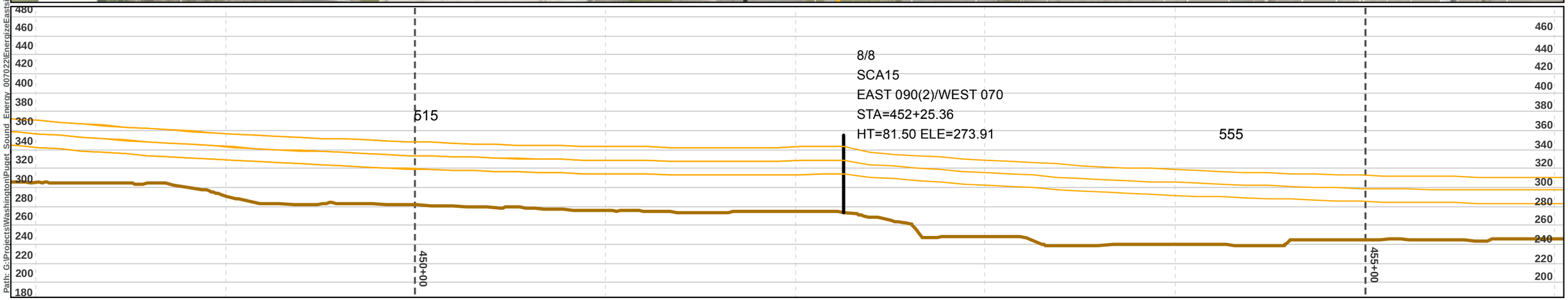

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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
- Olympic Underground Pipeline (Approx. Location)
- Underground Power Utility Line
- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
- Wetland
- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

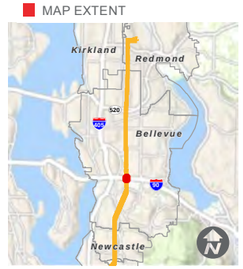
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

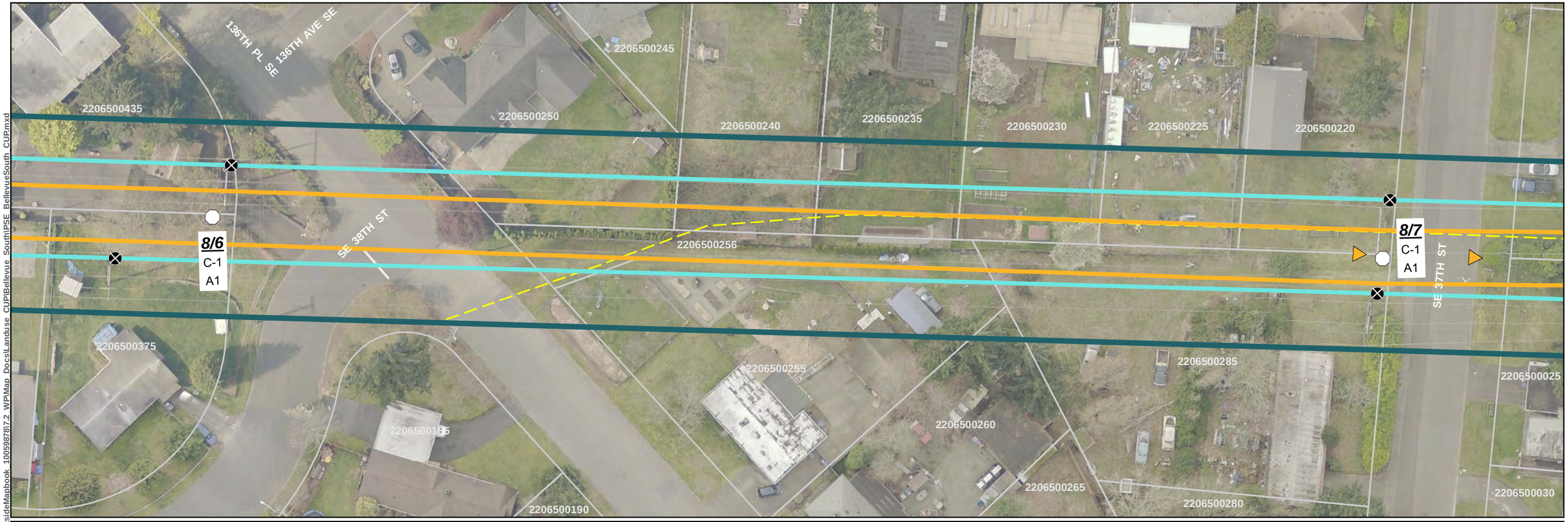
SOUTH BELLEVUE

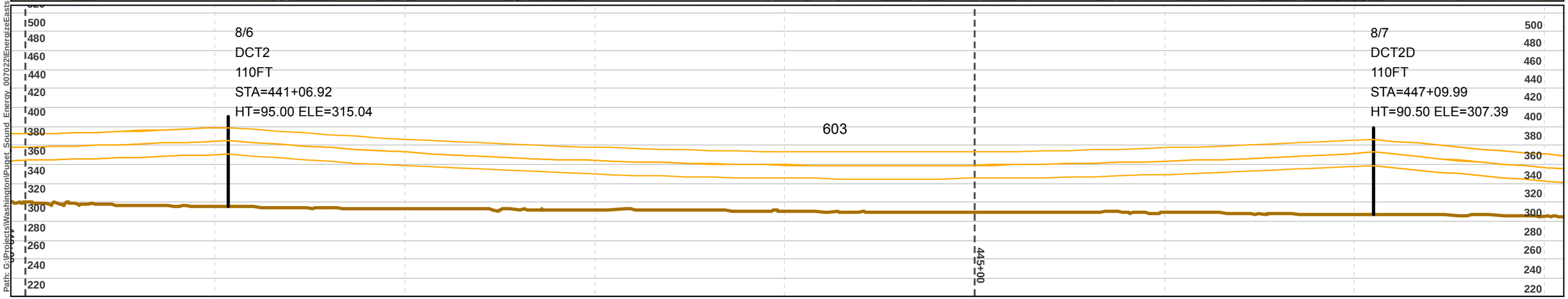
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 5 of 25

Date: 8/29/2017

DSD 002230





Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

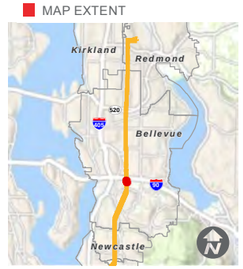
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 6 of 25

Date: 8/29/2017

DSD 002231

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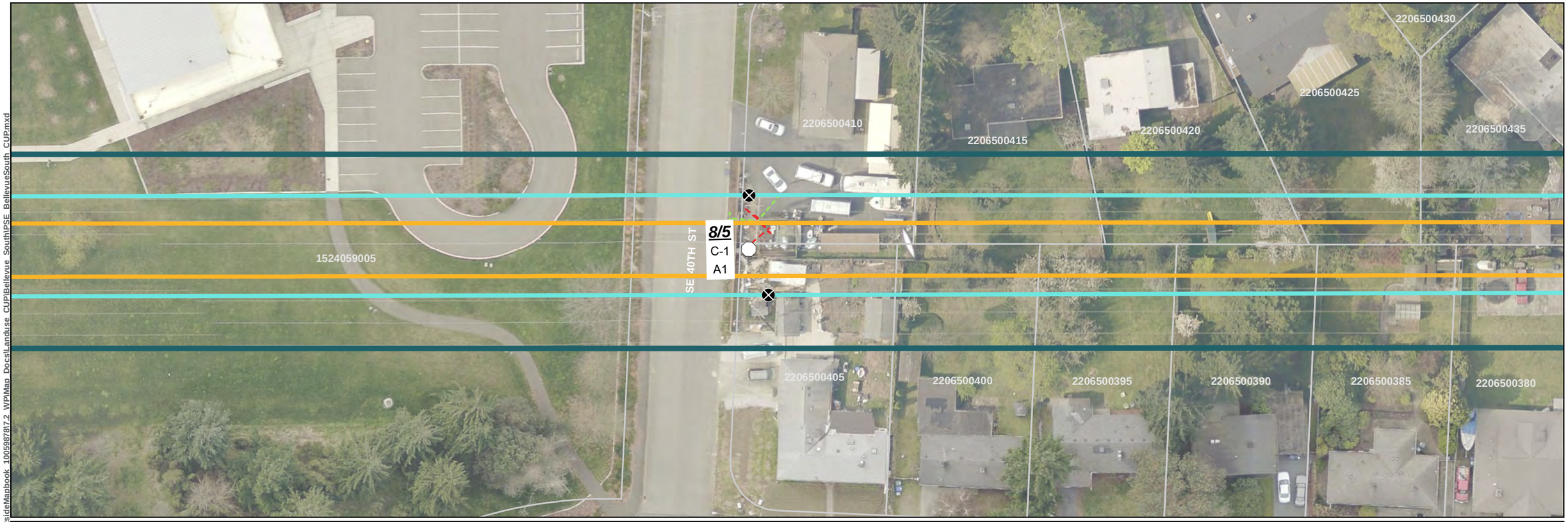

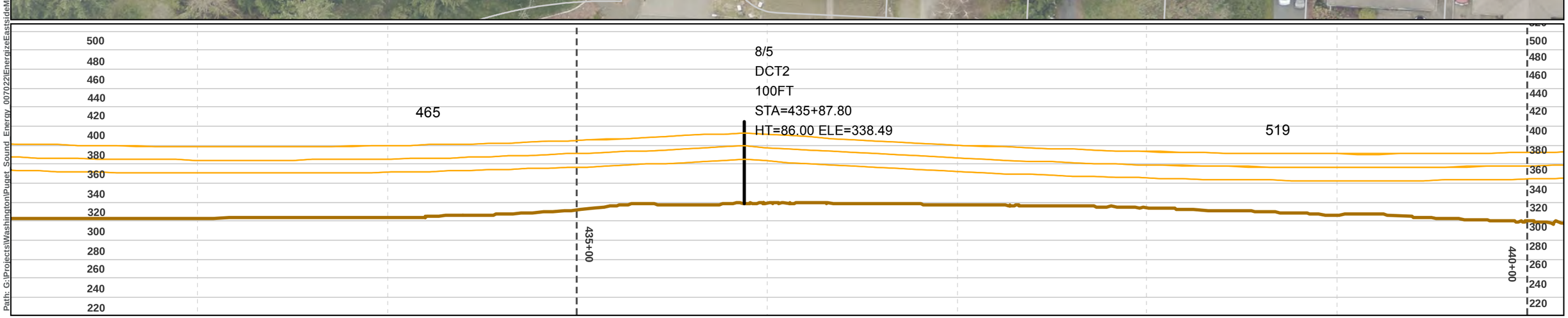

Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

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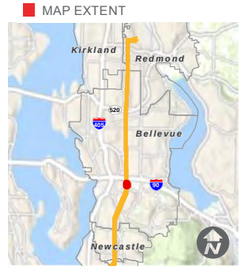

SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 7 of 25

Date: 8/29/2017

DSD 002232

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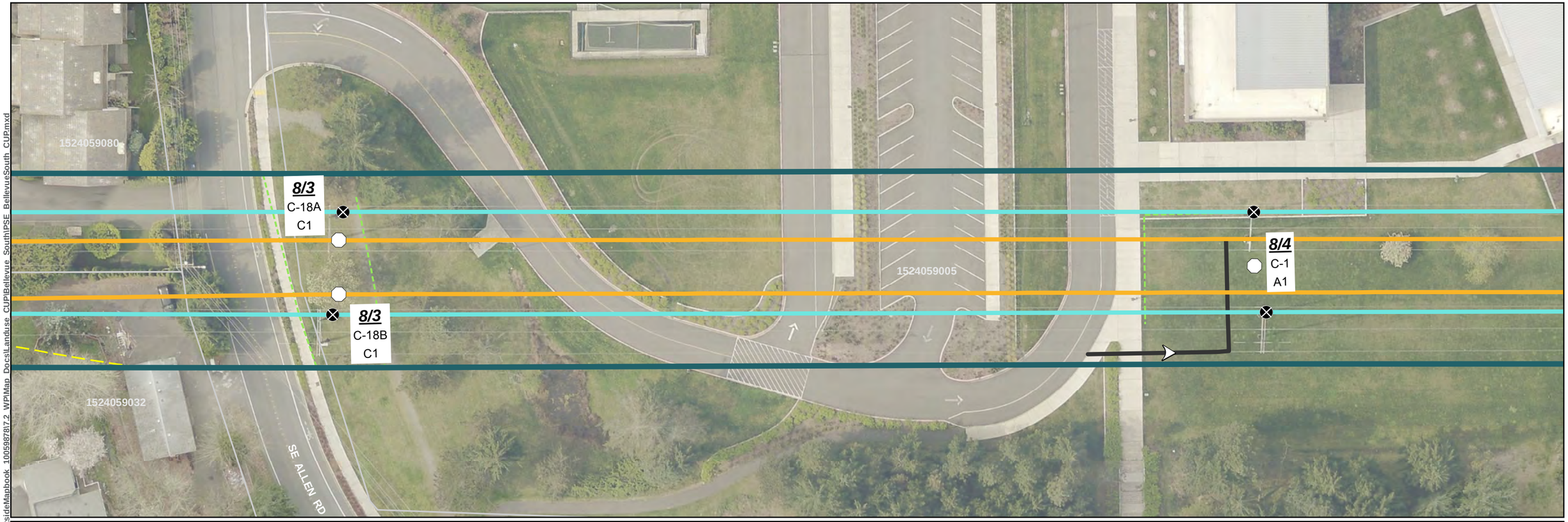
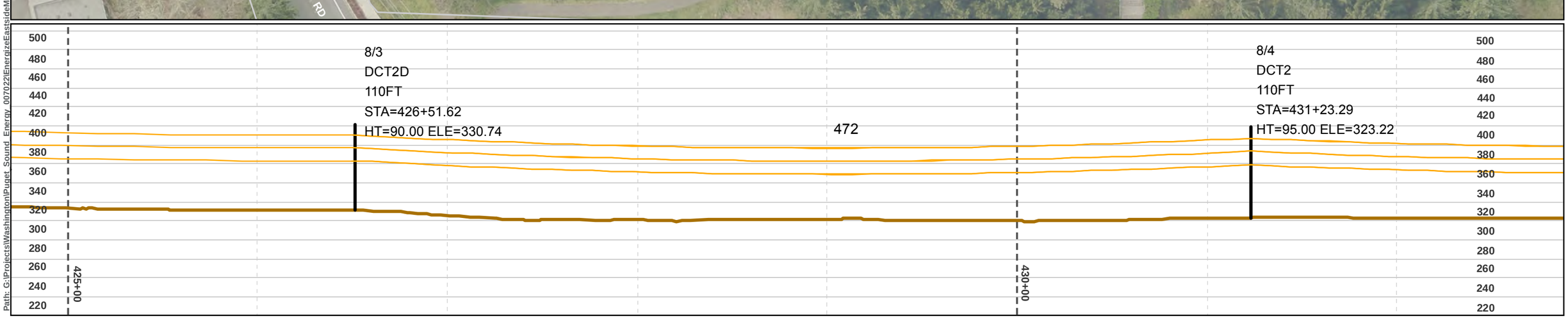




Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

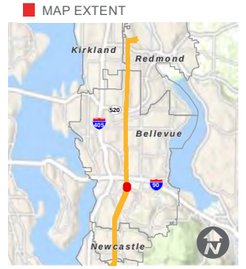
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 8 of 25

Date: 8/29/2017

DSD 002233

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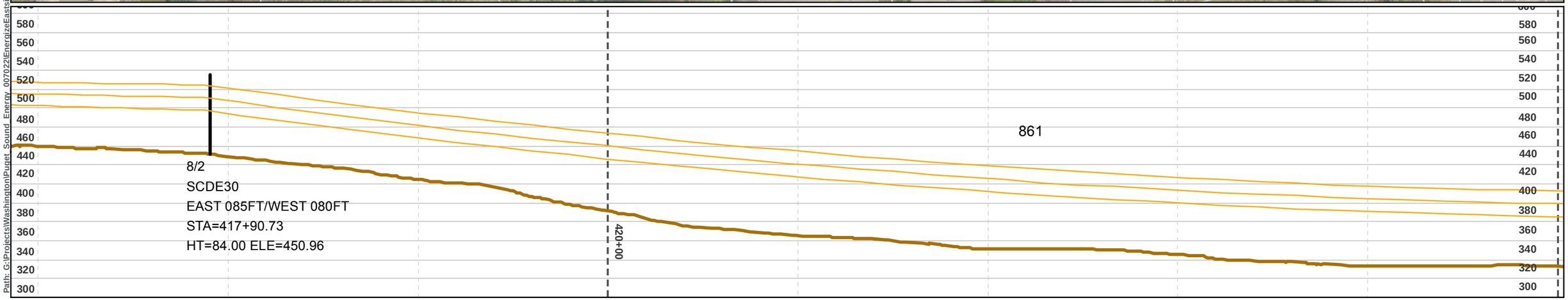

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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
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- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
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- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

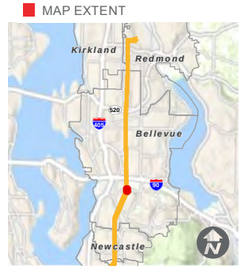
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

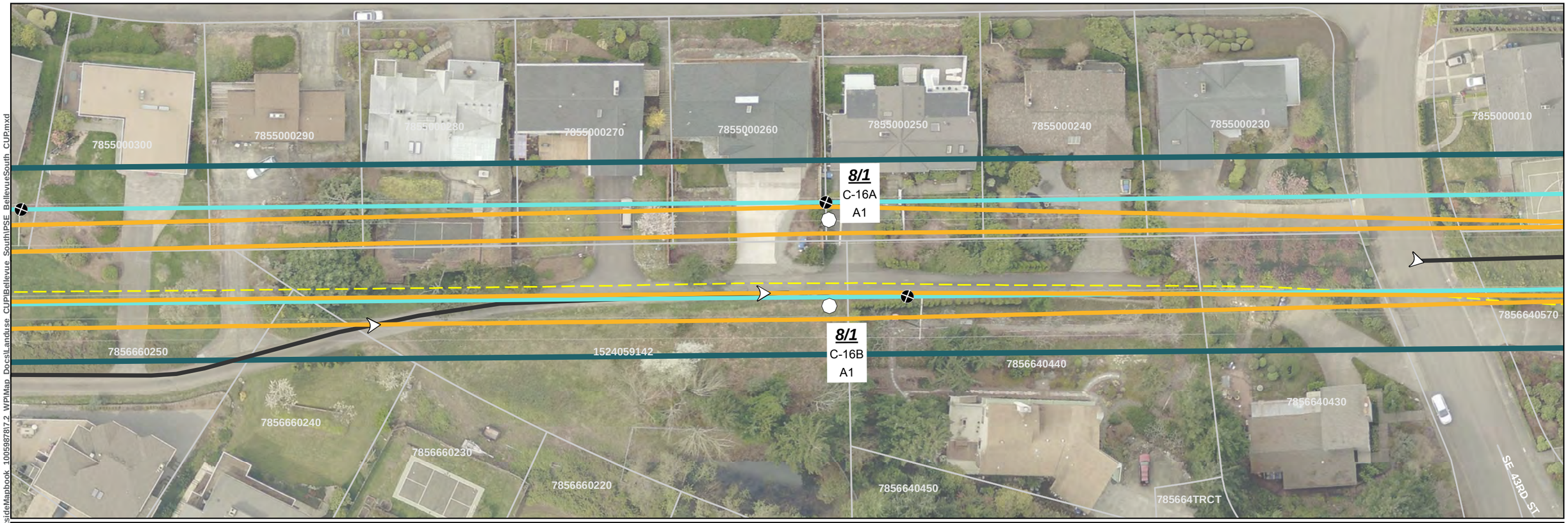
SOUTH BELLEVUE

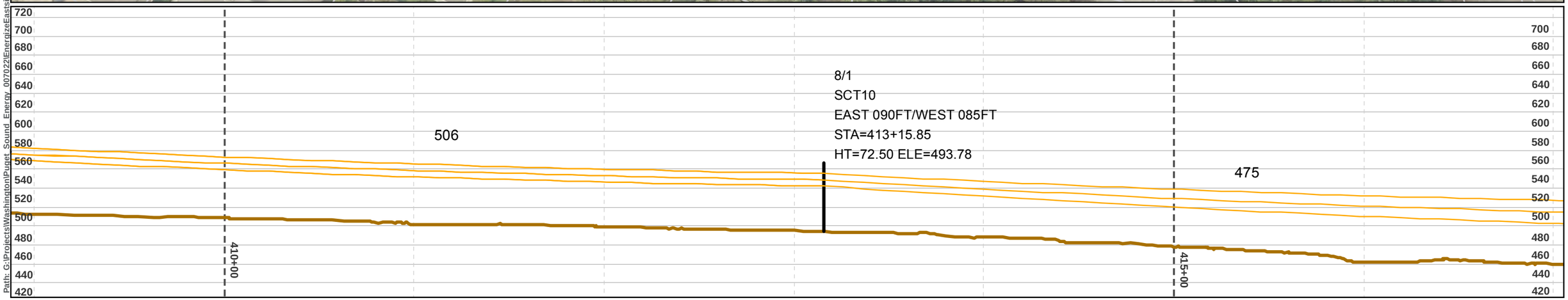
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 9 of 25

Date: 8/29/2017

DSD 002234





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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
- Olympic Underground Pipeline (Approx. Location)
- Underground Power Utility Line
- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
- Wetland
- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

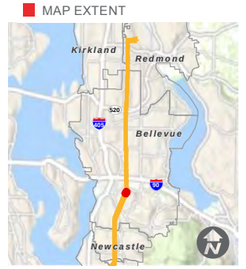
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

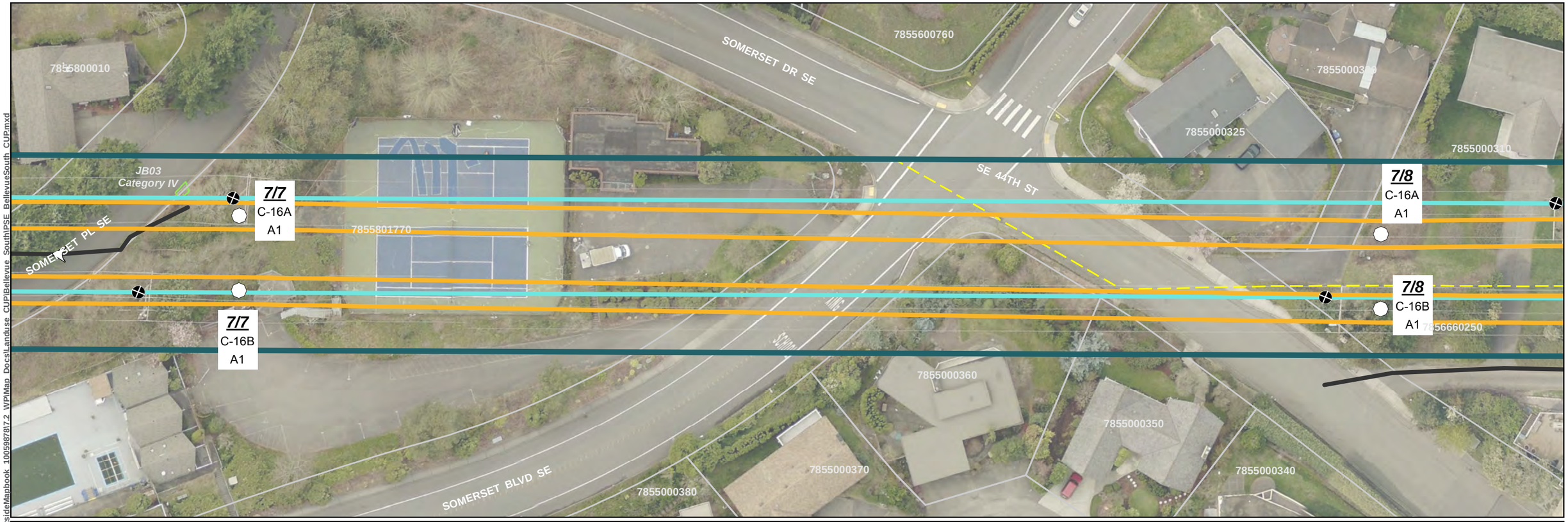
SOUTH BELLEVUE

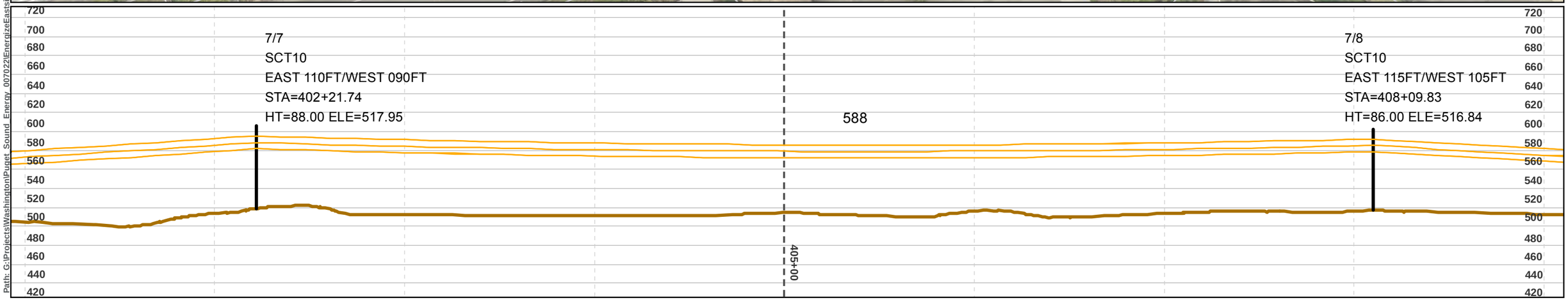
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 10 of 25

Date: 8/29/2017

DSD 002235





Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

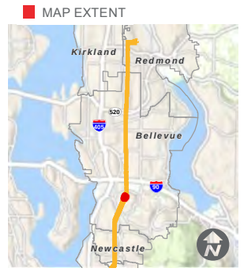
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 11 of 25

Date: 8/29/2017

DSD 002236

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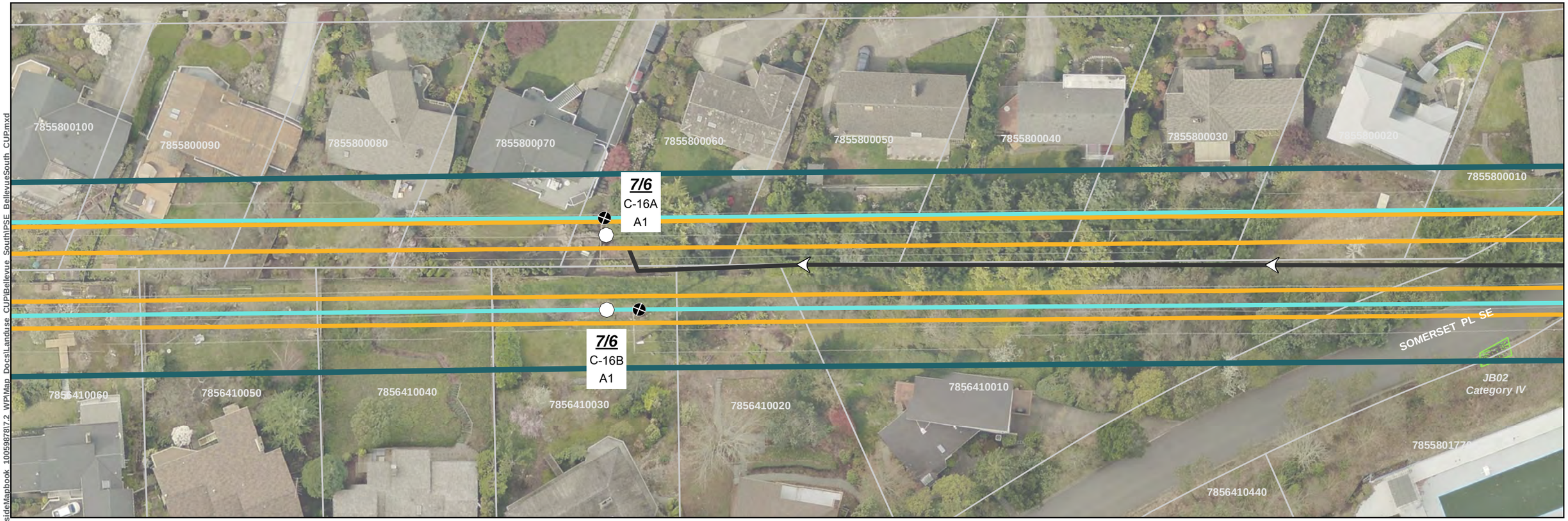

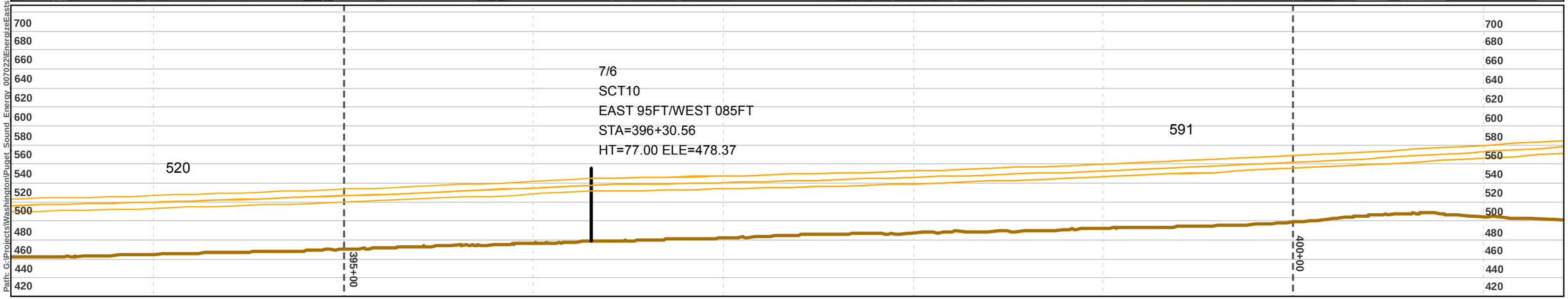

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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
- Olympic Underground Pipeline (Approx. Location)
- Underground Power Utility Line
- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
- Wetland
- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

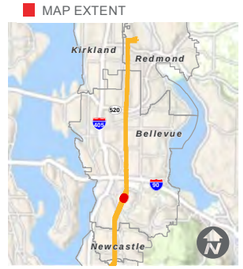
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

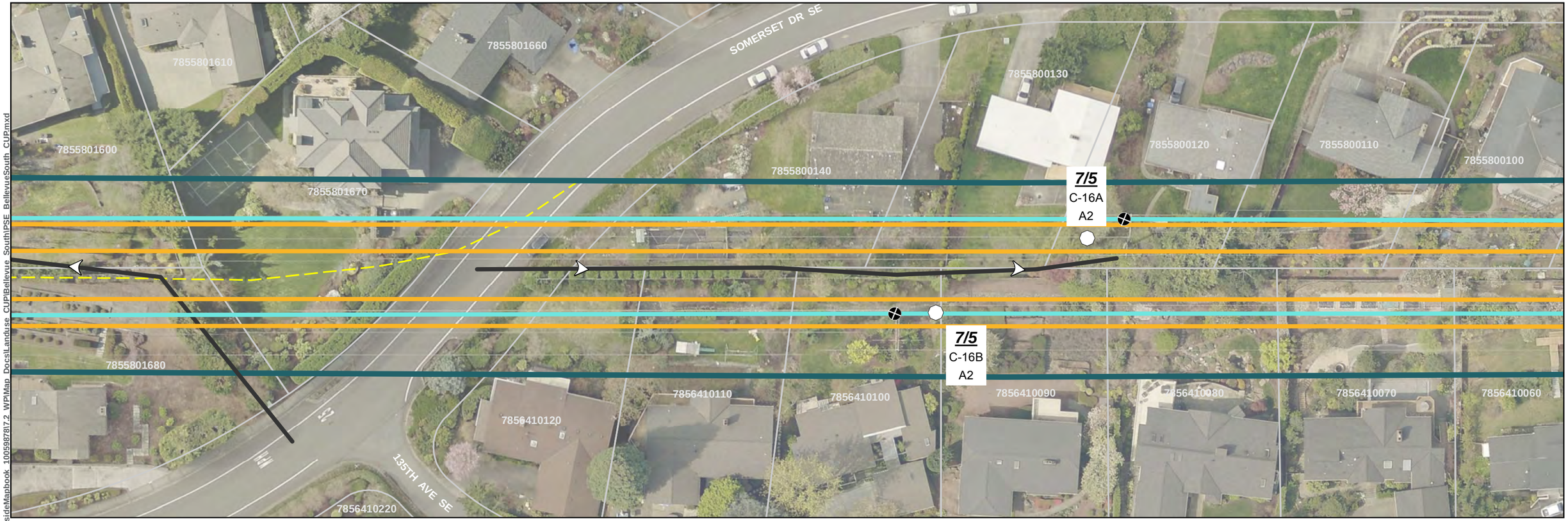
SOUTH BELLEVUE

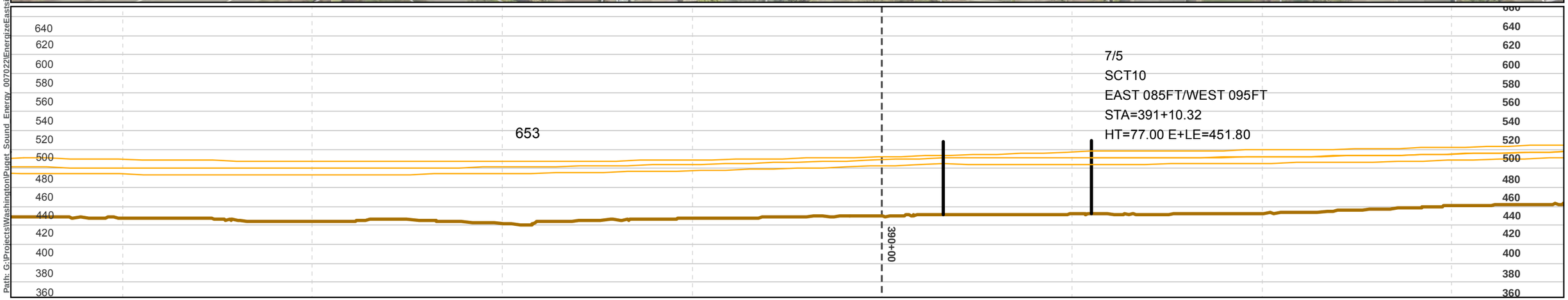
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 12 of 25

Date: 8/29/2017

DSD 002237





Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

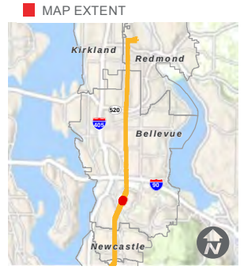
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 13 of 25

Date: 8/29/2017

DSD 002238

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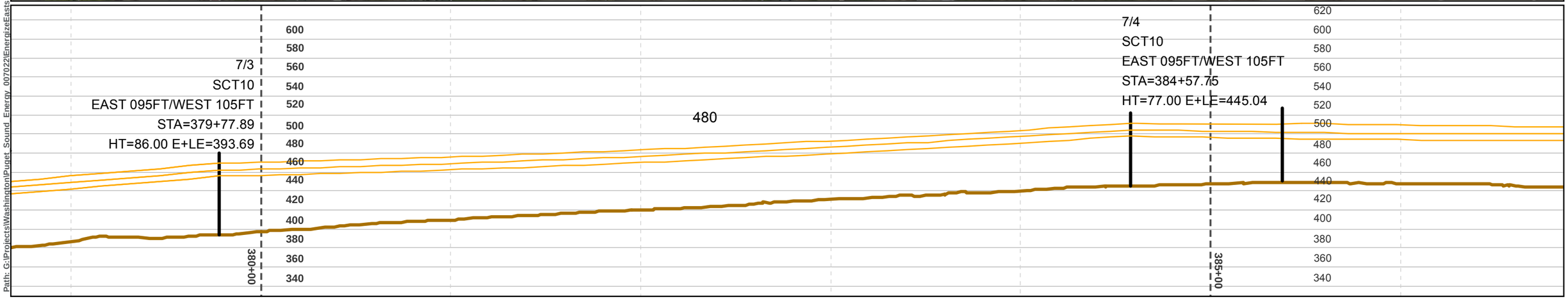

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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
- Olympic Underground Pipeline (Approx. Location)
- Underground Power Utility Line
- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
- Wetland
- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

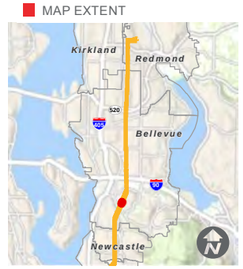
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

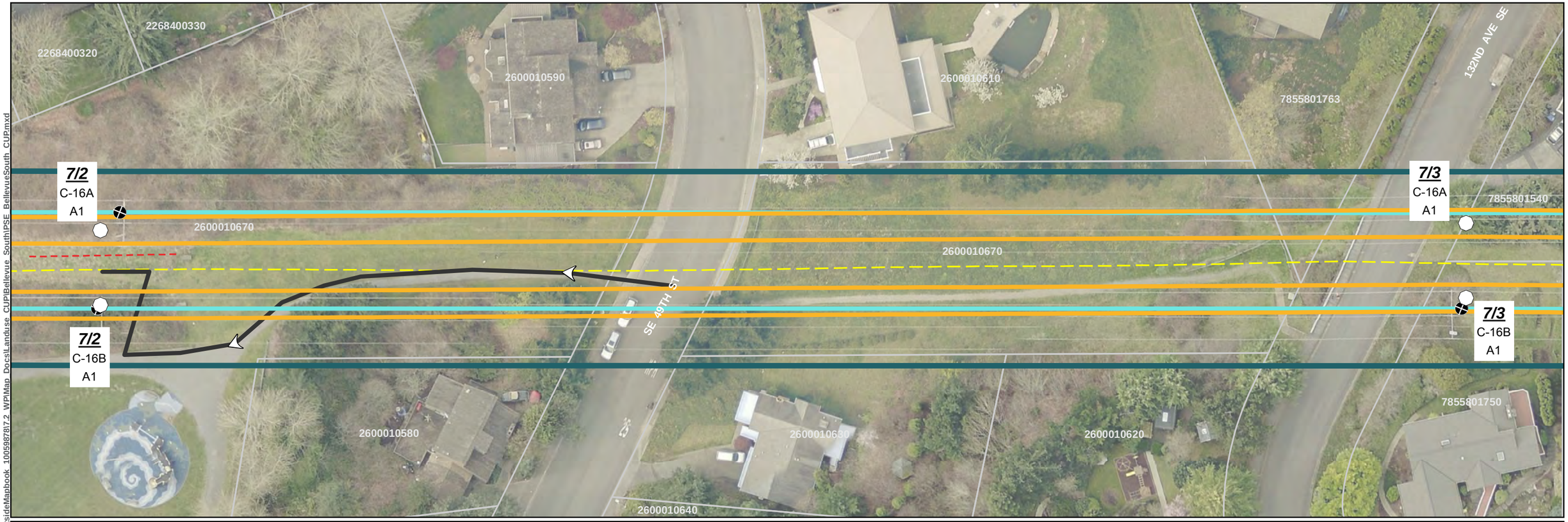
SOUTH BELLEVUE

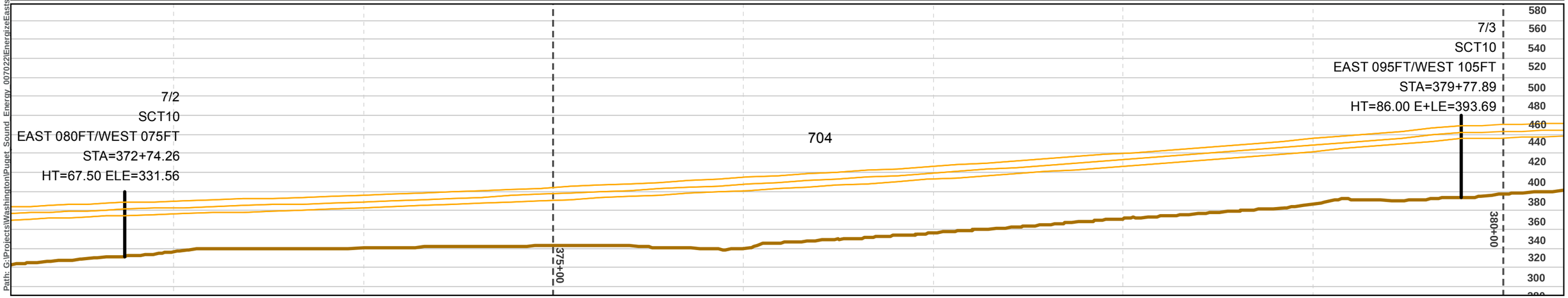
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 14 of 25

Date: 8/29/2017

DSD 002239





Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

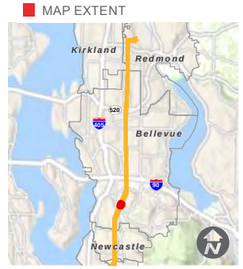
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 15 of 25

Date: 8/29/2017

DSD 002240

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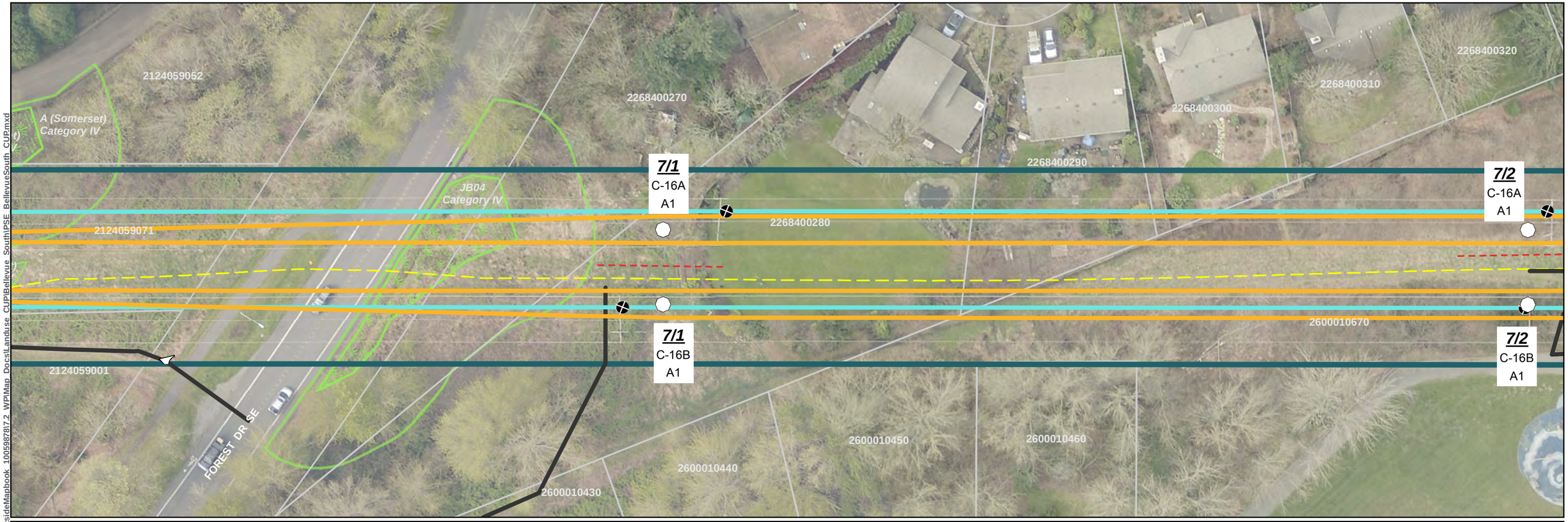

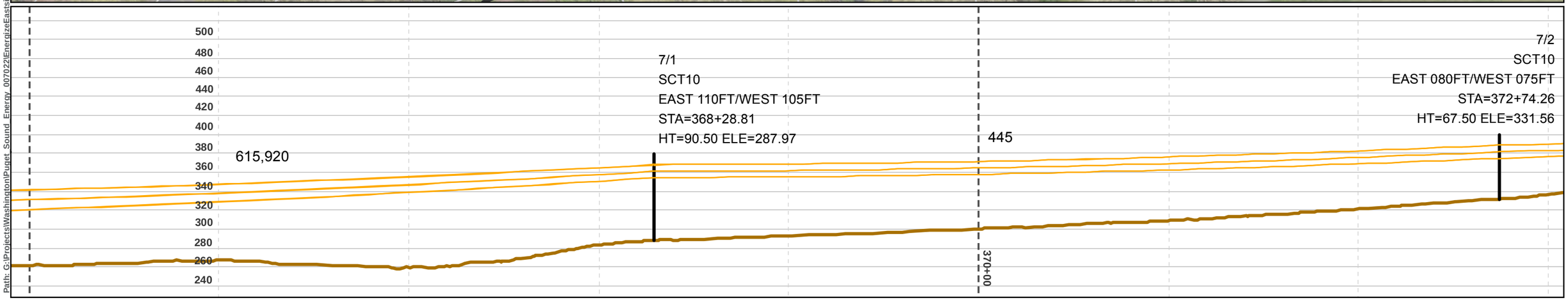

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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
- Olympic Underground Pipeline (Approx. Location)
- Underground Power Utility Line
- Underground Water & Wastewater Utility Line
- Richards Creek Substation Footprint
- Stream
- Wetland
- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

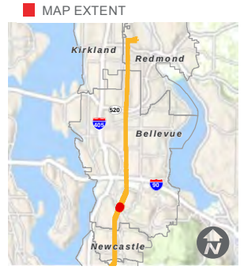
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

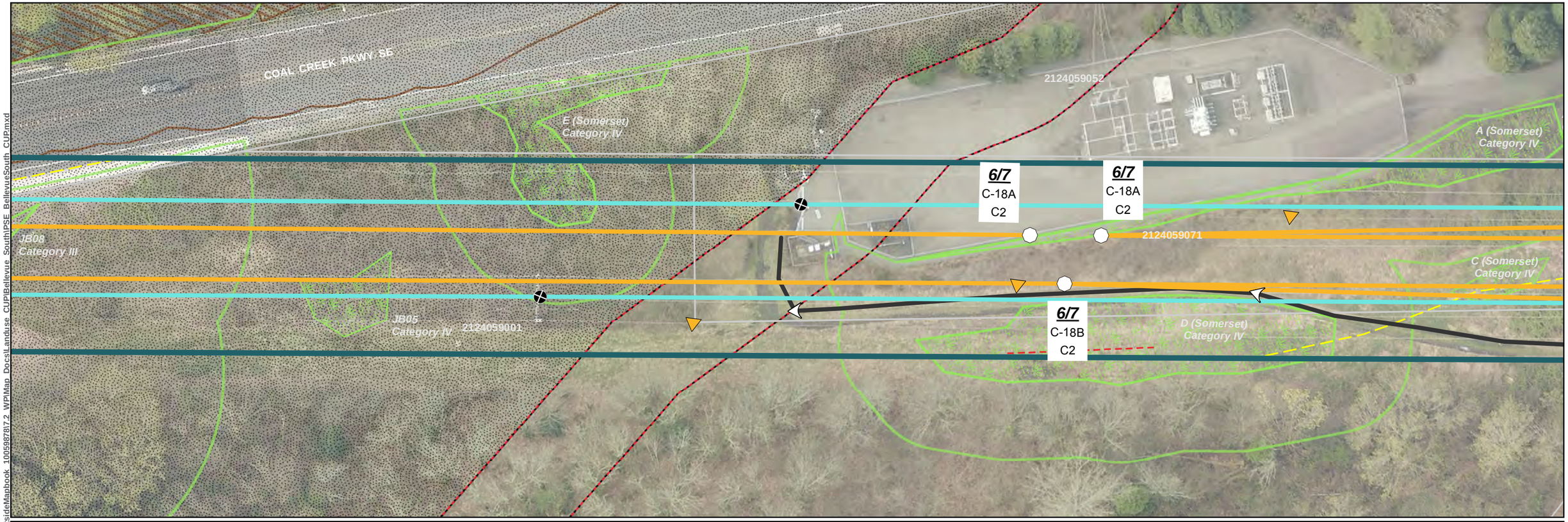
SOUTH BELLEVUE

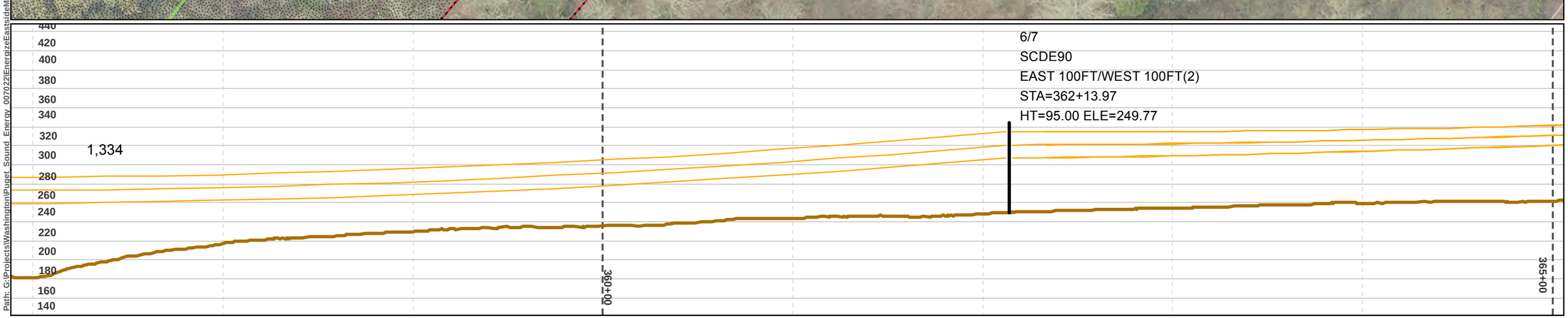
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 16 of 25

Date: 8/29/2017

DSD 002241





Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

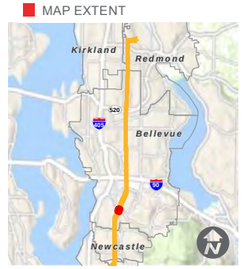
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 17 of 25

Date: 8/29/2017

DSD 002242

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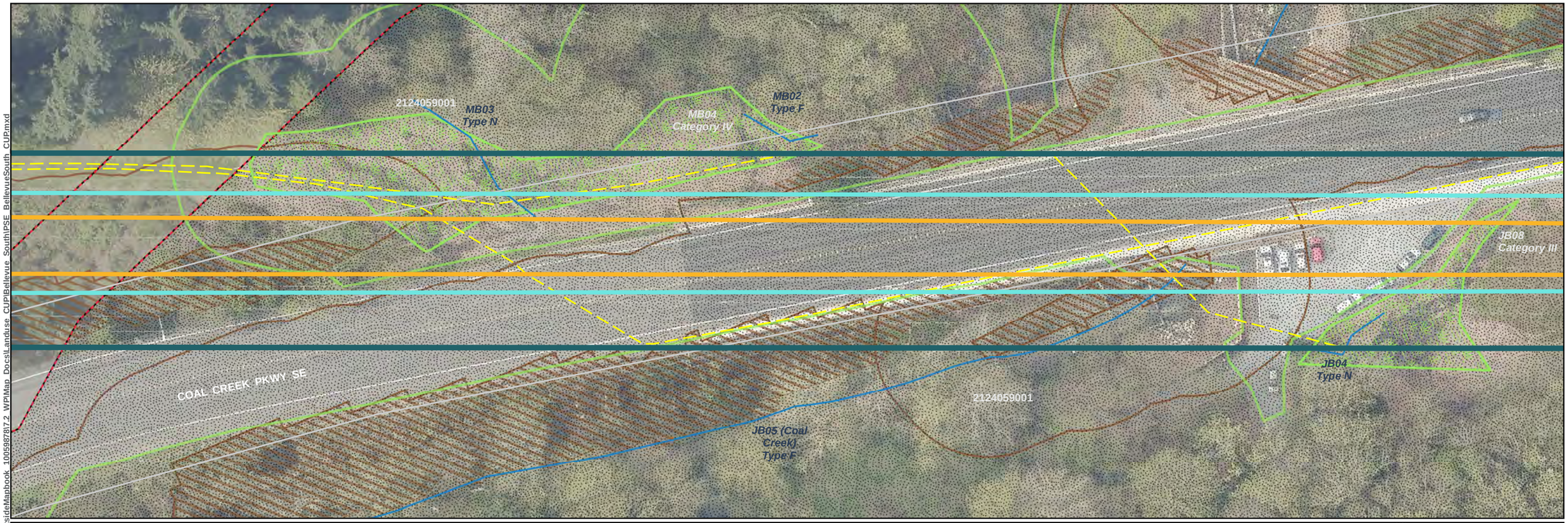

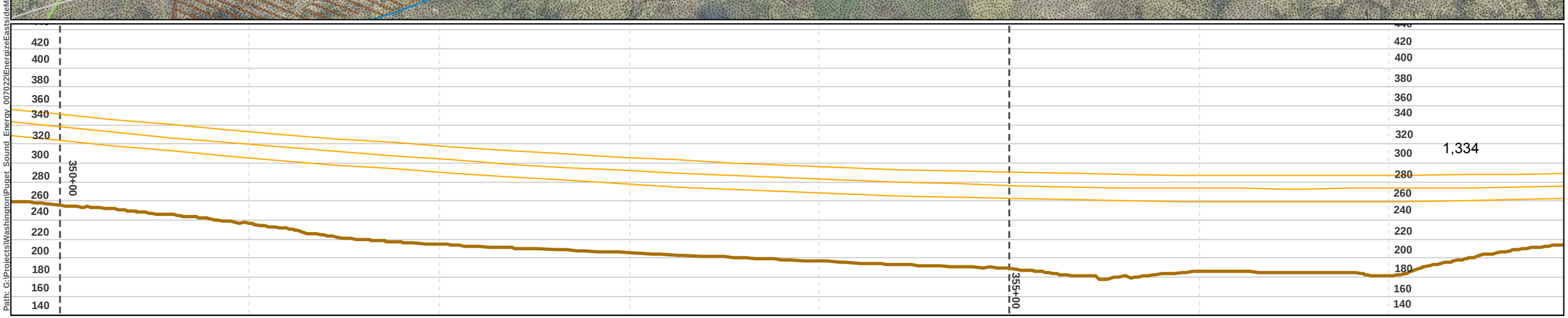

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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
- Potential Stringing Site
- Recommended Access- Proposed Pole
- Olympic Underground Pipeline (Approx. Location)
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- Wetland and Stream Buffer
- Landslide Hazard
- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

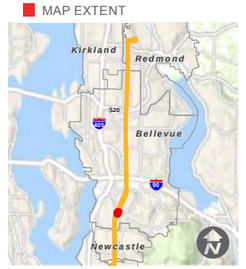
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

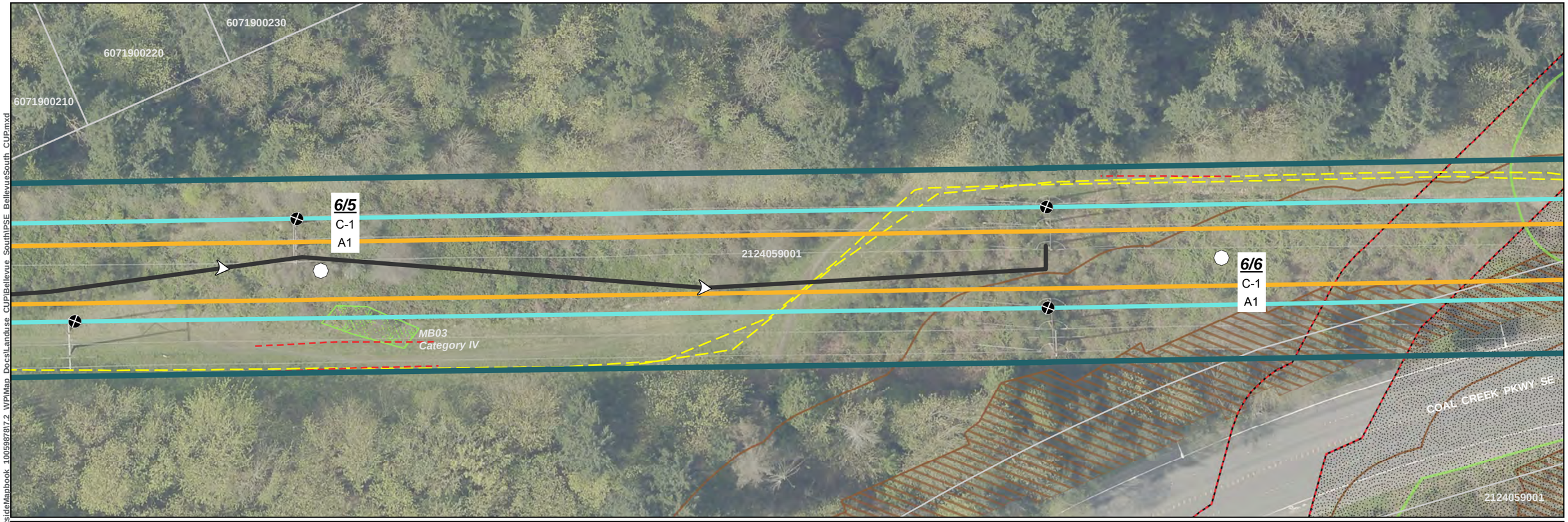
SOUTH BELLEVUE

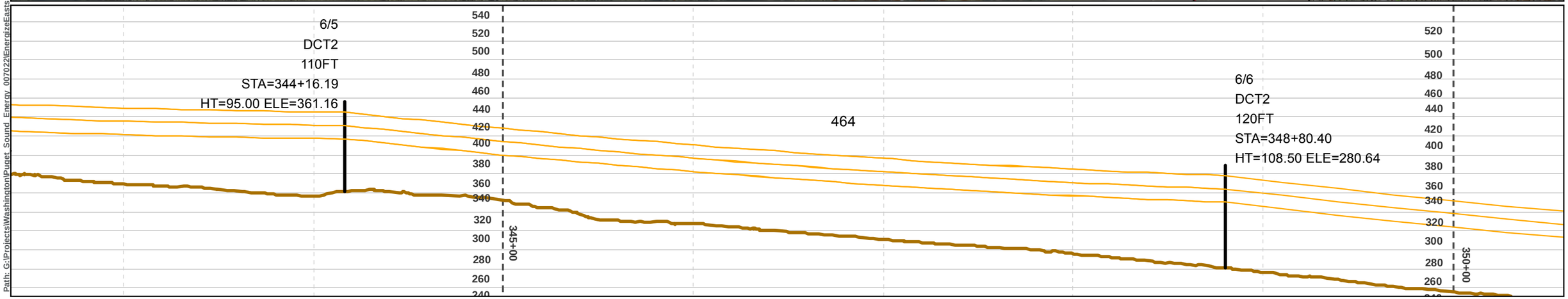
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 18 of 25

Date: 8/29/2017

DSD 002243





Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

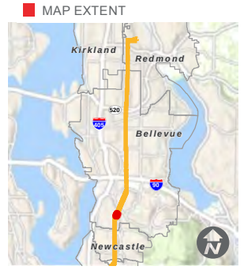
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 19 of 25

Date: 8/29/2017

DSD 002244

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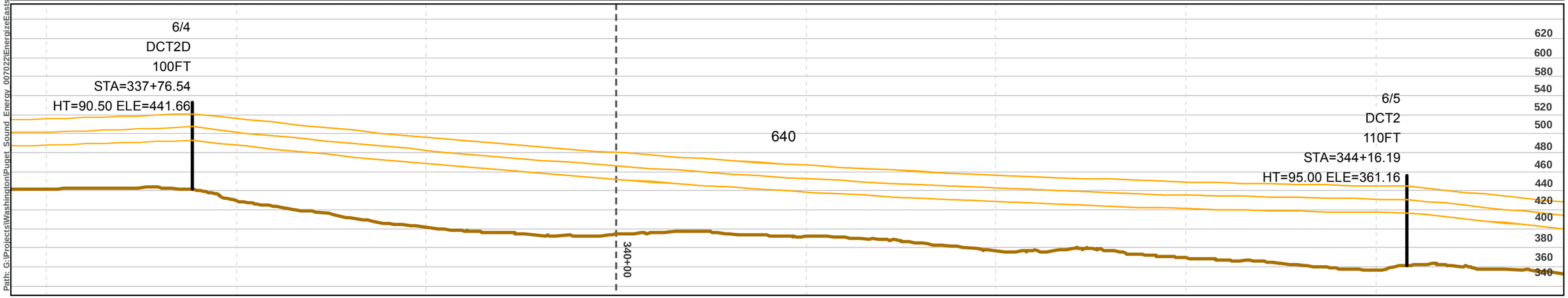

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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
- C-16 Structure Type (See Appx. A)
- A1 Construction Scenario Key (See Appx. B)
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- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

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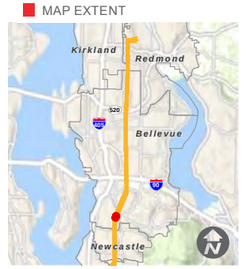
For cartographic purposes only.

MAP EXTENT



SITE PLAN

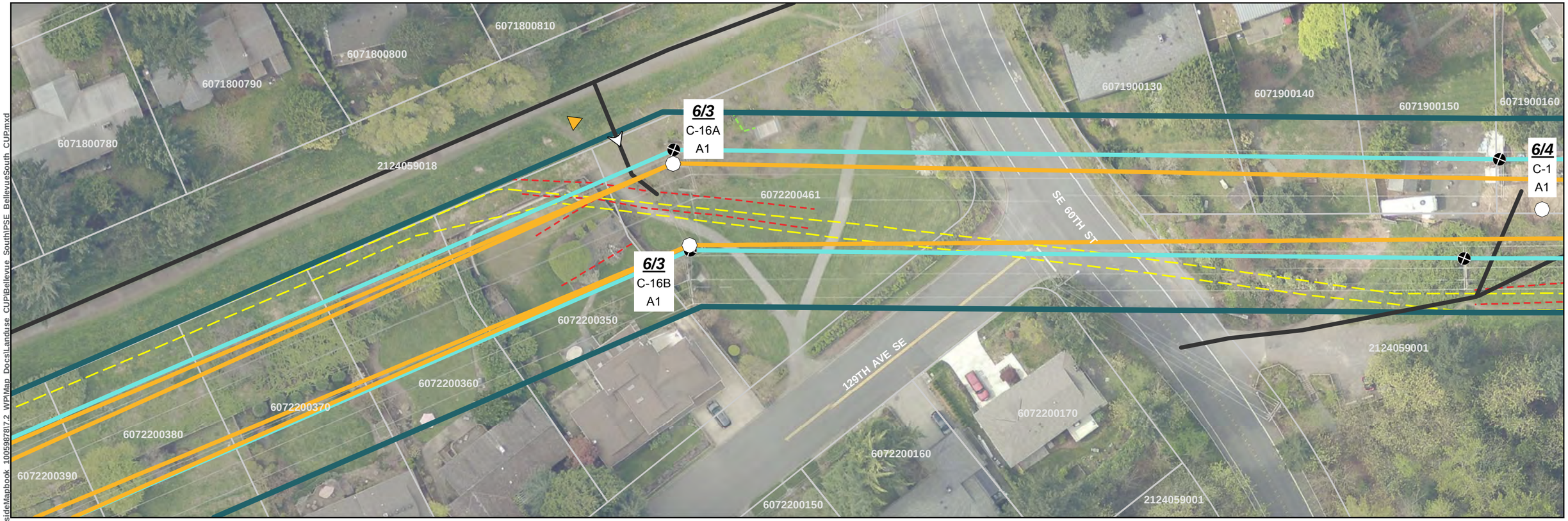
SOUTH BELLEVUE

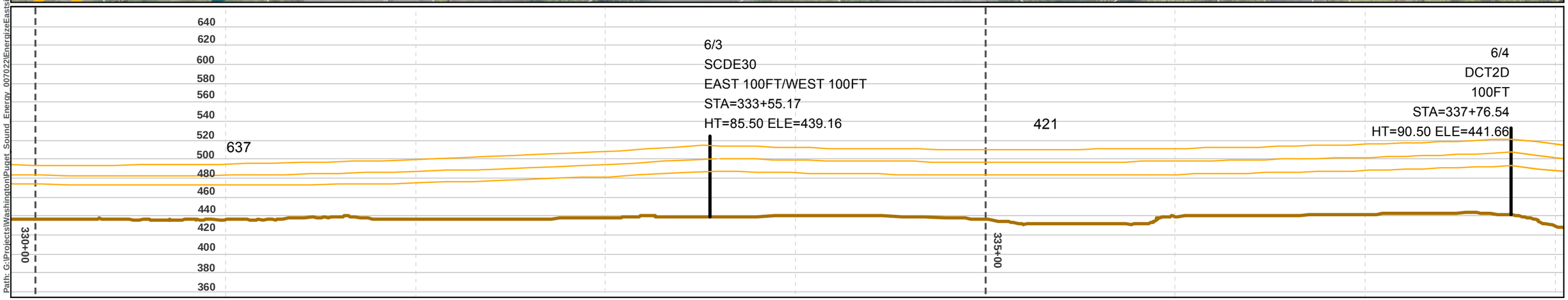
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 20 of 25

Date: 8/29/2017

DSD 002245





Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
Transmission Line - Proposed
Transmission Line - Existing
5/7 Proposed Pole Number
C-16 Structure Type (See Appx. A)
A1 Construction Scenario Key (See Appx. B)

Potential Stringing Site
Recommended Access- Proposed Pole
Olympic Underground Pipeline (Approx. Location)
Underground Power Utility Line
Underground Water & Wastewater Utility Line
Richards Creek Substation Footprint

Stream
Wetland
Wetland and Stream Buffer
Landslide Hazard
Landslide Hazard 50ft Buffer
Steep Slope
Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

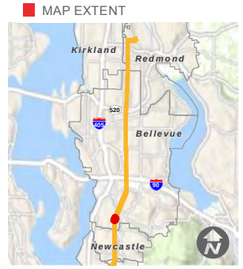
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 21 of 25

Date: 8/29/2017

DSD 002246

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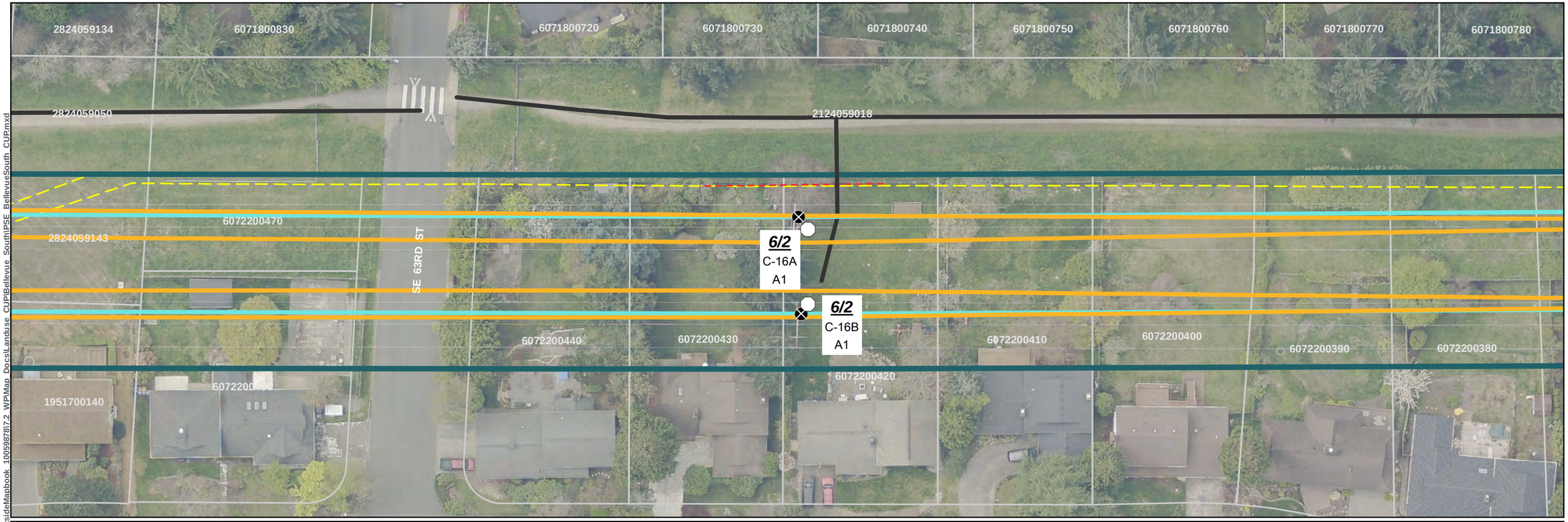

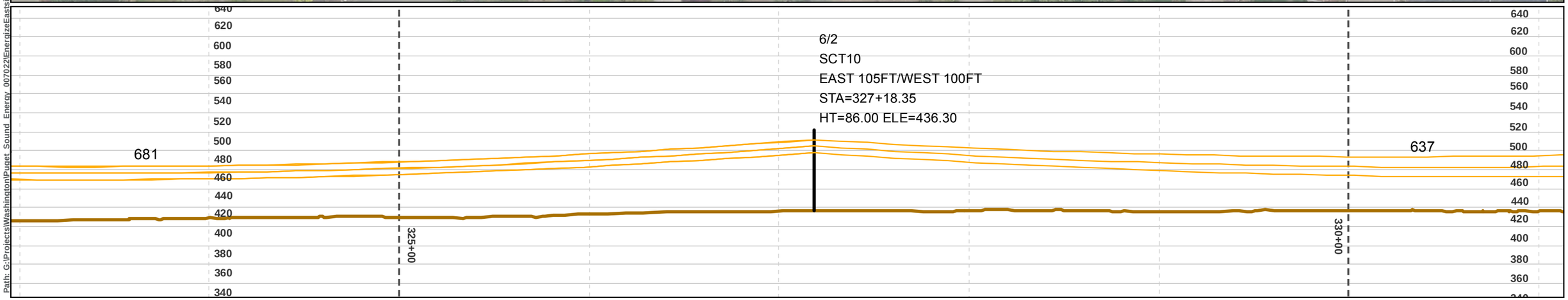

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City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

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For cartographic purposes only.

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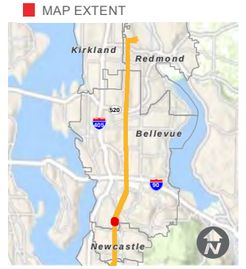

SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 22 of 25

Date: 8/29/2017

DSD 002247

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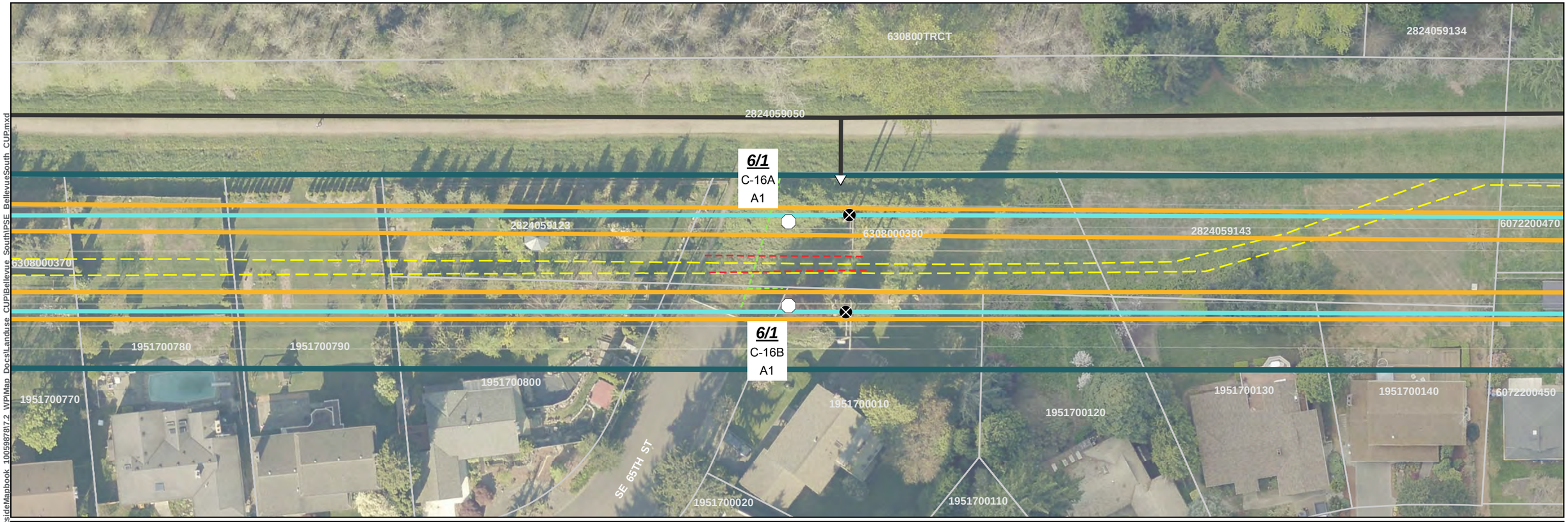

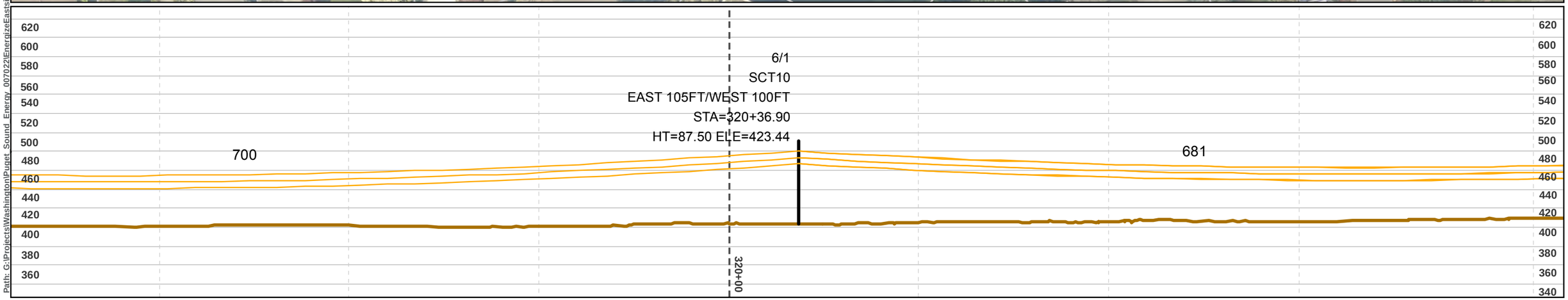

Project Corridor
Proposed Pole Location
Existing Pole Location– To Be Removed
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Transmission Line - Existing
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C-16 Structure Type (See Appx. A)
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Wetland and Stream Buffer
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Steep Slope 50ft Buffer
Parcel
City Jurisdiction Boundary

Profile View
Structure
Conductor
Ground Line
Major Elevation Grid
Major Station Grid
Minor Station Grid

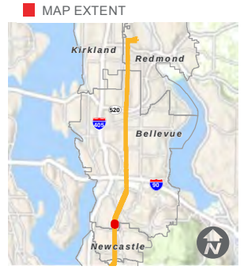
0 25 50 Feet
1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

MAP EXTENT



SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 23 of 25

Date: 8/29/2017

DSD 002248

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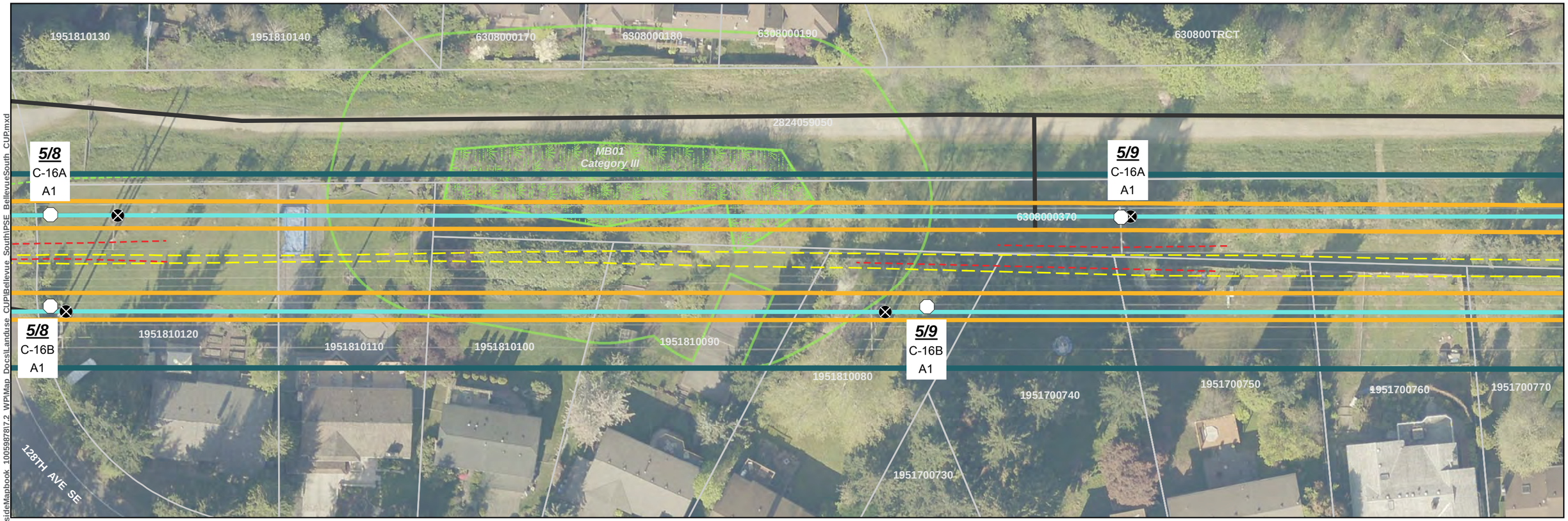

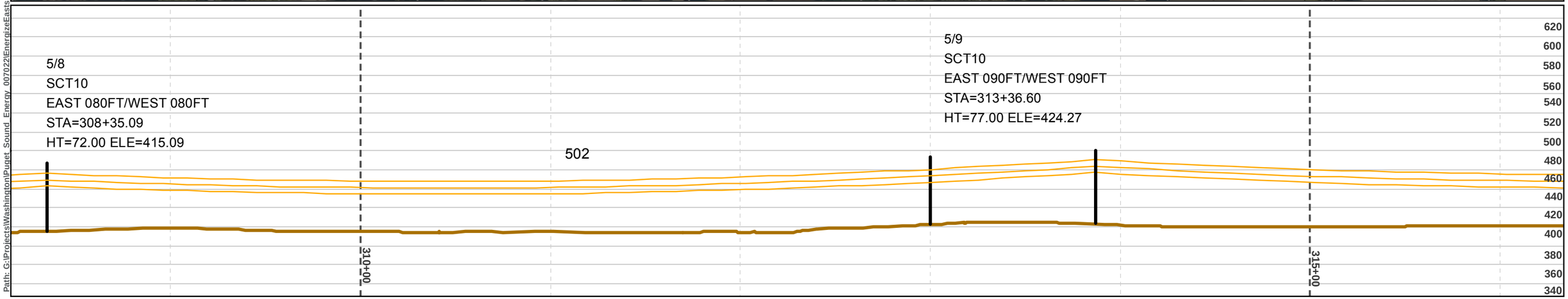

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- Project Corridor
- Proposed Pole Location
- Existing Pole Location– To Be Removed
- Transmission Line - Proposed
- Transmission Line - Existing
- 5/7 Proposed Pole Number
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- A1 Construction Scenario Key (See Appx. B)

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- Wetland
- Wetland and Stream Buffer
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- Landslide Hazard 50ft Buffer
- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
- Major Elevation Grid
- Major Station Grid
- Minor Station Grid

0 25 50 Feet

1 inch = 50 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

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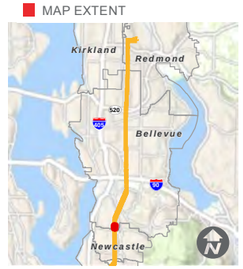


SITE PLAN

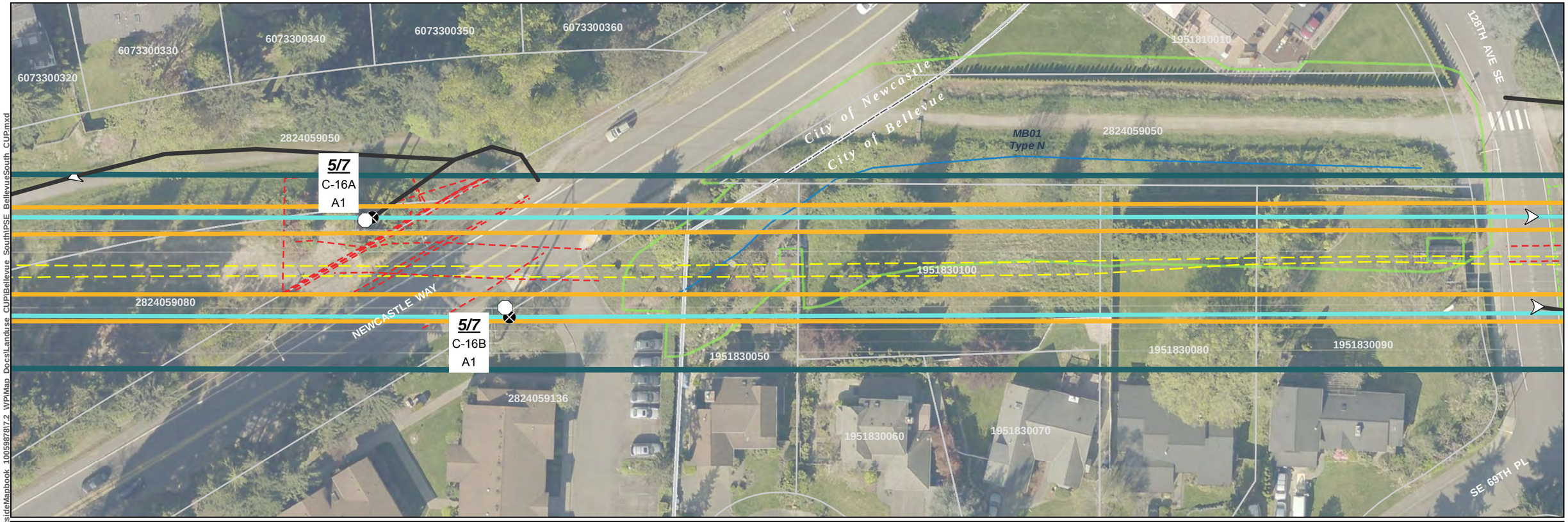
SOUTH BELLEVUE

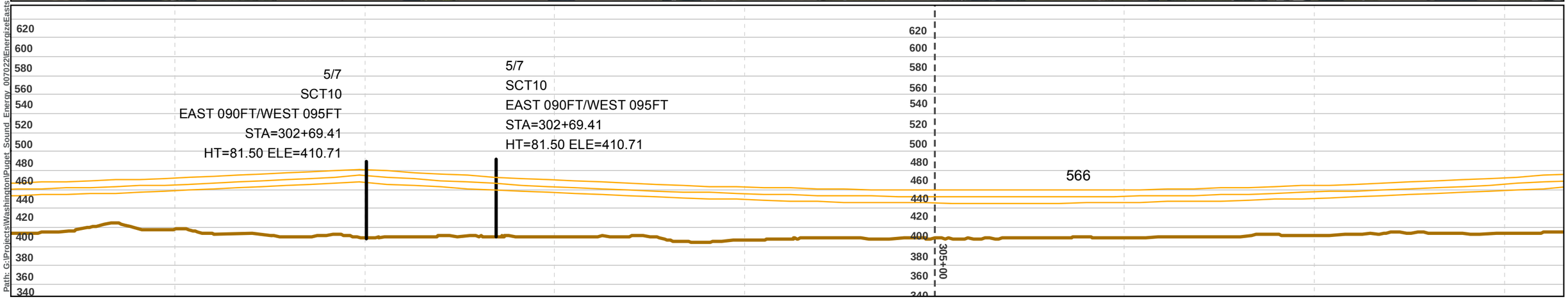
BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 24 of 25

Date: 8/29/2017

DSD 002249





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- Project Corridor
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- Landslide Hazard 50ft Buffer
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- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

Profile View
- Structure
- Conductor
- Ground Line
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- Minor Station Grid

0 25 50 Feet

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SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

Note: See Appendix C for Lakeside and Richards Creek substation site plan

For cartographic purposes only.

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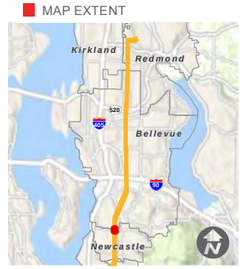


SITE PLAN

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Sheet 25 of 25

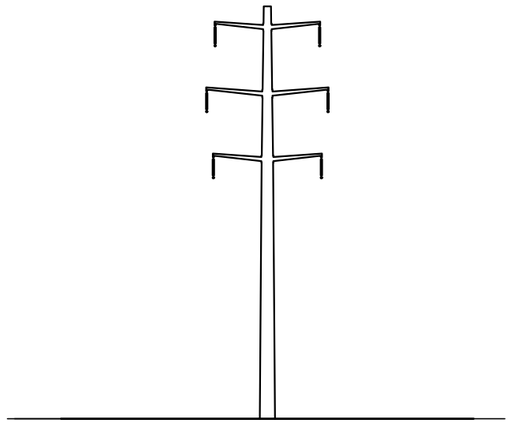
Date: 8/29/2017

DSD 002250

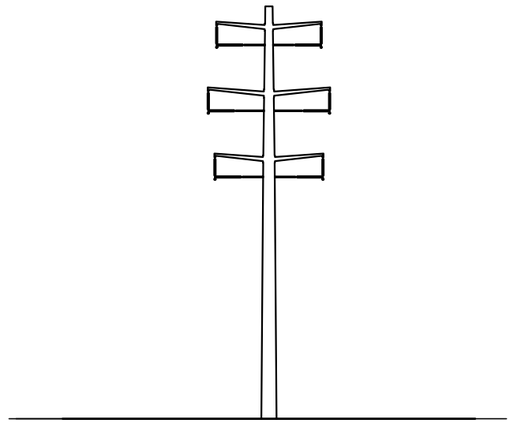
ENERGIZE EASTSIDE 230KV - STRUCTURE TYPES

NOTE: FOR SPECIFIC LOCATIONS AND HEIGHTS, SEE PROFILE SHEETS

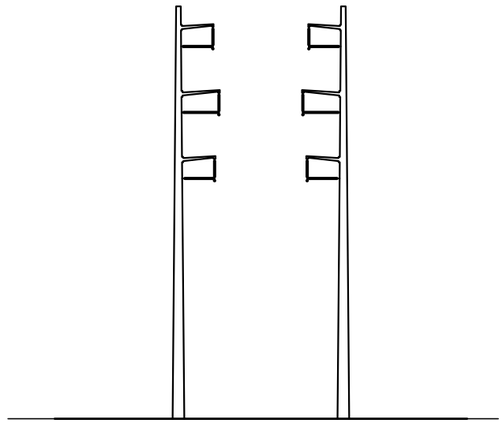
(230kV) C-1



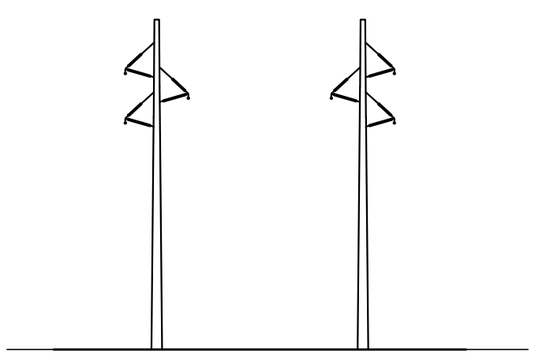
(230kV) C-1B



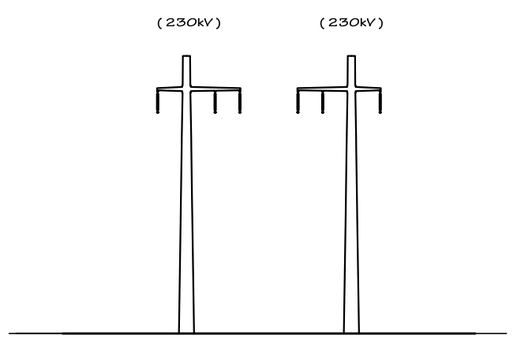
C-2A (230kV) C-2B (230kV)



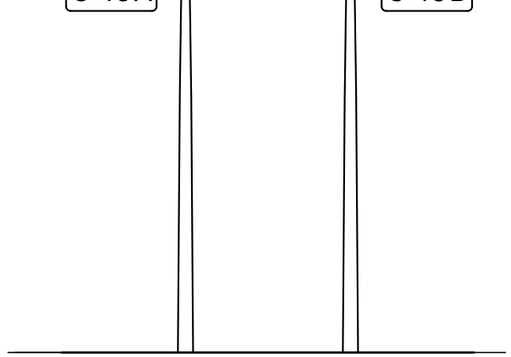
C-16A (230kV) C-16B (230kV)



C-17A (230kV) C-17B (230kV)



(230kV) C-18A (230kV) C-18B



Eastside 230 ROW and structure options.dgn 8/16/2017 2:06:44 PM

Structure Type	Naming Convention	Description
SCDE	C-18 A/B	Single circuit deadend
SCT	C-16 A/B	Single circuit tangent
DCT	C-1	Double circuit tangent (D denotes OHGW overhead groundwire)
DCA	C-1B	Double circuit angle - equiv to a C1 with a post brace to handle bigger angle
SCHDE	C-17 A/B	Single circuit horizontal deadend (only under SCL line)
SCA	C-2 A/B	Single circuit angle

*number after type in table denotes angle

STRUCTURE TYPES

SOUTH BELLEVUE

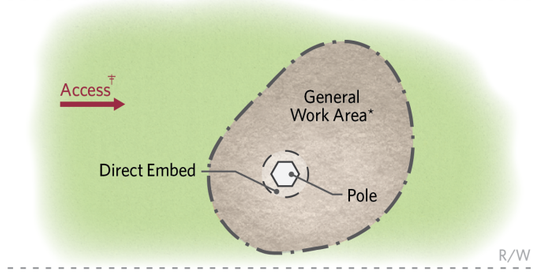
BASED ON PSE ENGINEERING DESIGN REVISION K

Appendix A

Date: 8/29/2017

DSD 002251

Construction Scenario A1



Pole Type
Single Pole

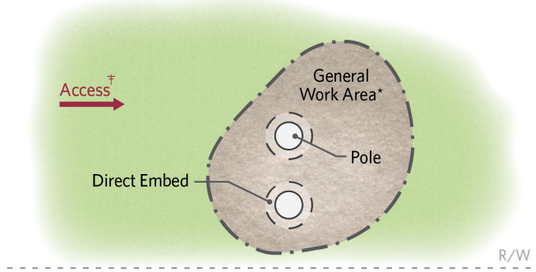
Temporary Work Area
Approx. 2,500 sq. ft.

Installation Type
Direct Embed

Additional Considerations
Place pole in hole and backfill annulus

** Terrain/topography dependent*
† See map sheets

Construction Scenario B1



Pole Type
H-Frame

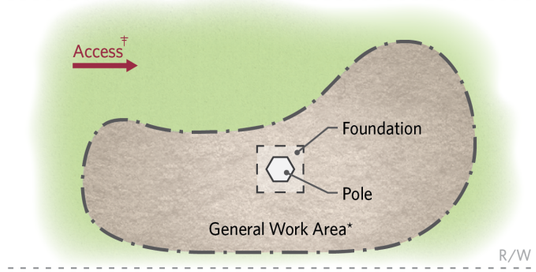
Temporary Work Area
Approx. 2,500 sq. ft.

Installation Type
Direct Embed

Additional Considerations
Place each pole in hole and backfill annulus

** Terrain/topography dependent*
† See map sheets

Construction Scenario C1



Pole Type
Single Pole

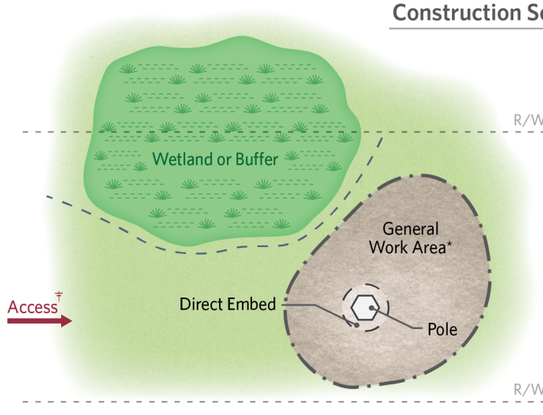
Temporary Work Area
Approx. 5,000 sq. ft.

Installation Type
Foundation

Additional Considerations
Build foundation and install pole

** Terrain/topography dependent*
† See map sheets

Construction Scenario A2



Pole Type
Single Pole

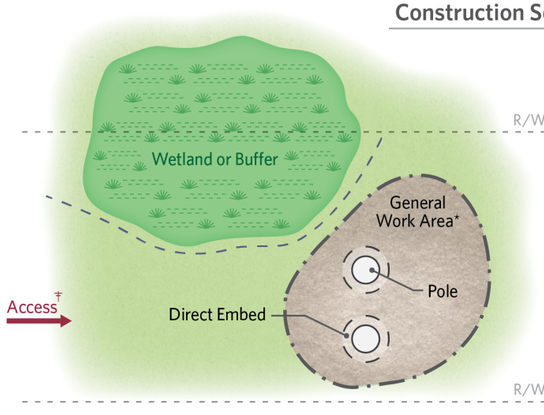
Temporary Work Area
Approx. 2,500 sq. ft.

Installation Type
Direct Embed

Additional Considerations
Establish construction buffer from critical area using appropriate BMPs

** Terrain/topography dependent*
† See map sheets

Construction Scenario B2



Pole Type
H-Frame

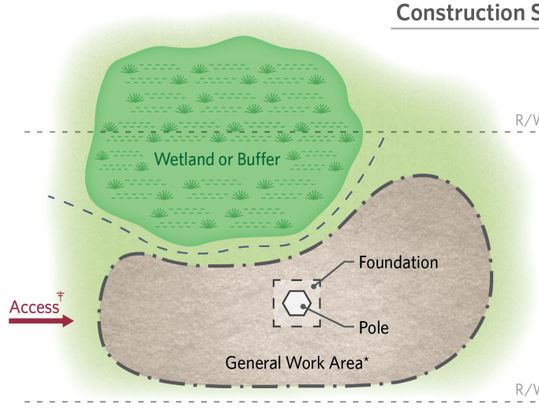
Temporary Work Area
Approx. 2,500 sq. ft.

Installation Type
Direct Embed

Additional Considerations
Establish construction buffer from critical area using appropriate BMPs

** Terrain/topography dependent*
† See map sheets

Construction Scenario C2



Pole Type
Single Pole

Temporary Work Area
Approx. 5,000 sq. ft.

Installation Type
Foundation

Additional Considerations
Establish construction buffer from critical area using appropriate BMPs

** Terrain/topography dependent*
† See map sheets

Structure Type	Typical Construction Scenario (Not in critical area)	Typical Construction Scenario (In a critical area)
C-1	A1	A2
C-2	C1	C2
C-1B	C1	C2
C-16	A1	A2
C-17	C1	C2
C-18	C1	C2

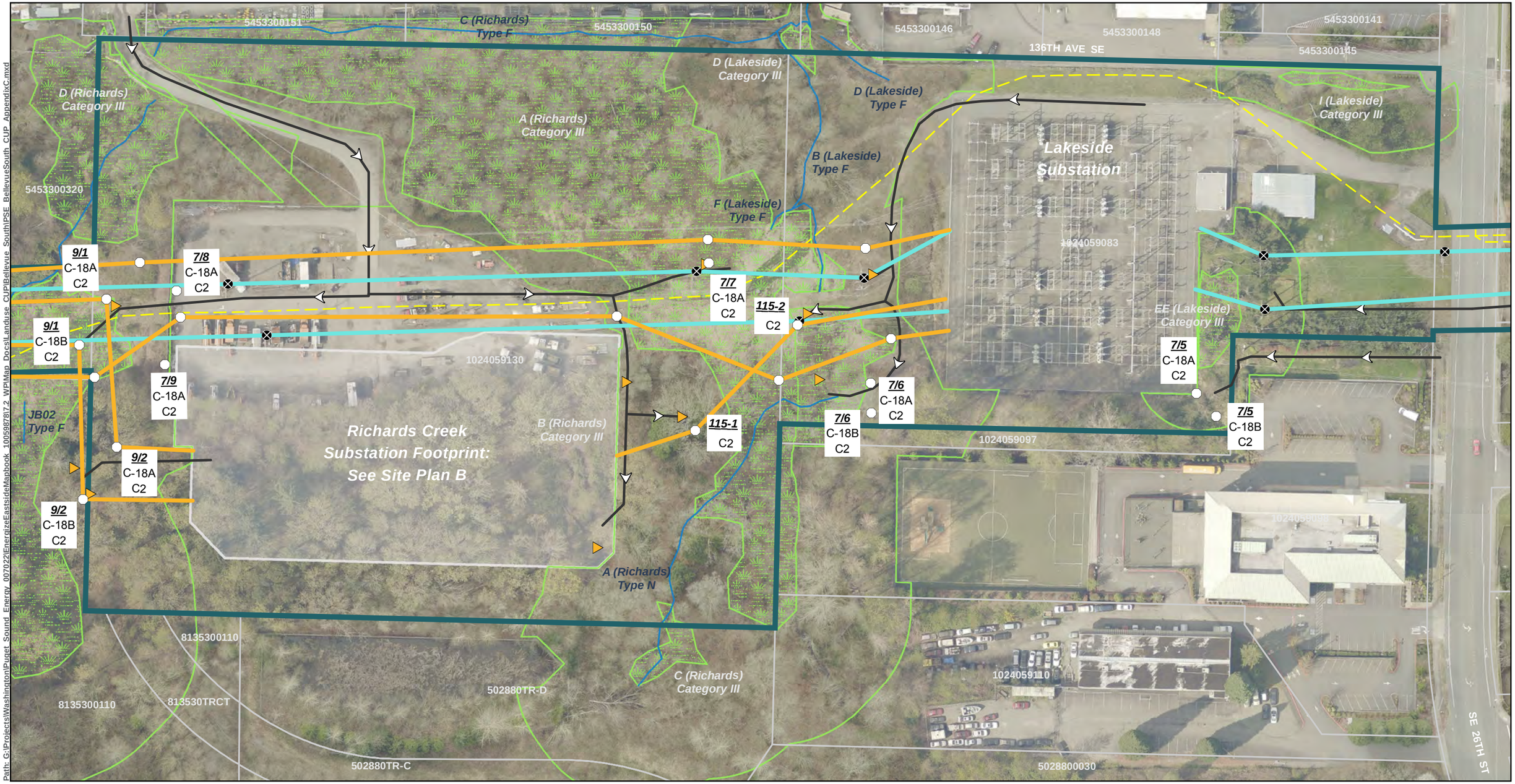
CONSTRUCTION SCENARIOS

SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Appendix B
Date: 8/29/2017

DSD 002252



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- Steep Slope
- Steep Slope 50ft Buffer
- Parcel
- City Jurisdiction Boundary

0 25 50 Feet
1 inch = 90 feet

SOURCES: Roads and Parcels - King County (2015), Aerial - King County (2015) Online; Streams, Wetlands and Buffers, Landslide Hazard and Buffers, and Steep Slopes and Buffers from Watershed Company (2016).

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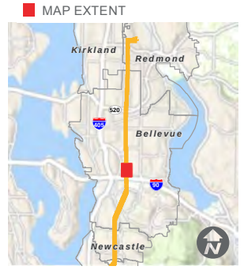
MAP EXTENT



LAKESIDE AND RICHARDS CREEK SUBSTATION SITE PLAN

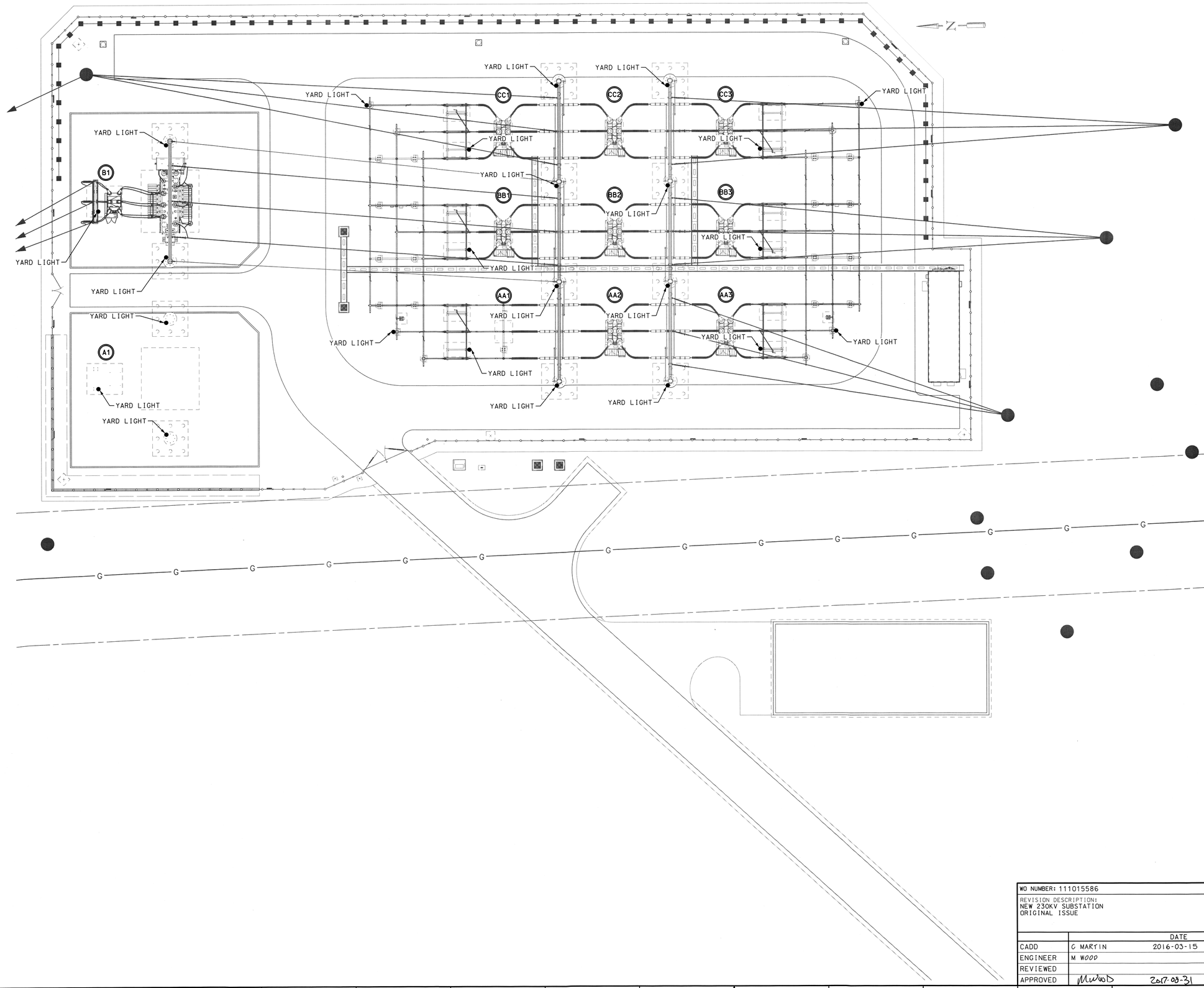
SOUTH BELLEVUE

BASED ON PSE ENGINEERING DESIGN REVISION K

Appendix C

Date: 8/29/2017

DSD 002253



SCALE 1"=20'
0 1" 2"

WO NUMBER: 111015586		
REVISION DESCRIPTION: NEW 230KV SUBSTATION ORIGINAL ISSUE		
	DATE	
CADD	C MARTIN 2016-03-15	
ENGINEER	M WOOD	
REVIEWED		
APPROVED	2017-08-31	

STATION ELECTRICAL ASSEMBLY LIGHTING PLAN RICHARDS CREEK SUBSTATION

PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: SK-620 — REV NO: 0

SHEET: 01 of 01

SCALE: 1"= 20' — CLASS: ASSY — FILE NO:

CADD NO: SK-620.dgn — CODE: RIC

DSD 002254

8/30/2017 3:01:45 PM USER: cmartin

I:\Substation Design\Richards Creek\Electrical\Design\Lighting\SK-620.dgn

June 22, 2017

Molly Reed
PSE Energize Eastside
355 110th Avenue NE
Bellevue, WA 98004

Re: Richards Creek Substation property, Wetland and Stream Delineation Report
The Watershed Company Reference Number: 111103.6

Dear Molly:

On March 15th and 27th, a wetland and stream delineation study was completed at the Richards Creek Substation parcel located at SE 30th Street in the city of Bellevue (parcel number 1024059130). The purpose of the study was to delineate wetland and stream boundaries on the parcel that could potentially encumber the planned Richards Creek Substation to be developed. This delineation study will update the findings of previous delineation studies conducted on the parcel. This report presents the findings of the 2017 re-delineation effort and details applicable local, state and federal regulations. The following attachments are included:

- Survey-based Wetland Delineation Map
- Wetland Determination Data Forms
- 2004 and 2014 Ecology Wetland Rating Forms and Figures

Methods

Public-domain information on the subject properties was reviewed for this delineation study and include the following:

- USDA Natural Resources Conservation Service, Web Soil Survey (WSS) application
- U.S. Fish and Wildlife Service National Wetland Inventory (NWI) maps
- Washington Department of Fish and Wildlife interactive mapping programs (PHS on the Web, SalmonScape)
- Washington Department of Natural Resources, Forest Practices Application Mapping Tool (FPARS)
- King County's GIS mapping website (iMAP)

750 Sixth Street South | Kirkland, WA 98033
p 425.822.5242 | f 425.827.8136 | watershedco.com

Climatic conditions for precipitation were determined to be normal using the WETS table methodology from the USDA NRCS document Part 650 Engineering Field Handbook, National Engineering Handbook, Hydrology Tools for Wetland Identification and Analysis, Chapter 19 (September 2015). The Seattle-Tacoma International AP station as recorded by NOAA (http://agacis.rcc-acis.org/) was used as a source for precipitation data. The WETS table methodology uses climate data from the three months prior to the site visit month to determine if normal conditions are present.

Wetlands

The study area was evaluated for wetlands using methodology from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (Regional Supplement) (US Army Corps of Engineers [Corps] May 2010). Wetland boundaries were determined on the basis of an examination of vegetation, soils, and hydrology. Areas meeting the criteria set forth in the Regional Supplement were determined to be wetland. Soil, vegetation, and hydrologic parameters were sampled at several locations along the wetland boundaries to make the determination. Data points were marked with yellow- and black-striped flagging. Wetland boundaries were marked with pink- and black-striped flagging.

Delineated wetlands were classified using both *2014 Update to the Western Washington Wetland Rating System* (Publication #14-06-029) (hereafter 2014 Rating System) and the *Washington State Wetland Rating System for Western Washington, Version 2* (Publication #04-06-025) (hereafter 2004 Rating System).

Streams

The study area was also evaluated for streams based on the presence or absence of an ordinary high water mark (OHWM) as defined by the Revised Code of Washington (RCW) 90.58.030 and the Washington Administrative Code (WAC) 220-660-030. The OHWM edge was located by examining the bed and bank physical characteristics and vegetation to ascertain the water elevation for mean annual floods. Stream boundaries were marked with blue- and white-striped flagging.

Streams were classified according to City of Bellevue regulations.

Mapping

Delineation and data point flags were survey-located in May 2017. The attached Wetland Delineation Figure was created using the AutoCAD file of the survey-located flags.

Findings

The subject parcel is approximately 8.5 acres in size and located in the Kelsey Creek/Mercer Slough drainage basin in the Cedar-Sammamish Water Resource Inventory Area (WRIA 8); Section 10 of Township 24N, Range 05E of the Public Land Survey System. The property contains an existing gravel maintenance yard and forested vegetation; it is encumbered by wetland and stream critical areas.

Previous delineation studies conducted by The Watershed Company have occurred on and adjacent to the property. The first of these delineation studies occurred in 2012 followed by supplemental delineation in 2014 associated with work detailed in the Lakeside Substation Rebuild Critical Areas Report. Then, in October 2016 and February 2017, delineation work occurred near the southwest corner of the parcel as part of the Richards Creek culvert replacement and stream restoration studies on the property.

A total of five wetlands and two streams are located on or adjacent to the Richards Creek Substation property that may encumber proposed activities on the parcel. A summary of these features, including delineation date and previously-used names, is provided in Table 1 below. The information contained in this report is meant to supersede any discrepancies that may exist between new information and old reports.

Table 1. Summary of potentially encumbering critical areas located on the Richards Creek parcel including most recent delineation date and formerly-reported critical area name.

Critical Area	Recent Delineation Date	Other Names and Delineation Dates
Wetland A	March 2017	*formerly* Wetland BDC (2012) and Wetland BC (2014)
Wetland B	March 2017	*formerly* Wetland E (2012, 2014)
Wetland C	March 2017	*formerly* Wetland A (2012)
Wetland D	October 2016	*formerly* Wetland FG (2012)
Wetland H	February 2017	*also known as* JB01 in Energize Eastside study (July 2015), previously delineated in 2012
Stream A	March 2017	*no other names*, previously delineated in 2012
Stream C	October 2016 and February 2017	*no other names*, previously delineated in 2012

Wetland A

Wetland A is a slope wetland located in the northwest portion of the parcel. Although parts of the wetland are contiguous with adjacent stream segments, the primary source of hydrology to the wetland is from groundwater seeps. Wetland A generally slopes in one direction draining to streams without impounding water.

Wetland A includes forested, shrub, and emergent Cowardin vegetation communities. Common vegetation observed throughout the wetland includes red alder, western red cedar, black cottonwood, willow species, salmonberry, red-osier dogwood, skunk cabbage, lady fern, reed canarygrass, and giant horsetail among others. The diagnostic soil layers (at DP-1) are a moderately dark brown (10YR 3/2) and a depleted greyish-brown (10YR 4/2) gravelly sandy loam and sandy loam. Both layers contain redoximorphic features (RMFs) of 7.5YR 3/4 which become more prevalent in the lower layer (8-16 inches). Soils were saturated to the surface and a water table was present at eight inches below the ground surface during the site visit.

Wetland A rates as a Category III wetland under both the 2004 and 2014 Rating Systems. Rating forms are attached.

Figure 1. View of forested portion of Wetland A (in background), facing northwest from non-wetland area (February 2012).

Wetland B

Wetland B is a small slope wetland located in the northeast portion of the property. The wetland contains palustrine forested and palustrine scrub-shrub Cowardin vegetation communities dominated by Pacific willow, red alder, salmonberry, Himalayan blackberry, giant horsetail, and lady fern. The diagnostic soil is a dark brown (2.5Y 3/1) sandy loam containing 7.5YR 3/4 RMFs (DP-3). Soils were saturated to the surface and a water table was present at four inches below the ground surface during the site visit. Shallow surface water ponding was also observed near the test pit.

Wetland B rates as a Category III wetland under both the 2004 and 2014 Rating Systems.

Figure 2. Wetland B, facing southeast (March 2017).

Wetland C

Wetland C is a small forested slope wetland located on the eastern parcel boundary at the north end adjacent to Stream A. Stream A flows within the boundaries of Wetland C but does not provide hydrology to the wetland unit; hydrology is provided by groundwater seeps. It is dominated by a palustrine forested Cowardin vegetation community including red alder, black cottonwood, salmonberry, and skunk cabbage. The diagnostic soil layer is a grey-blue (10EG 5/1) gravelly sandy clay loam with 10YR 4/6 RMFs present in the matrix and pore linings (DP-5). Soils were saturated to the surface and a high water table was present at eight inches below the ground surface.

Wetland C rates as a Category III wetland under both the 2004 and 2014 Rating Systems.

Figure 3. Wetland C, facing north (March 2017).

Wetland D

Wetland D is riverine wetland located in the southwest corner of the property. It is contiguous with Stream C. A constructed stormwater detention pond is located immediately north of this wetland and not included within its boundaries. Overbank flooding of Stream C is the primary source of hydrology to the wetland. Twin culverts beneath the access road function as the wetland outlet (Figure 4).

Figure 4. Wetland D, facing southwest adjacent to Richard's Creek substation access drive (October 2016).

Wetland D contains a forested Cowardin vegetation community dominated by Pacific willow, red alder, lady fern, small-fruited bulrush, reed canarygrass and giant horsetail with some Himalayan blackberry rooted along the fringes. The diagnostic soil layer is a very dark gray (10YR 3/1) loamy sand with 10 percent prominent RMFs (DP-9). Soils were saturated to the surface with a water table present at twelve inches below the soil surface.

Wetland D rates as a Category II wetland under both the 2004 and 2014 Rating Systems.

Wetland H

Wetland H is a slope wetland located on the south end of the property and extending offsite to the south. Despite being bordered on the west side by Stream C, its primary source of hydrology is groundwater seeps. Wetland H contains emergent, scrub-shrub, and forested Cowardin vegetation communities. Vegetation is dominated by reed canarygrass, birdsfoot trefoil, giant horsetail, Himalayan blackberry, willow species, and red alder. Sampled soils were a dark brown (10YR 2/1) sandy clay loam and very dark gray (2.5Y 3/1) loamy sand (DP-35); and smelled of hydrogen sulfide. Soils were saturated to the surface and a high water table was present at eight inches below the soil surface.

Wetland H rates as a Category III wetland under both the 2004 and 2014 Rating Systems.

Figure 7. Wetland H, facing south from northern boundary (February 2017).

Stream A

Stream A is a seasonal stream that flows through Wetland C and into Wetland A. In the powerline corridor, channel loses definition and appears to go below the ground through old drainage structures. The stream substrate is composed of sand and gravel, meanders moderately, and averages five feet wide at bankfull width. The left and right banks are well vegetated with trees, shrubs, and herbaceous plants. King County iMap depicts the origins of Stream A approximately 600 feet east of the PSE parcel. Fish cannot access the portion of Stream A located on the east side of the parcel, upstream of the point where the channel transitions to sheetflow and loses definition.

Stream C

The King County iMap database depicts Stream C as originating in two tributaries southeast of the PSE property and running through Wetlands H, D and A. This delineation picks up the stream in Wetland D where it flows northwest to the southwest corner of the property. Here the stream flows through a culvert beneath the PSE property access drive and flows north along the west property boundary, largely on the adjacent property. It collects water from Stream A at the northwest corner of the property and then flows west, where the iMap database shows it to continue roughly

west in a mix of natural channels and pipes or culverts. The stream substrate is composed of sand, gravel, and cobbles. The stream meanders slightly and averages six feet wide at bankfull width.

Stream C flows year-round. Downstream of the culvert, the right bank was delineated and flagged; the left bank in this area is bounded by fill from the adjacent development. The right bank is bordered by vegetated buffer and Wetland A, which drains to the stream. Upstream of the culvert, both the right and left bank were flagged. Here the stream flows through Wetland D. The City of Bellevue stream inventory map depicts Stream C as Type F, or fish bearing, and WDFW Priority Habitats and Species maps indicate the presence of resident cutthroat trout in the stream.

Local Regulations

Critical Areas within the City of Bellevue are regulated under Part 20.25H of the City of Bellevue Land Use Code (LUC).

Wetlands

According to LUC 20.25H.095, wetlands are classified based on the 2004 Rating System. Bellevue is in the process of updating the city code to require Ecology's 2014 Rating System update. Furthermore, both state and federal agencies use the 2014 version of the rating system to evaluate direct impacts to wetlands. As this project may directly impact wetland area, both rating systems published by Ecology were used to rate wetlands. For the purposes of discussing Bellevue's regulations, only the 2004 wetland ratings will be presented here.

As stated previously, Wetlands A, B, C, and H classify as Category III slope wetlands; Wetland D is considered to be a Category II riverine wetland. Buffer widths are determined based upon the "developed" or "undeveloped" condition of the site, the water quality and habitat scores generated using the 2004 Rating System, and the wetland category. The Richards Creek parcel is considered undeveloped. Required buffer widths are presented in Table 2.

The proposed Richards Creek Substation is not considered a building or structure that would require an additional 15-foot building setback from critical area buffers. Building setbacks are not included this report or associated delineation map.

Table 2. Summary of 2004 wetland ratings, classifications, and required standard buffer widths.

Wetland Name	HGM Class	2004 Ecology Wetland Rating				Category	Standard Buffer Width (feet)
		Water Quality	Hydrologic Function	Habitat	Total		
A	Slope	6	10	21	37	III	110
B	Slope	6	12	16	34	III	60
C	Slope	6	12	20	38	III	110
D	Riverine	20	22	21	63	II	110
H	Slope	6	16	21	43	III	110

Streams

Streams in Bellevue are rated as one of four types based on inventory status as Shorelines of the State, fish use, and connectivity to other streams. As with wetlands, stream buffer widths are determined based on a combination of the stream type and whether the site is "developed" or "undeveloped."

None of the onsite streams is a Shoreline of the State due to low flow volumes. The upstream (and onsite) portion of Stream A is a Type N water, as it does not contain fish or fish habitat and is not connected by an above-ground channel to fish-bearing waters. Type N waters on undeveloped sites in Bellevue require regulatory buffers of 50 feet. Stream C is rated as Type F, and requires a 100-foot buffer.

State and Federal Regulations

Wetlands are also regulated by the Army Corps of Engineers under Section 404 of the Clean Water Act. Any filling of Waters of the U.S., including wetlands (except isolated wetlands), would require notification and permits from the Corps. Wetland B may be considered isolated. A formal isolated status inquiry can be requested from the Corps through the Jurisdictional Determination process.

Federally permitted actions that could affect endangered species may also require a biological assessment study and consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service. Application for Corps permits may also require an individual 401 Water Quality Certification and Coastal Zone Management Consistency determination from Ecology.

In general, neither the Corps nor Ecology regulates wetland buffers, unless direct wetland impacts are proposed. When direct impacts are proposed, mitigated wetlands

may be required to employ buffers based on Corps and Ecology joint regulatory guidance.

Disclaimer

The information contained in this letter is based on the application of technical guidelines currently accepted as the best available science and in conjunction with the manuals and criteria outlined in the methods section. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, state and federal regulatory authorities. No other warranty, expressed or implied, is made.

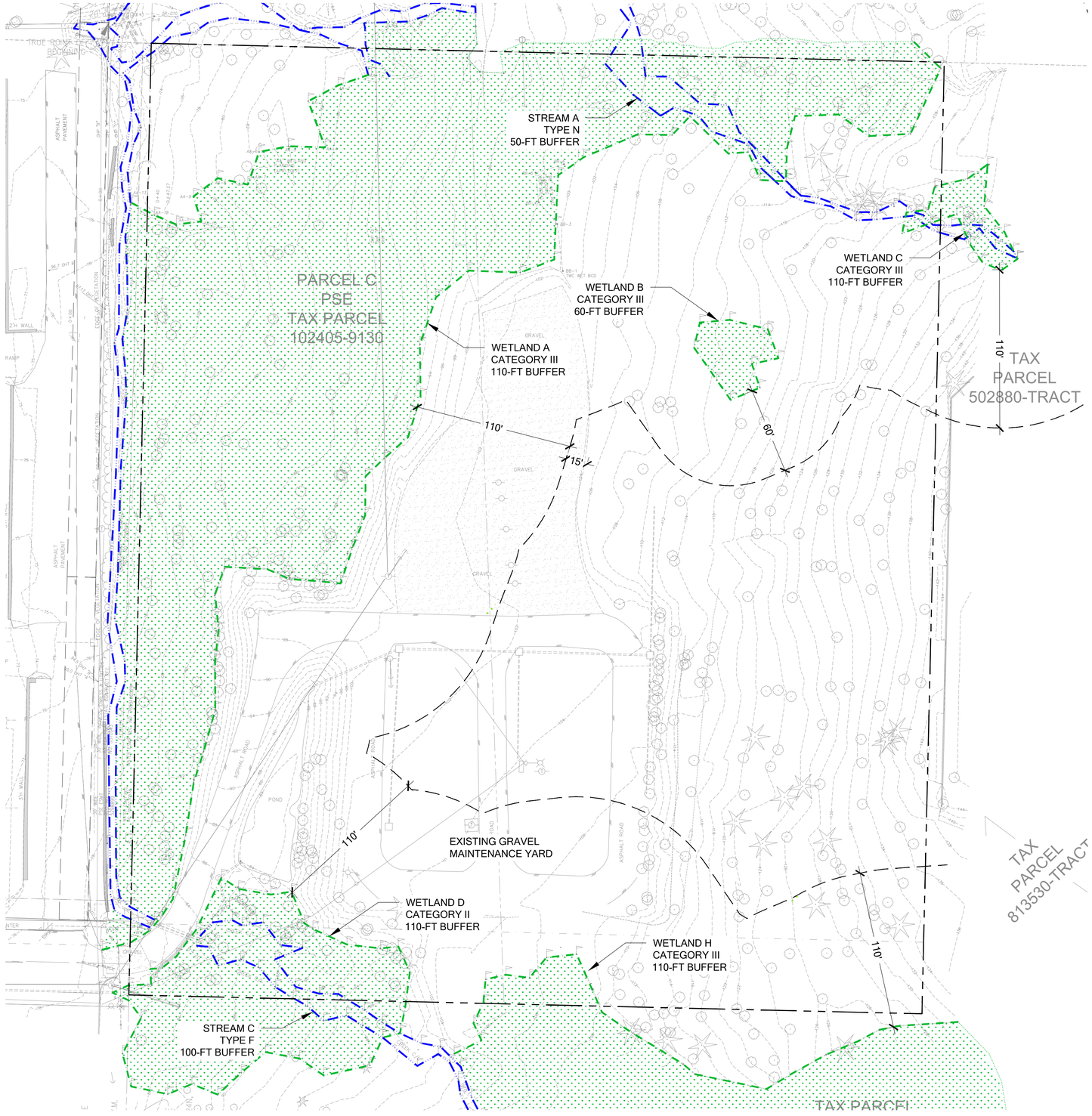
Please call if you have any questions or if we can provide you with any additional information.

Sincerely,

Katy Crandall, WPIT
Ecologist / Arborist

Enclosures

PSE RICHARDS CREEK 230kV SUBSTATION



LEGEND

- WETLAND BOUNDARY
- WETLAND BOUNDARY (APPROXIMATE)
- STREAM BOUNDARY (OHWM)
- CRITICAL AREA BUFFER
- PROPERTY BOUNDARY

NOTES

1. WETLAND AND STREAM BOUNDARIES BASED ON DELINEATION STUDIES PERFORMED BY THE WATERSHED COMPANY IN OCTOBER 2016, FEBRUARY 2017 AND MARCH 2017.

STREAM AND WETLAND DELINEATION FIGURE

0 20' 40' 80' 160'

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THE WATERSHED COMPANY
750 Sixth Street South
Kirkland WA 98033
p 425.822.5242
www.watershedco.com
Science & Design

RICHARDS CREEK SUBSTATION
WETLAND AND STREAM DELINEATION
PREPARED FOR: PUGET SOUND ENERGY

13440 SOUTHEAST 30TH STREET
BELLEVUE, WA 98005

SUBMITTALS & REVISIONS

NO.	DATE	DESCRIPTION	BY
1	05-10-2017	DELINEATION FIGURE	LJM
2	05-15-2017	FIRST ROUND DRAFT EDITS	LJM

SHEET SIZE:
ORIGINAL PLAN IS 22" x 34".
SCALE ACCORDINGLY.

PROJECT MANAGER: JC
DESIGNED:
DRAFTED: LJM
CHECKED: KC/AM
JOB NUMBER:
111103.6
SHEET NUMBER:
W1

FILENAME
PRINTED BY
DATE

DSD 002267

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-1

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**3/15/2017**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **1**
Investigator:	**KC, LM**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **HILLSLOPE**	Slope (%): **3**	Local relief (concave, convex, none): **NONE**	
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585**	Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**	
Are climatic/hydrologic conditions on the site typical for this time of year?	☒ Yes ☐ No	(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site?	☒ Yes ☐ No		
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☒ No ☐
Hydric Soils Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **WETLAND A IN PIT, SOUTHEAST CORNER OF WETLAND**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Salix sp.***	**10**	**Y**	**FAC**
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus armeniacus***	**100**	**Y**	**FAC**
2. ***Rubus spectabilis***	**3**	**N**	**FAC**
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Equisetum telmateia***	**30**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Athyrium cyclosorum*** **nearby**

SOIL **Sampling Point – DP-1**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	**10 YR 3/2**	**95**	**7.5 YR 3/4**	**5**	**C**	**M**	**GRAVELLY SANDY LOAM**	
8-16	**10 YR 4/2**	**85**	**7.5 YR 3/4**	**15**	**C**	**M**	**SANDY LOAM**	

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**8**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0-16**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-2

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**3/15/2017**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **2**
Investigator:	**KC, LM**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **HILLSLOPE**	Slope (%): **<5**	Local relief (concave, convex, none): **NONE**	
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585**	Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**	
Are climatic/hydrologic conditions on the site typical for this time of year?	☒ Yes ☐ No	(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site?	☒ Yes ☐ No		
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☒ No ☐
Hydric Soils Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **WETLAND A IN PIT, NORTH OF DP-1**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus armeniacus***	**20**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-2**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	**10 YR 2/2**	**100**					**SANDY LOAM**	**SOME CLAY**
6-13	**2.5 Y 3/1**	**80**	**7.5 YR 3/1**	**20**	**C**	**PL/M**	**SANDY LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**5**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0-13**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **PONDING NEARBY ~5' AWAY**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-3

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**3/27/2017**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **3**
Investigator:	**KC, LM**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **HILLSLOPE**	Slope (%): **~5**	Local relief (concave, convex, none): **CONCAVE**	
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585**	Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☒ No ☐
Hydric Soils Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **WETLAND B IN PIT**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Salix lucida***	**10**	**Y**	**FACW**
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus armeniacus***	**95**	**Y**	**FAC**
2. ***Rubus spectabilis***	**8**	**N**	**FAC**
3. ***Lonicera involucrata***	**2**	**N**	**FAC**
4.			
5.			
	105	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Equisetum telmateia***	**70**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-3**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-15	**2.5 Y 3/1**	**90**	**7.5 YR 3/4**	**10**	**C**	**M, PL**	**SANDY LOAM**	
15-18	**2.5 Y 3/1**	**75**	**7.5 YR 3/4**	**15**	**C**	**M**	**SANDY LOAM**	**MIXED MATRIX**
			2.5 Y 4/1	**10**	**D**	**M**		

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☒	No ☐	Depth (in):	**1-2**
Water Table Present?	Yes ☒	No ☐	Depth (in):	**4**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0-18**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **PONDING NEXT TO DP**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-4

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**3/27/2017**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **4**
Investigator:	**KC, LM**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **HILLSLOPE**	Slope (%): **<5**	Local relief (concave, convex, none): **NONE**	
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585**	Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☐ No ☒
Hydric Soils Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **OUT PIT BETWEEN WETLANDS A & B ON FORESTED SLOPE**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Acer macrophyllum***	**40**	**Y**	**FACU**
2.			
3.			
4.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Corylus cornuta***	**10**	**N**	**FACU**
2. ***Rubus armeniacus***	**100**	**Y**	**FAC**
3.			
4.			
5.			
	83 = Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Pteridium aquilinum***	**10**	**Y**	**FACU**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	9 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= 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:	**33.3**	(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

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL **Sampling Point – DP-4**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-5	**10 YR 2/2**	**100**					**SANDY LOAM**	
5-12	**10 YR 4/6**	**100**					**GRAVELLY SANDY LOAM**	

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-5

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**3/27/2017**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **5**
Investigator:	**KC, LM**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **HILLSLOPE**	Slope (%): **<5**	Local relief (concave, convex, none): **CONCAVE**	
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585**	Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☒ No ☐
Hydric Soils Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **WETLAND C IN PIT, NORTHEAST CORNER OF WETLAND B, NEXT TO STREAM**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**70**	**Y**	**FAC**
2. ***Populus balsamifera***	**30**	**Y**	**FAC**
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus spectabilis***	**80**	**Y**	**FAC**
2. ***Rubus armeniacus***	**3**	**N**	**FAC**
3.			
4.			
5.			
	83	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Tolmiea menziesii***	**4**	**N**	**FAC**
2. ***Lysichiton americanus***	**5**	**N**	**OBL**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	9	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-5**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-7	**10 YR 2/1**	**100**					**GRAVELLY SANDY LOAM**	
7-13	**10 EG 5/1**	**93**	**10 YR 4/6**	**7**	**C**	**PL/M**	**GRAVELLY SANDY CLAY LOAM**	**COBBLES**

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☒	No ☐	Depth (in): **8**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **0-13**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-6

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**3/27/2017**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **6**
Investigator:	**KC, LM**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **HILLSLOPE**	Slope (%): **>15**	Local relief (concave, convex, none): **NONE**	
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585**	Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**	
Are climatic/hydrologic conditions on the site typical for this time of year?	☒ Yes ☐ No	(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site?	☒ Yes ☐ No		
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Soils Present?	Yes ☐	No ☒	**Is the Sampling Point within a Wetland?**	Yes ☐ No ☒
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **WETLAND C OUT PIT, NORTHEAST OF WETLAND B**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**60**	**Y**	**FAC**
2. ***Acer macrophyllum***	**40**	**Y**	**FACU**
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus armeniacus***	**10**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Polystichum munitum***	**25**	**Y**	**FACU**
2. ***Ilex aquifolium***	**3**	**N**	**FACU**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	28	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL **Sampling Point – DP-6**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-9	**10 YR 2/2**	**98**	**7.5 YR 4/6**	**2**	**C**	**M**	**GR SA LOAM**	
9-15	**10 YR 2/1**	**50**					**GR SA LOAM**	**MIX MATRIX**
	10 YR 3/4	**50**						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **DAMP, NOT SATURATED**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-7

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**3/27/2017**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **7**
Investigator:	**KC, LM**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **HILLSLOPE**	Slope (%): **>15**	Local relief (concave, convex, none): **NONE**	
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585**	Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**	
Are climatic/hydrologic conditions on the site typical for this time of year?	☒ Yes ☐ No	(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site?	☒ Yes ☐ No		
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Soils Present?	Yes ☐	No ☒	**Is the Sampling Point within a Wetland?**	Yes ☐ No ☒
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **WETLAND A OUT PIT IN NW CORNER OF PROPERTY**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**100**	**Y**	**FACU**
2. ***Acer macrophyllum***	**5**	**N**	**FACU**
3.			
4.			
	105	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Acer circinatum***	**20**	**Y**	**FAC**
2. ***Rubus armeniacus***	**70**	**Y**	**FAC**
3.			
4.			
5.			
	90	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Dicentra formosa***	**50**	**Y**	**FACU**
2. ***Polystichum munitum***	**20**	**Y**	**FACU**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

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		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

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL **Sampling Point – DP-7**

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
0-12	**10 YR 2/1**	**100**					**LOAM**	**SOME SAND**
12-14	**10 YR 3/6**	**80**					**LOAM**	**MIXED MATRIX**
	10 YR 2/2	**20**						

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **DAMP, NOT SATURATED**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **DAMP, WET MARCH AND FEBRUARY**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-8

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**3/27/2017**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **8**
Investigator:	**KC, LM**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **SWALE**	Slope (%): **5-10**	Local relief (concave, convex, none): **CONCAVE**	
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585**	Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☒ No ☐
Hydric Soils Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **WETLAND A IN PIT NEAR NW CORNER OF PROPERTY**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Acer macrophyllum***	**60**	**Y**	**FACU**
2. ***(partially rooted in)***			
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus armeniacus***	**100**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	100	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= 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:	**2**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	**100**	x 3 =	**300**
FACU species	**60**	x 4 =	**240**
UPL species		x 5 =	
Column totals	(A) **160**	(B)	**540**

Prevalence Index = B / A = **540/160 = 3.38**

Hydrophytic Vegetation Indicators

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☒ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: **Plants currently dominated by invasive blackberry in understory. Bigleaf maple present in canopy is only partially rooted in. Soils and hydrology indicators are strong. Presumed that later in the growing season other wetland-indicative plants like giant horsetail or willowherb may be dominant in herb stratum.**

SOIL **Sampling Point – DP-8**

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
0-8	**10 YR 2/2**	**100**					**LOAM**	**SOME SAND**
8-14	**10 YR 5/1**	**75**	**10 YR 3/6**	**20**	**C**	**M**	**GRAVELLY SANDY LOAM**	**DIFFUSE REDOX**
			5 YR 3/4	**5**	**C**	**M**	**GRAVELLY SANDY LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**4**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0-14**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 9

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**RICHARDS CREEK SUBSTATION**	Sampling Date:	**10/19/2016**
Applicant/Owner:	**PUGET SOUND ENERGY**	Sampling Point:	DP- **9**
Investigator:	**MIKE FOSTER**	City/County:	**BELLEVUE/KING**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**

Landform (hillslope, terrace, etc):	Slope (%):	Local relief (concave, convex, none):
Subregion (LRR): **A**	Lat: **47.5838**	Long: **-122.1585** Datum:
Soil Map Unit Name: **EvD VERY GRAVELLY SANDY LOAM, 15-30 PERCENT SLOPES**		NWI classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes	☒	No	☐	**Is the Sampling Point within a Wetland?** Yes ☒ No ☐
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: **WETLAND D IN PIT**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Salix lucida***	**75**	**Y**	**FACW**
2. ***Alnus rubra***	**10**	**N**	**FAC**
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Athyrium cyclosorum***	**10**	**N**	**FAC**
2. ***Scirpus microcarpus***	**60**	**Y**	**OBL**
3. ***Phalaris arundinacea***	**15**	**N**	**FACW**
4. ***Equisetum telmateia***	**10**	**N**	**FACW**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**2**	**N**	**FAC**
2.			
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-9**

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	**10YR 3/2**	**100**					**Loam with high org. cont.**	
4-14	**10YR 3/1**	**90**	**7.5YR 3/3**	**10**	**C**	**M, PL**	**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☒	No ☐	Depth (in): **12**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **0-14**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 35

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 5453300320**	Sampling Date:	**7/1/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **35**
Investigator:	**R. Kahlo, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **8**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **EvD, Everett gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland H in pit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 1m diam.)				
1.	***Carex rostrata***	**80**	**Y**	**OBL**
2.	***Lotus corniculatus***	**60**	**Y**	**FAC**
3.	***Scirpus microcarpus***	**10**	**N**	**OBL**
4.	***Phalaris arundinacea***	**5**	**N**	**FACW**
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		155	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: **50** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-35**

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	**10YR 2/1**	**100**					**Sandy clay loam**	
4-12	**2.5Y 3/1**	**100**					**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**4 BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**Throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 36

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J Parcel 5453300320**	Sampling Date:	**6/15/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **36**
Investigator:	**R. Kahlo, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **25**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **EvD, Everett gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☐ No ☒
Hydric Soils Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **Wetland H out pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Salix spp. (hybrid)***	**15**	**Y**	**FACW***
2.			
3.			
4.			
5.			
	15	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Equisetum telmateia***	**60**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**90**	**Y**	**FACU**
2.			
	90	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**67**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed**

SOIL **Sampling Point – DP-36**

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
0-10	**2.5Y 3/2**	**100**	**None**				**Sandy loam**	
10-14	**2.5Y 4/3**	**100**	**None**				**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

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): Richards Creek Substation – Wetland A Date of site visit: 03/27/2017

Rated by: Katy Crandall Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 1 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	10
Score for Habitat Functions	21
TOTAL score for functions	**37**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

Wetland Type		Wetland Class	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	**X**
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above	**X**	Check if unit has multiple HGM classes present	

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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

* The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/). Resident coastal cutthroat are mapped as occurring in the stream adjacent to this wetland.

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

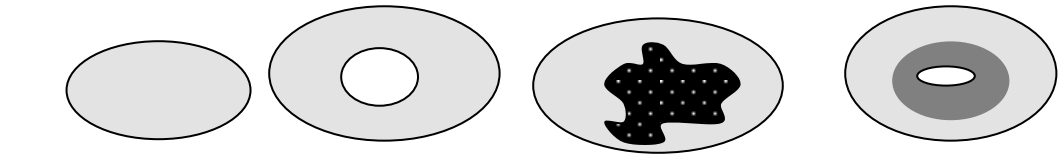
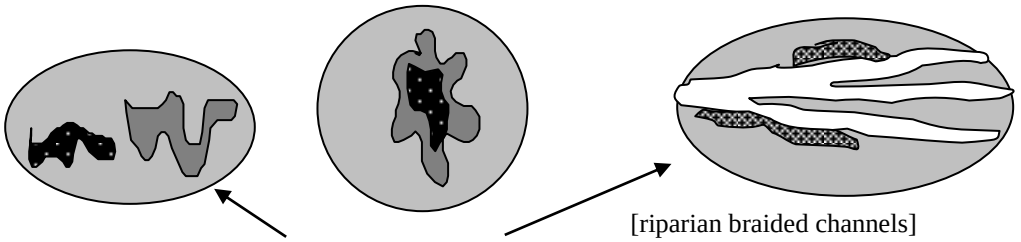
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☒ Other: refuse, turbid runoff observed, gravel pole yard, parking **YES** multiplier is **2** **NO** multiplier is **1**	multiplier 2
S	**TOTAL - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**6**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the potential to reduce flooding and 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 ..... 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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	multiplier 2
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☒ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more ..... points = 4 3 structures ..... points = 2 2 structures ..... points = 1 1 structure ..... points = 0	4
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 ..... points = 1 ☒ Saturated only — 1 types present……points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species ..... points = 1 < 5 species ..... points = 0	2

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	3
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 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 ☐ 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.*	3
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	13

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

DSD 002299

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	13
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	**21**

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): Richards Creek Substation – Wetland B Date of site visit: 03/27/2017

Rated by: Katy Crandall Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 1 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	2
Score for Hydrologic Functions	16
Score for Habitat Functions	16
TOTAL score for functions	**34**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

Wetland Type		Wetland Class	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	**X**
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above	**X**	Check if unit has multiple HGM classes present	

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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

* The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

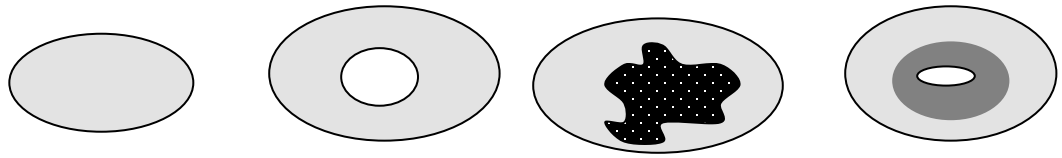
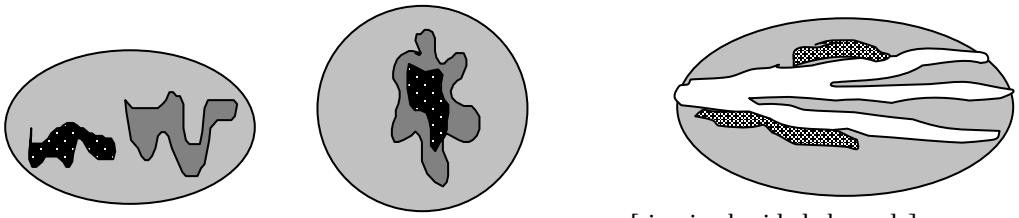
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	2
S	**Total for S 1** *Add the points in the boxes above*	2
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☐ Other: **YES** multiplier is **2** **NO** multiplier is **1**	multiplier 1
S	**TOTAL - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**2**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 ..... 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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☒ Other: <u>Wetland retains surface water that would otherwise flow to a river or stream with flooding problems</u> *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	multiplier <u>2</u>
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☒ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more ..... points = 4 3 structures ..... points = 2 2 structures ..... points = 1 1 structure ..... points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 ..... points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species..... points = 1 < 5 species ..... points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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*	6

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	3
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	10
TOTAL for H1 from page 14	6
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	**16**

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): Richards Creek Substation – Wetland C Date of site visit: 03/27/2017

Rated by: Katy Crandall Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 1 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	12
Score for Habitat Functions	20
TOTAL score for functions	**38**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

Wetland Type		Wetland Class	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	**X**
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above	**X**	Check if unit has multiple HGM classes present	

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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

* The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

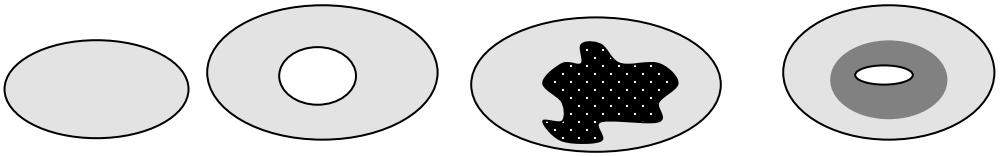
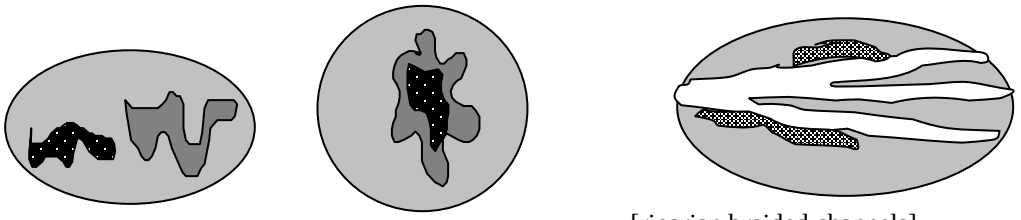
S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☐ Other: _____ **YES** multiplier is **2** **NO** multiplier is **1**	multiplier 2
S	**TOTAL - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**6**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the potential to reduce flooding and 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 ..... 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	6
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	0
S	**Total for S 3** *Add the points in the boxes above*	6
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	multiplier 2
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**12**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☒ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more ..... points = 4 3 structures ..... points = 2 2 structures ..... points = 1 1 structure ..... points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 ..... points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species..... points = 1 < 5 species ..... points = 0	1

DSD 002318

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	2
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 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 ☐ 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.*	4
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	10

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	3
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	10
TOTAL for H1 from page 14	10
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	**20**

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: Richards Creek Wetland – Wetland D Date of Site visit: 10/2016

Rated by: M. Foster, K. Crandall Trained by Ecology? Yes☒ No☐ Date of Training: 09/2014

SEC: 3, 4 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes☐ No ☒

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	20
Score for Hydrologic Functions	22
Score for Habitat Functions	21
TOTAL score for functions	**63**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

* The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

R	**Riverine and Freshwater Tidal Fringe Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
R	**R 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 52)***
R	**R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event:** ☐ Depressions cover >3/4 area of wetland .....points = 8 ☐ Depressions cover > 1/2 area of wetland .....points = 4 ☒ Depressions present but cover < 1/2 area of wetland.....points = 2 ☐ No depressions present .....points = 0	2
R	**R 1.2 Characteristics of the vegetation in the wetland (areas with > 90% cover at person height):** ☒ Forest or shrub > 2/3 the area of the wetland.....points = 8 ☐ Forest or shrub > 1/3 area of the wetland .....points = 6 ☐ Ungrazed, emergent plants > 2/3 area of wetland.....points = 6 ☐ Ungrazed emergent plants > 1/3 area of wetland.....points = 3 ☐ Forest, shrub, and ungrazed emergent < 1/3 area of wetland.....points = 0	8
R	**Total for R 1** *Add the points in the boxes above*	10
R	**R 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 53)*** 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.* ☐ Grazing in the wetland or within 150 ft ☒ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☒ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality ☐ Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	multiplier <u>2</u>
R	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from R 1 by R 2 ***Add score to table on p. 1***	**20**

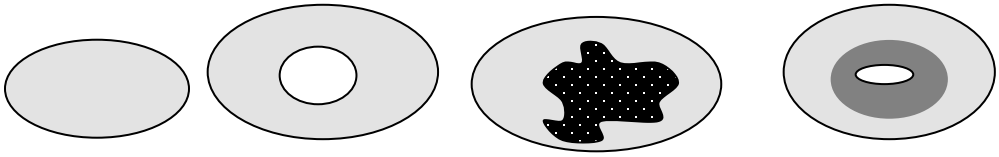
Comments

R	**Riverine and Freshwater Tidal Fringe Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	R 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 54)***
R	**R 3.1 Characteristics of the overbank storage the wetland provides:** *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (width of wetland)/(width of stream).* ☐ If the ratio is more than 20.....points = 9 ☐ If the ratio is between 10 – 20.....points = 6 ☒ If the ratio is 5- <10.....points = 4 ☐ If the ratio is 1- <5.....points = 2 ☐ If the ratio is < 1.....points = 1	4
R	**R 3.2 Characteristics of vegetation that slow down water velocities during floods:** *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description.* (polygons need to have >90% cover at person height NOT Cowardin classes) ☒ Forest or shrub for >1/3 area OR Emergent plants > 2/3 area.....points = 7 ☐ Forest or shrub for > 1/10 area OR Emergent plants > 1/3 area.....points = 4 ☐ Vegetation does not meet above criteria.....points = 0	7
R	**Total for R 3** *Add the points in the boxes above*	11
R	**R 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 57)*** Answer YES if the wetland is in a location in the watershed where the flood storage, or 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.* ☒ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ☒ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 57) multiplier <u>2</u>
R	**TOTAL - Hydrologic Functions** Multiply the score from R 3 by R 4 ***Add score to table on p. 1***	22

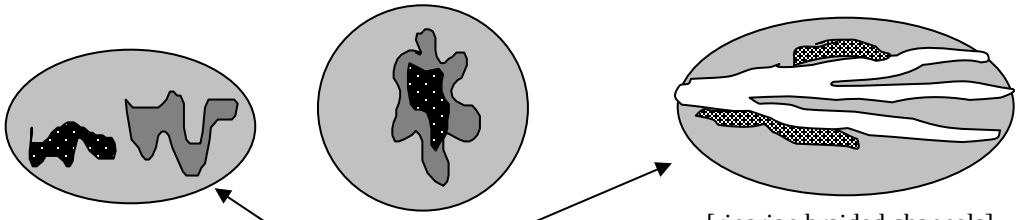
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☒ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more .....points = 4 3 structures .....points = 2 2 structures .....points = 1 1 structure .....points = 0	4
H 1.2. <u>Hydroperiods</u> *(see p. 73)* *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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.....points = 1 ☒ Saturated only — 1 types 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**	2
H 1.3. <u>Richness of Plant Species</u> *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle* If you counted: ☐ > 19 species points = 2 *List species below if you want to:* ☒ 5 - 19 species points = 1 ☐ < 5 species points = 0	1

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

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



☒High = 3 points [riparian braided channels]

NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".

3

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 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.

☐ 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.

3

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

13

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? ☐ YES = **1 point** ☒ NO = **0 points**	0

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW</u> *(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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description in WDFW PHS report p. 152*) ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock. ☐ **Old-growth/Mature forests:** (<u>Old-growth west of Cascade crest</u>) 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. (<u>Mature forests.</u>) 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

H 2.4 <u>Wetland Landscape</u> *(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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	13
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	21

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): Richards Creek Substation – Wetland H
Date of site visit: 7/1/2015, 5/8/2017

Rated by: R. Kahlo, A. Hoenig, K. Crandall Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 10 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	16
Score for Habitat Functions	21
TOTAL score for functions	**43**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

Wetland Type		Wetland Class	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	**X**
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above	**X**	Check if unit has multiple HGM classes present	

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.		X
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).		X
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X
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.		X

*The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/). Resident coastal cutthroat are mapped as occurring in the stream adjacent to this wetland.

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

☐☐NO – go to 5 ☒☐**YES –** The wetland class is **Slope**

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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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance*) *for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐☐ Grazing in the wetland or within 150 ft ☐☐ Untreated stormwater discharges to wetland ☐☐ Tilled fields, logging or orchards within 150 ft of wetland ☒☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒☐ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☐☐ Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	multiplier _2_
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**6**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 ..... 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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	multiplier 2
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐☐ Aquatic bed ☒☐ Emergent plants ☒☐ Scrub/shrub (areas where shrubs have >30% cover) ☒☐ Forested (areas where trees have >30% cover) ☐☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more ..... points = 4 3 structures ..... points = 2 2 structures ..... points = 1 1 structure ..... points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 ..... points = 1 ☒☐ Saturated only 1 types present…….points = 0 ☐☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐☐ Seasonally flowing stream in, or adjacent to, the wetland ☐☐ ***Lake-fringe wetland* = 2 points** ☐☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species..... points = 1 < 5 species ..... points = 0	2

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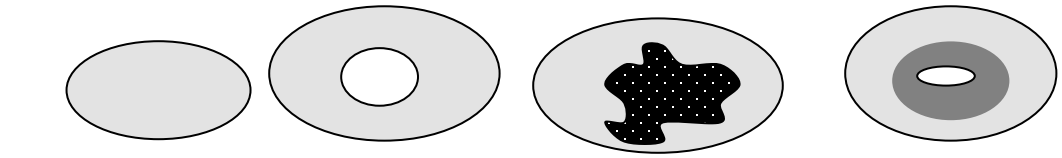
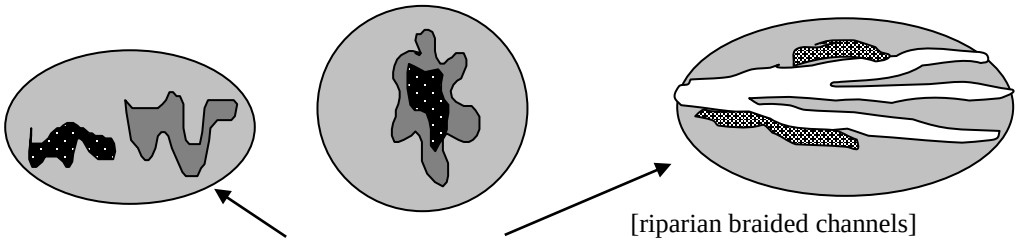
H 1.4. Interspersion of habitats ***(see p. 76)*** Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points  [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	3
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 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 ☐☐ 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.*	3
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	11

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	3
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	10
TOTAL for H1 from page 14	11
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	21

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? YES = Category I NO ☐ is not a bog for purpose of rating	**Cat. I**

DSD 002346

SC 4.0 Forested Wetlands *(see p. 90)*	
Does the wetland 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth	
YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions?	
☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet)	
YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Richards Creek Substation – Wetland A Date of site visit: 3/27/2016

Rated by: Katy Crandall Trained by Ecology? ☒Y ☐N Date of training: 09/2014

HGM Class used for rating: Slope Wetland has multiple HGM classes? ☒Y ☐N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map: King County iMap and Google Earth

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

1. Category of wetland based on FUNCTIONS

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

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H M (L)	H M (L)	H (M) L	
Landscape Potential	H (M) L	H (M) L	H M (L)	
Value	(H) M L	(H) M L	(H) M L	**TOTAL**
Score Based on Ratings	6	6	6	18

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

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I II**
Interdunal	**I II III IV**
None of the above	☒

Maps and figures required to answer questions correctly for Western Washington

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	2
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	3
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	3
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	2
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	8
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	9
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	10

DSD 002350

HGM Classification of Wetlands in Western Washington

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

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

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

   ☒NO – go to 2 ☐**YES** – the wetland class is **Tidal Fringe** – go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   ☒NO – go to 3 ☐**YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

   ☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ☒The wetland is on a slope (*slope can be very gradual*),
   ☒The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ☒The water leaves the wetland **without being impounded**.

   ☐NO – go to 5 ☒**YES –** The wetland class is **Slope**

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

5. Does the entire wetland unit **meet all** of the following criteria?
   ☐The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ☐The overbank flooding occurs at least once every 2 years.

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

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

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

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

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

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

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

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

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

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

SLOPE WETLANDS

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

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

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

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? ☒Yes = 1 ☐ No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources: refuse, turbid runoff observed, gravel pole yard, parking ☒Yes = 1 ☐ No = 0	1
Total for S 2 Add the points in the boxes above	2

Rating of Landscape Potential If score is: ☒**1-2 = M** ☐**0 = L** *Record the rating on the first page*

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

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

SLOPE WETLANDS

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

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually >1/8 in), or dense enough, to remain erect during surface flows.* ☐ Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 ☒ All other conditions points = 0	0

Rating of Site Potential If score is: ☐**1 = M** ☒**0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? ☒Yes = 1 ☐ No = 0	1

Rating of Landscape Potential If score is: ☒**1 = M** ☐**0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: ☒ The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 ☐ Surface flooding problems are in a sub-basin farther down-gradient points = 1 ☐ No flooding problems anywhere downstream points = 0	2
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? ☐Yes = 2 ☒ No = 0	0
Total for S 6 Add the points in the boxes above	2

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

NOTES and FIELD OBSERVATIONS:

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

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

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

☐ Aquatic bed	4 structures or more: points = 4
☒ Emergent	3 structures: points = 2
☒ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
☒ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4

H 1.2. Hydroperiods

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

☐ Permanently flooded or inundated	4 or more types present: points = 3
☐ Seasonally flooded or inundated	3 types present: points = 2
☒ Occasionally flooded or inundated	2 types present: points = 1
☒ Saturated only	1 type present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

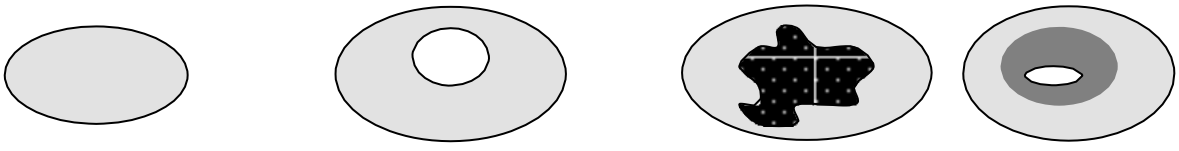
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:	☒ > 19 species	points = 2
	☐ 5 - 19 species	points = 1
	☐ < 5 species	points = 0

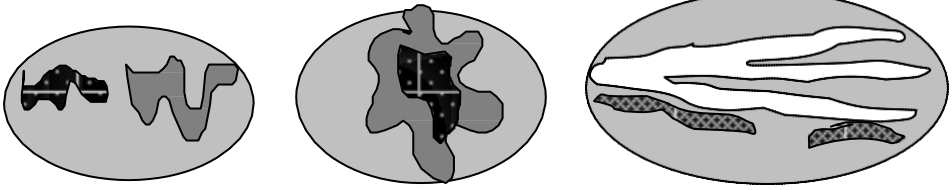
2

H 1.4. Interspersion of habitats

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



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



All three diagrams in this row are

☒ **HIGH** = 3points

3

DSD 002355

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☒ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☒ Standing snags (dbh > 4 in) within the wetland. ☒ Undercut banks are present for at least 6.6 ft (2 m) **AND/OR** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m). ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) **OR** signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed).* ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians).* ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*).	3
Total for H 1 Add the points in the boxes above	13

Rating of Site Potential If score is: ☐**15-18 = H** ☒**7-14 = M** ☐**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2] = **3.0% + 0%= 3.0%** If total accessible habitat is: ☐ > 1/3 (33.3%) of 1 km Polygon points = 3 ☐ 20-33% of 1 km Polygon points = 2 ☐ 10-19% of 1 km Polygon points = 1 ☒ < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2 **= 13.8% + (0%/2) = 13.8%** ☐ Undisturbed habitat > 50% of Polygon points = 3 ☐ Undisturbed habitat 10-50% and in 1-3 patches points = 2 ☒ Undisturbed habitat 10-50% and > 3 patches points = 1 ☐ Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If ☒ > 50% of 1 km Polygon is high intensity land use points = (- 2) ☐ ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

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

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

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

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

WDFW Priority Habitats

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

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

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi- layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☒ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☒ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

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

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Richards Creek Substation – Wetland B Date of site visit: 3/27/2017

Rated by: Katy Crandall Trained by Ecology? ☒Y ☐N Date of training: 09/2014

HGM Class used for rating: Slope Wetland has multiple HGM classes? ☐Y ☒N

NOTE: **Form is not complete without the figures requested** *(figures can be combined).*

Source of base aerial photo/map: King County iMap and Google Earth

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

1. Category of wetland based on FUNCTIONS

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

FUNCTION	Improving Water Quality			Hydrologic			Habitat			TOTAL
	Circle the appropriate ratings									
Site Potential	H	M	(L)	H	(M)	L	H	M	(L)	
Landscape Potential	H	M	(L)	H	M	(L)	H	M	(L)	
Value	(H)	M	L	(H)	M	L	(H)	M	L	
Score Based on Ratings	5			6			5			16

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

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	☒

Maps and figures required to answer questions correctly for Western Washington

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	2
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	3
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	3
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	2
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	8
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	9
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	10

HGM Classification of Wetlands in Western Washington

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

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

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

   ☒NO – go to 2 ☐**YES** – the wetland class is **Tidal Fringe** – go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   ☒NO – go to 3 ☐**YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

   ☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ☒The wetland is on a slope (*slope can be very gradual*),
   ☒The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ☒The water leaves the wetland **without being impounded**.

   ☐NO – go to 5 ☒**YES –** The wetland class is **Slope**

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

5. Does the entire wetland unit **meet all** of the following criteria?
   ☐The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ☐The overbank flooding occurs at least once every 2 years.

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

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

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

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

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

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

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

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

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

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

SLOPE WETLANDS

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

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

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

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? ☐Yes = 1 ☒ No = 0	0
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources_____ ☐Yes = 1 ☒ No = 0	0
Total for S 2 Add the points in the boxes above	0

Rating of Landscape Potential If score is: ☐**1-2 = M** ☒**0 = L** *Record the rating on the first page*

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

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

SLOPE WETLANDS

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

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually >1/8 in), or dense enough, to remain erect during surface flows.* ☒ Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 ☐ All other conditions points = 0	1

Rating of Site Potential If score is: ☒**1 = M** ☐**0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? ☐Yes = 1 ☒ No = 0	0

Rating of Landscape Potential If score is: ☐**1 = M** ☒**0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: ☒ The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 ☐ Surface flooding problems are in a sub-basin farther down-gradient points = 1 ☐ No flooding problems anywhere downstream points = 0	2
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? ☐Yes = 2 ☒ No = 0	0
Total for S 6 Add the points in the boxes above	2

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

NOTES and FIELD OBSERVATIONS:

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

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

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

☐ Aquatic bed	4 structures or more: points = 4
☐ Emergent	3 structures: points = 2
☒ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
☒ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

2

H 1.2. Hydroperiods

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

☐ Permanently flooded or inundated	4 or more types present: points = 3
☐ Seasonally flooded or inundated	3 types present: points = 2
☒ Occasionally flooded or inundated	2 types present: points = 1
☒ Saturated only	1 type present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

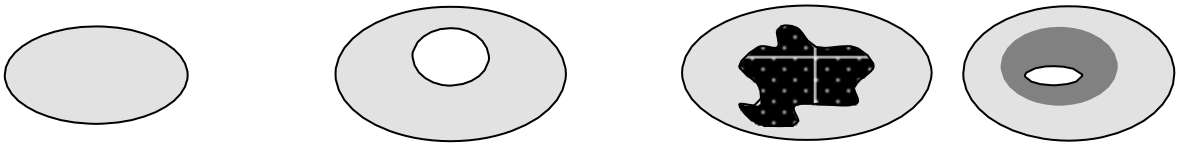
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:	☐ > 19 species	points = 2
	☒ 5 - 19 species	points = 1
	☐ < 5 species	points = 0

1

H 1.4. Interspersion of habitats

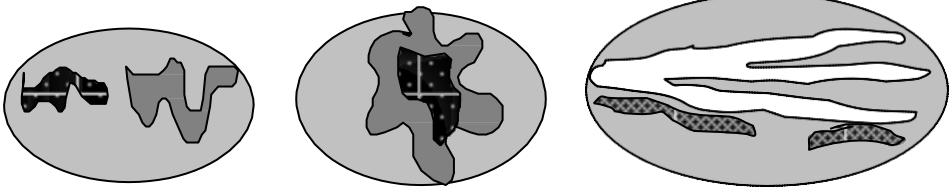
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always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



☐ **None** = 0 points ☒ **Low** = 1 point ☐ **Moderate** = 2 points

All three diagrams in this row are

☐ **HIGH** = 3points



1

DSD 002364

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

Rating of Site Potential If score is: ☐**15-18 = H** ☐**7-14 = M** ☒**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2] = **3.0% + (0%/2) = 3.0%** If total accessible habitat is: ☐ > 1/3 (33.3%) of 1 km Polygon points = 3 ☐ 20-33% of 1 km Polygon points = 2 ☐ 10-19% of 1 km Polygon points = 1 ☒ < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2 **= 13.8% + (0%/2) = 13.8%** ☐ Undisturbed habitat > 50% of Polygon points = 3 ☐ Undisturbed habitat 10-50% and in 1-3 patches points = 2 ☒ Undisturbed habitat 10-50% and > 3 patches points = 1 ☐ Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If ☒ > 50% of 1 km Polygon is high intensity land use points = (- 2) ☐ ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

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

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

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

WDFW Priority Habitats

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

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

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi- layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☒ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☒ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

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

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Richards Creek Substation – Wetland C Date of site visit: 3/27/2017

Rated by: Katy Crandall Trained by Ecology? ☒Y ☐N Date of training: 09/2014

HGM Class used for rating: Slope Wetland has multiple HGM classes? ☒Y ☐N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map: King County iMap and Google Earth

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

1. Category of wetland based on FUNCTIONS

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

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		Circle the appropriate ratings		
Site Potential	H M (L)	H (M) L	H (M) L	
Landscape Potential	H (M) L	H M (L)	H M (L)	
Value	(H) M L	(H) M L	(H) M L	**TOTAL**
Score Based on Ratings	6	6	6	18

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

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I II**
Interdunal	**I II III IV**
None of the above	☒

Maps and figures required to answer questions correctly for Western Washington

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	2
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	3
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	3
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	2
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	8
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	9
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	10

HGM Classification of Wetlands in Western Washington

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

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

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

   ☒NO – go to 2 ☐**YES** – the wetland class is **Tidal Fringe** – go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   ☒NO – go to 3 ☐**YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

   ☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ☒The wetland is on a slope (*slope can be very gradual*),
   ☒The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ☒The water leaves the wetland **without being impounded**.

   ☐NO – go to 5 ☒**YES –** The wetland class is **Slope**

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

5. Does the entire wetland unit **meet all** of the following criteria?
   ☐The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ☐The overbank flooding occurs at least once every 2 years.

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

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

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

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

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

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

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

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

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

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

SLOPE WETLANDS

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

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

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

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? ☐Yes = 1 ☒ No = 0	0
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources Stream conveying roadway and urban runoff ☒Yes = 1 ☐ No = 0	1
Total for S 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ☒**1-2 = M** ☐**0 = L** *Record the rating on the first page*

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

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

SLOPE WETLANDS

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

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually >1/8 in), or dense enough, to remain erect during surface flows.* ☒ Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 ☐ All other conditions points = 0	1

Rating of Site Potential If score is: ☒**1 = M** ☐**0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? ☐Yes = 1 ☒ No = 0	0

Rating of Landscape Potential If score is: ☐**1 = M** ☒**0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: ☒ The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 ☐ Surface flooding problems are in a sub-basin farther down-gradient points = 1 ☐ No flooding problems anywhere downstream points = 0	2
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? ☐Yes = 2 ☒ No = 0	0
Total for S 6 Add the points in the boxes above	2

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

NOTES and FIELD OBSERVATIONS:

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

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

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

☐ Aquatic bed	4 structures or more: points = 4
☐ Emergent	3 structures: points = 2
☒ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
☒ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

2

H 1.2. Hydroperiods

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

☐ Permanently flooded or inundated	4 or more types present: points = 3
☐ Seasonally flooded or inundated	3 types present: points = 2
☒ Occasionally flooded or inundated	2 types present: points = 1
☒ Saturated only	1 type present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

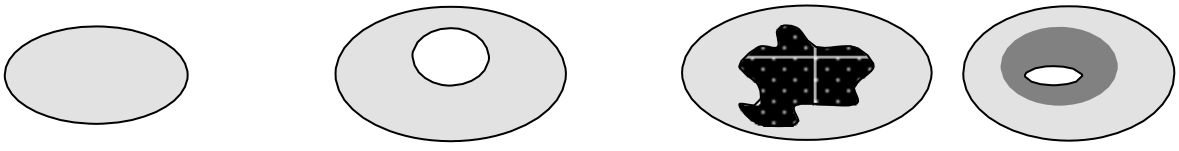
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:	☐ > 19 species	points = 2
	☒ 5 - 19 species	points = 1
	☐ < 5 species	points = 0

1

H 1.4. Interspersion of habitats

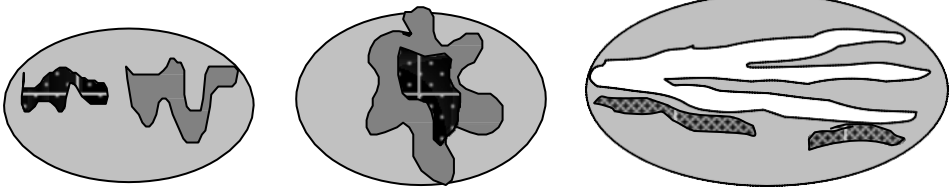
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always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



☐ **None** = 0 points ☐ **Low** = 1 point ☒ **Moderate** = 2 points

All three diagrams in this row are

☐ **HIGH** = 3points



2

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

Rating of Site Potential If score is: ☐**15-18 = H** ☒**7-14 = M** ☐**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2] = **3.0% + (0%/2) = 3.0%** If total accessible habitat is: ☐ > 1/3 (33.3%) of 1 km Polygon points = 3 ☐ 20-33% of 1 km Polygon points = 2 ☐ 10-19% of 1 km Polygon points = 1 ☒ < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2 **= 13.8% + (0%/2) = 13.8%** ☐ Undisturbed habitat > 50% of Polygon points = 3 ☐ Undisturbed habitat 10-50% and in 1-3 patches points = 2 ☒ Undisturbed habitat 10-50% and > 3 patches points = 1 ☐ Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If ☒ > 50% of 1 km Polygon is high intensity land use points = (- 2) ☐ ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

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

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

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

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

WDFW Priority Habitats

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

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

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☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

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☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

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

RATING SUMMARY – Western Washington

Name of wetland: Richards Creek Substation – Wetland D Date of site visit: 10/10/2016, 5/8/2017

Rated by: M. Foster, K. Crandall Trained by Ecology? ☒Y ☐N Date of training: 09/2014

HGM Class used for rating: Riverine Wetland has multiple HGM classes? ☐Y ☒N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map: King County iMap and Google Earth

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

1. Category of wetland based on FUNCTIONS

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

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	H (M) L	H (M) L	
Landscape Potential	(H) M L	H (M) L	H M (L)	
Value	H (M) L	(H) M L	(H) M L	**TOTAL**
Score Based on Ratings	7	7	6	20

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

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	☒

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	4
Hydroperiods	H 1.2	5
Ponded depressions	R 1.1	5
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	4
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	6
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	5
Map of the contributing basin	R 2.2, R 2.3, R 5.2	7
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	8
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	9
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	10

HGM Classification of Wetlands in Western Washington

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

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

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

   ☒NO – go to 2 ☐**YES** – the wetland class is **Tidal Fringe** – go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   ☒NO – go to 3 ☐**YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

   ☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ☐The wetland is on a slope (*slope can be very gradual*),
   ☐The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ☐The water leaves the wetland **without being impounded**.

   ☒NO – go to 5 ☐**YES –** The wetland class is **Slope**

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

5. Does the entire wetland unit **meet all** of the following criteria?
   ☒The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ☒The overbank flooding occurs at least once every 2 years.

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

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

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

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

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

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

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

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

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

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

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: ☐ Depressions cover > 3/4 area of wetland points = 8 ☐ Depressions cover > 1/2 area of wetland points = 4 ☒ Depressions present but cover < 1/2 area of wetland points = 2 ☐ No depressions present points = 0	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) ☒ Trees or shrubs > 2/3 area of the wetland points = 8 ☐ Trees or shrubs > 1/3 area of the wetland points = 6 ☐ Herbaceous plants (> 6 in high) > 2/3 area of the wetland points = 6 ☐ Herbaceous plants (> 6 in high) > 1/3 area of the wetland points = 3 ☐ Trees, shrubs, and ungrazed herbaceous < 1/3 area of the wetland points = 0	8
Total for R 1 Add the points in the boxes above	10

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

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? ☒Yes = 2 ☐ No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? ☒Yes = 1 ☐ No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? ☐Yes = 1 ☒ No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? ☒Yes = 1 ☐ No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4 Other sources: ☐Yes = 1 ☒ No = 0	0
Total for R 2 Add the points in the boxes above	4

Rating of Landscape Potential If score is: ☒**3-6 = H** ☐**1 or 2 = M** ☐**0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? ☒Yes = 1 ☐ No = 0	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? ☐Yes = 1 ☒ No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (A*nswer **YES** if there is a TMDL for the drainage in which the unit is found*) ☐Yes = 2 ☒ No = 0	0
Total for R 3 Add the points in the boxes above	1

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

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

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

R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* ☐ If the ratio is more than 20 points = 9 ☐ If the ratio is 10-20 points = 6 ☒ If the ratio is 5-<10 points = 4 ☐ If the ratio is 1-<5 points = 2 ☐ If the ratio is < 1 points = 1	4
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* ☒ Forest or shrub for > 1/3 area OR emergent plants > 2/3 area points = 7 ☐ Forest or shrub for > 1/10 area OR emergent plants > 1/3 area points = 4 ☐ Plants do not meet above criteria points = 0	7
Total for R 4 Add the points in the boxes above	11

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

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

R 5.1. Is the stream or river adjacent to the wetland downcut? ☒Yes = 0 ☐ No = 1	0
R 5.2. Does the up-gradient watershed include a UGA or incorporated area? ☒Yes = 1 ☐ No = 0	1
R 5.3. Is the up-gradient stream or river controlled by dams? ☐Yes = 0 ☒ No = 1	1
Total for R 5 Add the points in the boxes above	2

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

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

R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* ☒ The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 ☐ Surface flooding problems are in a sub-basin farther down-gradient points = 1 ☐ No flooding problems anywhere downstream points = 0	2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? ☐Yes = 2 ☒ No = 0	0
Total for R 6 Add the points in the boxes above	2

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

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

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

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

☐ Aquatic bed	4 structures or more: points = 4
☒ Emergent	3 structures: points = 2
☒ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
☒ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4

H 1.2. Hydroperiods

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

☐ Permanently flooded or inundated	4 or more types present: points = 3
☐ Seasonally flooded or inundated	3 types present: points = 2
☒ Occasionally flooded or inundated	2 types present: points = 1
☒ Saturated only	1 type present: points = 0
☒ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

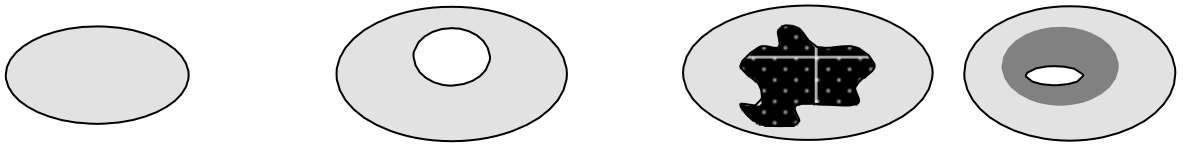
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:	☐ > 19 species	points = 2
	☒ 5 - 19 species	points = 1
	☐ < 5 species	points = 0

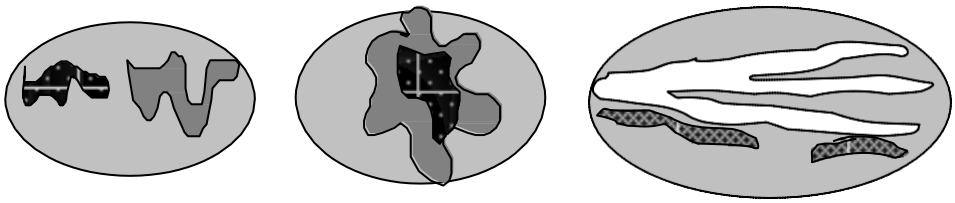
1

H 1.4. Interspersion of habitats

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



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



All three diagrams in this row are

☒ **HIGH** = 3points

3

DSD 002382

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☒ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☒ Standing snags (dbh > 4 in) within the wetland. ☒ Undercut banks are present for at least 6.6 ft (2 m) **AND/OR** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m). ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) **OR** signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed).* ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians).* ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*).	3
Total for H 1 Add the points in the boxes above	13

Rating of Site Potential If score is: ☐**15-18 = H** ☒**7-14 = M** ☐**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2] = **3.0% + (0%/2) = 3.0%** If total accessible habitat is: ☐ > 1/3 (33.3%) of 1 km Polygon points = 3 ☐ 20-33% of 1 km Polygon points = 2 ☐ 10-19% of 1 km Polygon points = 1 ☒ < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2 **= 13.8% + (0%/2) = 13.8%** ☐ Undisturbed habitat > 50% of Polygon points = 3 ☐ Undisturbed habitat 10-50% and in 1-3 patches points = 2 ☒ Undisturbed habitat 10-50% and > 3 patches points = 1 ☐ Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If ☒ > 50% of 1 km Polygon is high intensity land use points = (- 2) ☐ ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

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

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

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

WDFW Priority Habitats

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

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

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi- layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☒ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☒ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

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

RATING SUMMARY – Western Washington

Name of wetland: Richards Creek Substation – Wetland H Date of site visit: 7/1/2015, 5/8/2017

Rated by: R. Kahlo, A. Hoenig, K. Crandall Trained by Ecology? ☒Y ☐N Date of training: 09/2014

HGM Class used for rating: Slope Wetland has multiple HGM classes? ☐Y ☒N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map: King County iMap and Google Earth

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

1. Category of wetland based on FUNCTIONS

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

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H M (L)	H (M) L	H (M) L	
Landscape Potential	H (M) L	H M (L)	H M (L)	
Value	(H) M L	(H) M L	(H) M L	**TOTAL**
Score Based on Ratings	6	6	6	18

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

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	☒

Maps and figures required to answer questions correctly for Western Washington

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	4
Hydroperiods	H 1.2	5
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	6
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	6
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	4
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	8
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	9
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	10

HGM Classification of Wetlands in Western Washington

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

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

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

   ☒NO – go to 2 ☐**YES** – the wetland class is **Tidal Fringe** – go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   ☒NO – go to 3 ☐**YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

   ☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ☒The wetland is on a slope (*slope can be very gradual*),
   ☒The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ☒The water leaves the wetland **without being impounded**.

   ☐NO – go to 5 ☒**YES –** The wetland class is **Slope**

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

5. Does the entire wetland unit **meet all** of the following criteria?
   ☐The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ☐The overbank flooding occurs at least once every 2 years.

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

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

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

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

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

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

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

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

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

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

SLOPE WETLANDS

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

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

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

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? ☒Yes = 1 ☐ No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources_____ ☐Yes = 1 ☒ No = 0	0
Total for S 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ☒**1-2 = M** ☐**0 = L** *Record the rating on the first page*

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

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

SLOPE WETLANDS

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

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually >1/8 in), or dense enough, to remain erect during surface flows.* ☒ Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 ☐ All other conditions points = 0	1

Rating of Site Potential If score is: ☒**1 = M** ☐**0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? ☐Yes = 1 ☒ No = 0	0

Rating of Landscape Potential If score is: ☐**1 = M** ☒**0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: ☒ The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 ☐ Surface flooding problems are in a sub-basin farther down-gradient points = 1 ☐ No flooding problems anywhere downstream points = 0	2
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? ☐Yes = 2 ☒ No = 0	0
Total for S 6 Add the points in the boxes above	2

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

NOTES and FIELD OBSERVATIONS:

DSD 002390

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

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

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

☐ Aquatic bed	4 structures or more: points = 4
☒ Emergent	3 structures: points = 2
☒ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
☒ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

2

H 1.2. Hydroperiods

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

☐ Permanently flooded or inundated	4 or more types present: points = 3
☐ Seasonally flooded or inundated	3 types present: points = 2
☒ Occasionally flooded or inundated	2 types present: points = 1
☒ Saturated only	1 type present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

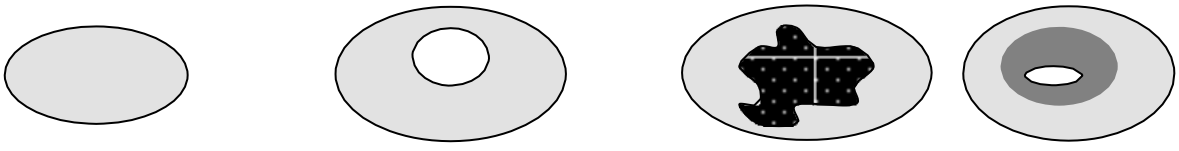
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:	☒ > 19 species	points = 2
	☐ 5 - 19 species (SASC, TEGR, BUTTERFLY BUSH, EQGI, GAAP, RUAR)	points = 1
	☐ < 5 species	points = 0

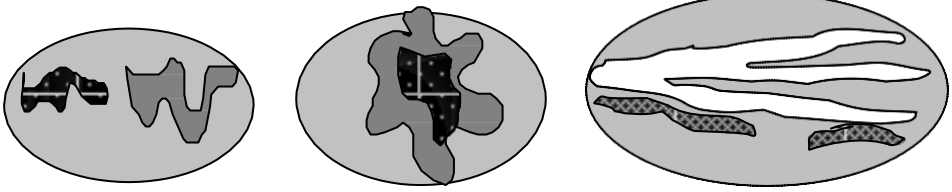
2

H 1.4. Interspersion of habitats

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



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



All three diagrams in this row are

☒ **HIGH** = 3points

3

DSD 002391

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☒ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☒ Standing snags (dbh > 4 in) within the wetland. ☒ Undercut banks are present for at least 6.6 ft (2 m) **AND/OR** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m). ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) **OR** signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed).* ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians).* ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*).	3
Total for H 1 Add the points in the boxes above	11

Rating of Site Potential If score is: ☐**15-18 = H** ☒**7-14 = M** ☐**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2] = **3.0% + (0%/2) = 3%** If total accessible habitat is: ☐ > 1/3 (33.3%) of 1 km Polygon points = 3 ☐ 20-33% of 1 km Polygon points = 2 ☐ 10-19% of 1 km Polygon points = 1 ☒ < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat + [(%moderate and low intensity land uses)/2 **= 13.8% + (0%/2) = 13.8%** ☐ Undisturbed habitat > 50% of Polygon points = 3 ☐ Undisturbed habitat 10-50% and in 1-3 patches points = 2 ☒ Undisturbed habitat 10-50% and > 3 patches points = 1 ☐ Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If ☒ > 50% of 1 km Polygon is high intensity land use points = (- 2) ☐ ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

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

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

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

WDFW Priority Habitats

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

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

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi- layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☒ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☒ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

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

2014 Ecology Wetland Rating Form Figures

PSE Richards Creek Substation

Wetlands A, B, and C (Slope) 1

Figure 1. Cowardin plant classes – H1.1, H1.4 1

Figure 2. Hydroperiods and 150-foot buffer – H1.2, S2.1, S5.1 2

Figure 3. Plant cover of dense and rigid trees, shrubs, and herbaceous plants – S1.3, S4.1 3

Wetlands D (Riverine) and H (Slope) 4

Figure 4. Cowardin plant classes and 150-ft buffer – H1.1, H1.4, R2.4, S2.1, S5.1 4

Figure 5. Hydroperiods, ponded depressions, and wetland-width-to-stream-width ratio – H1.2, R1.1, R4.1 5

Figure 6. Plant cover of trees, shrubs, and herbaceous plants (not Cowardin) – R1.2, R4.2, S1.3, S4.1 6

Figure 7. Map of the contributing basin (for Wetland D only) – R2.2, R2.3, R5.2 7

All Wetlands 8

Figure 8. Undisturbed habitat and moderate-low intensity land uses within 1 km from wetland edge including polygon for accessible habitat – H2.1, H2.2, H2.3 (move to all). 8

Figure 9. Screen-capture of 303(d) listed waters in basin – S3.1, S3.2 9

Figure 10. Screen-capture of TMDL list for WRIA in which unit is found – S3.3, R3.1 10

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WETLANDS A, B, AND C (SLOPE)

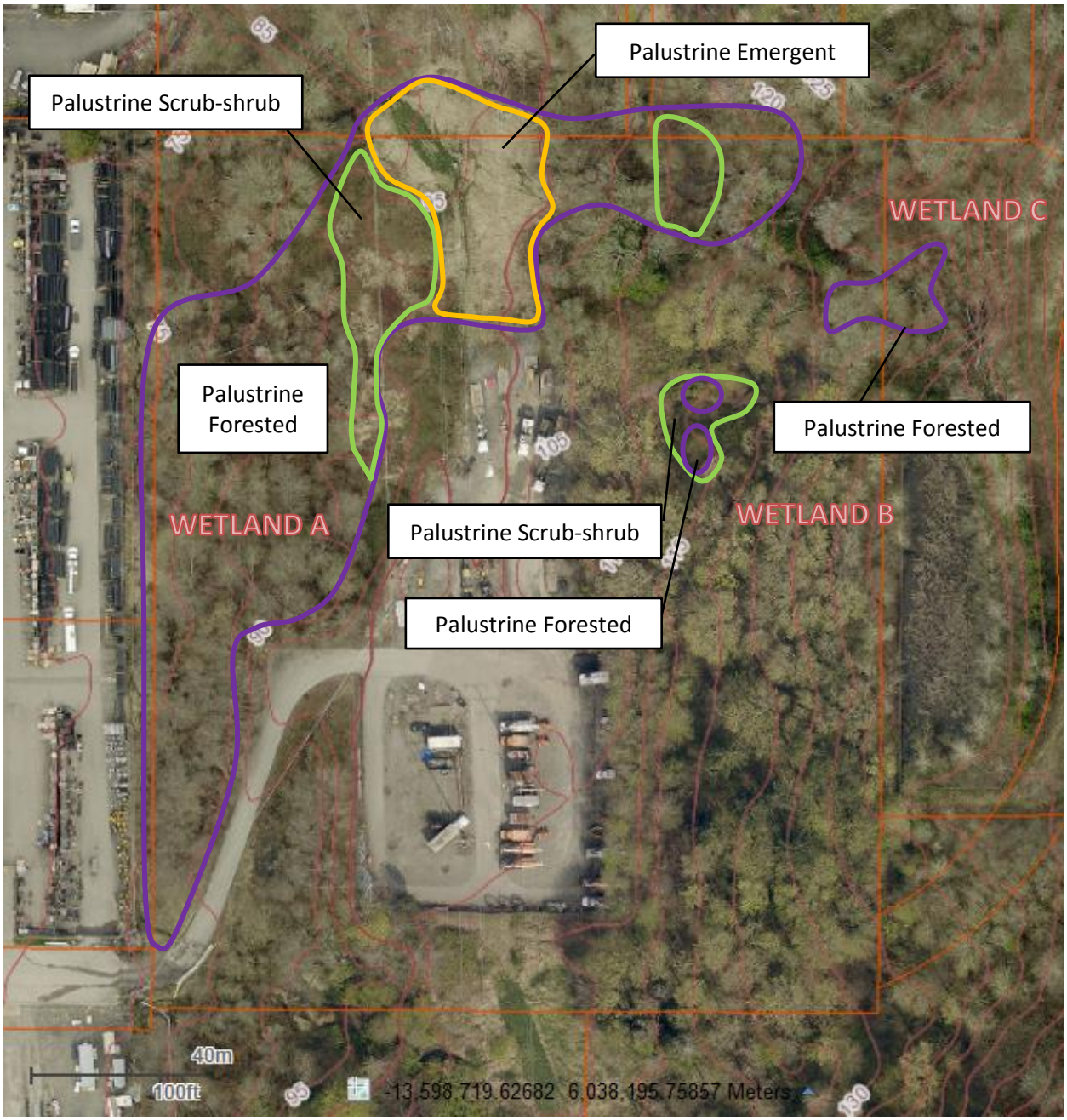


Figure 1. Cowardin plant classes – H1.1, H1.4

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

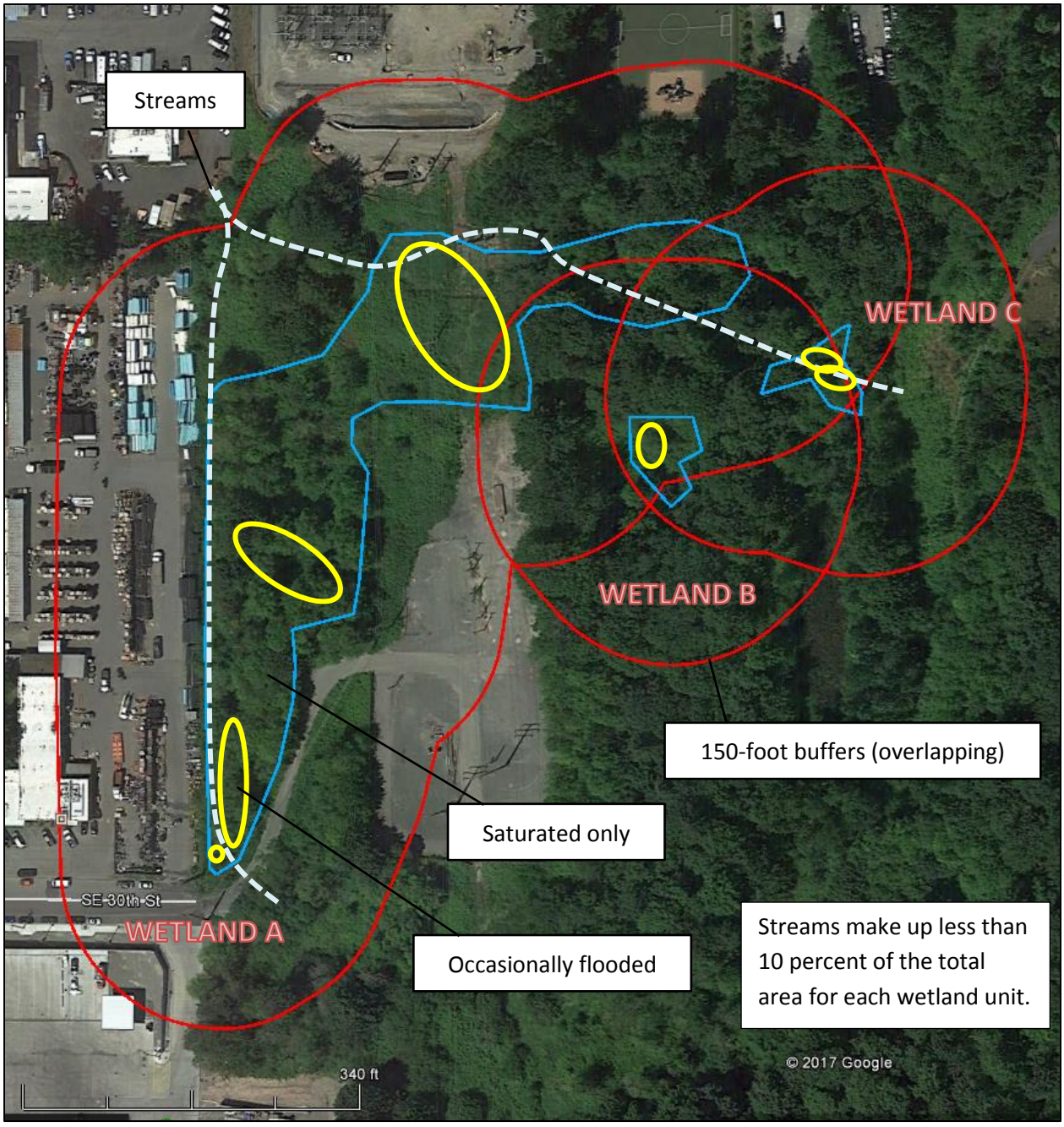


Figure 2. Hydroperiods and 150-foot buffer – H1.2, S2.1, S5.1

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

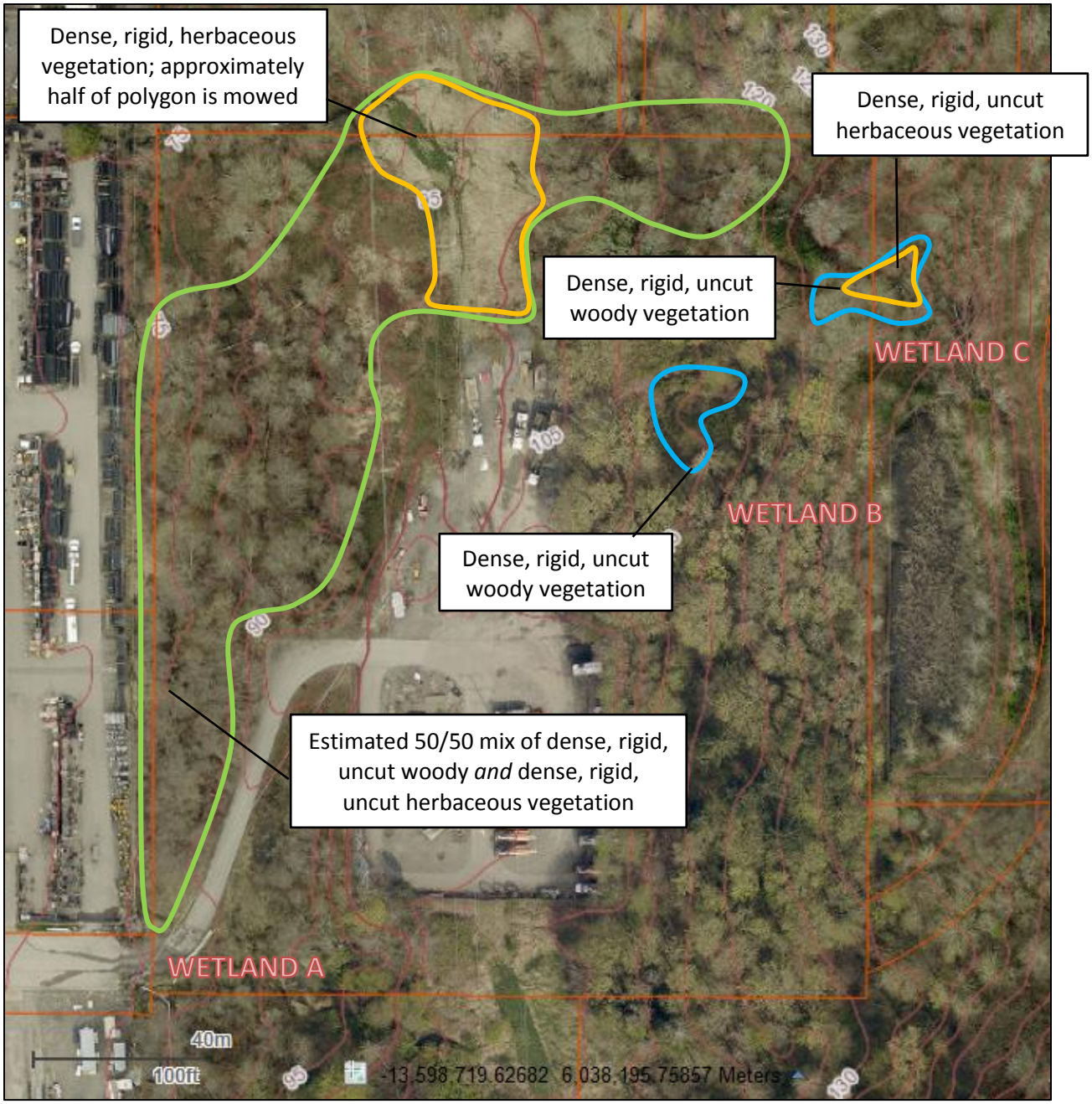


Figure 3. Plant cover of dense and rigid trees, shrubs, and herbaceous plants – S1.3, S4.1

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

WETLANDS D (RIVERINE) AND H (SLOPE)

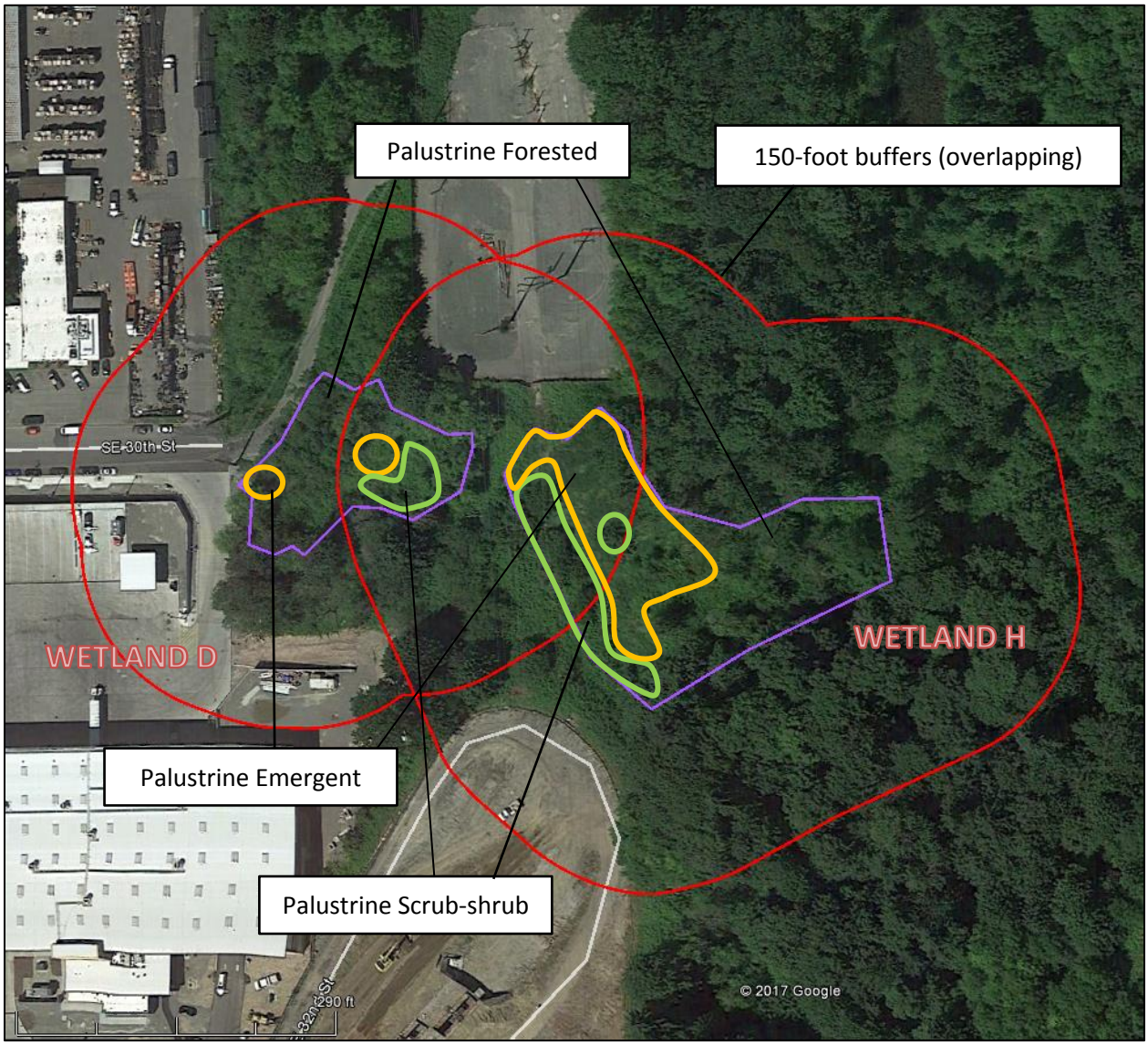


Figure 4. Cowardin plant classes and 150-ft buffer – H1.1, H1.4, R2.4, S2.1, S5.1

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

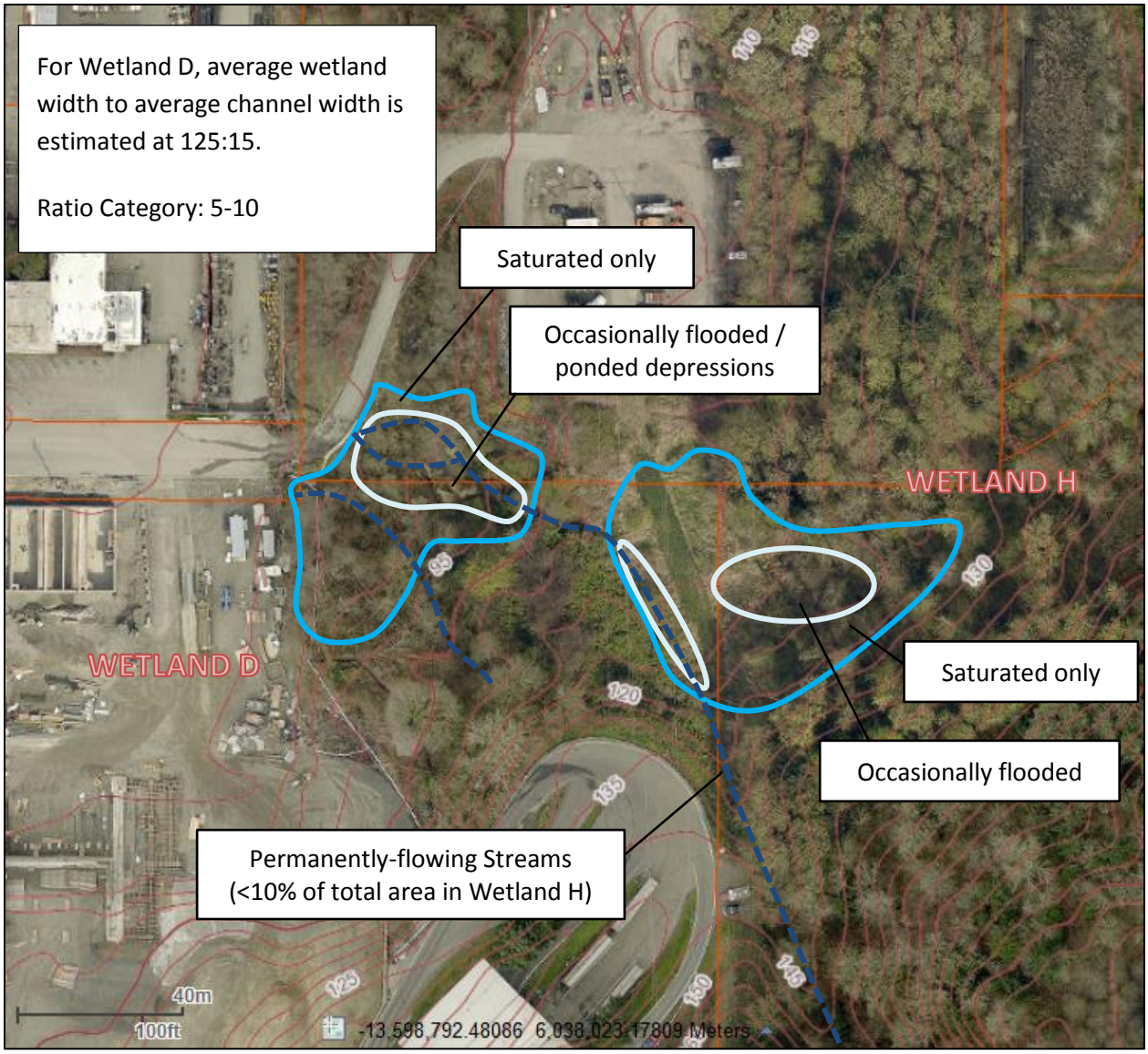


Figure 5. Hydroperiods, ponded depressions, and wetland-width-to-stream-width ratio – H1.2, R1.1, R4.1

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

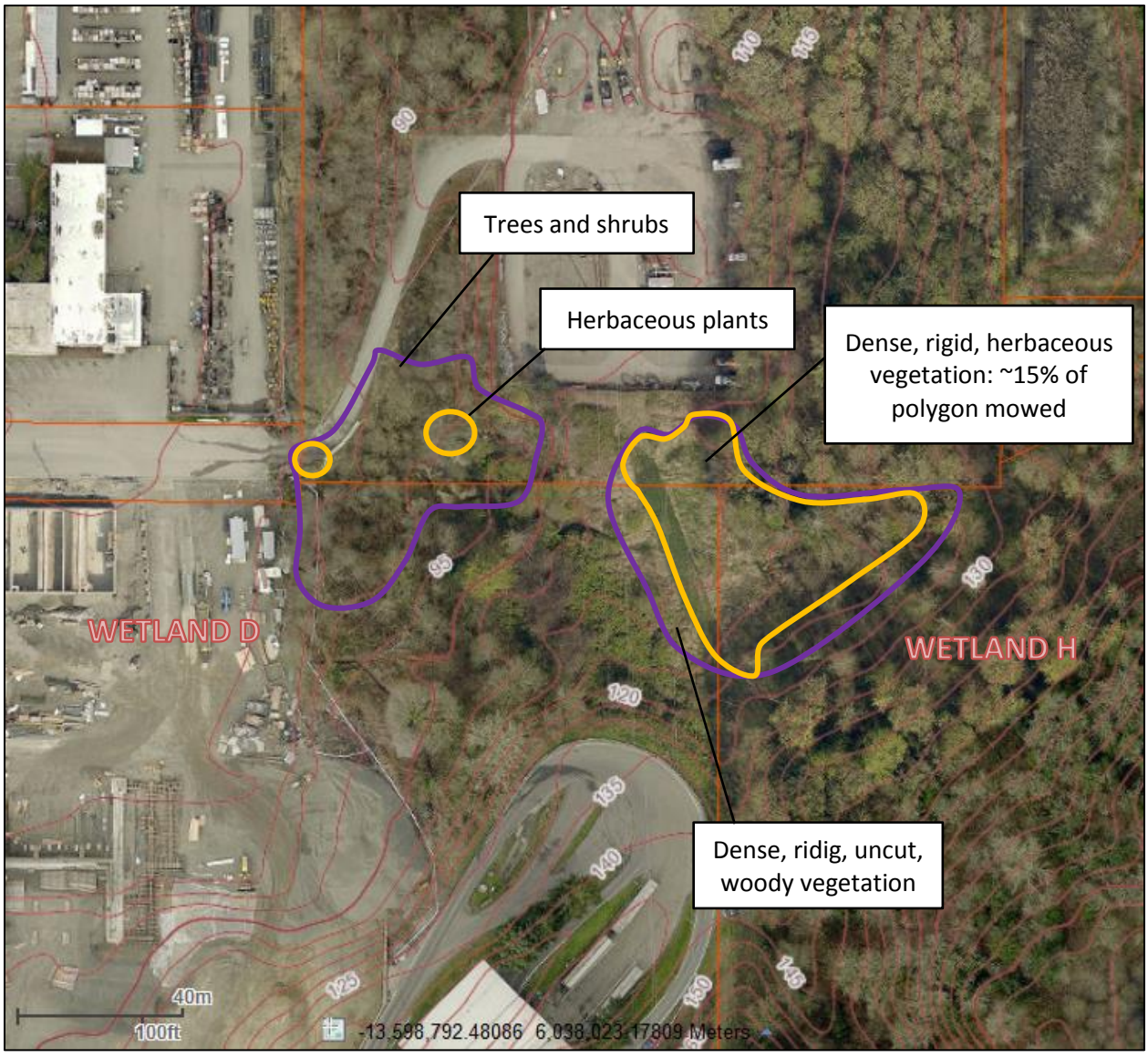


Figure 6. Plant cover of trees, shrubs, and herbaceous plants (not Cowardin) – R1.2, R4.2, S1.3, S4.1

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

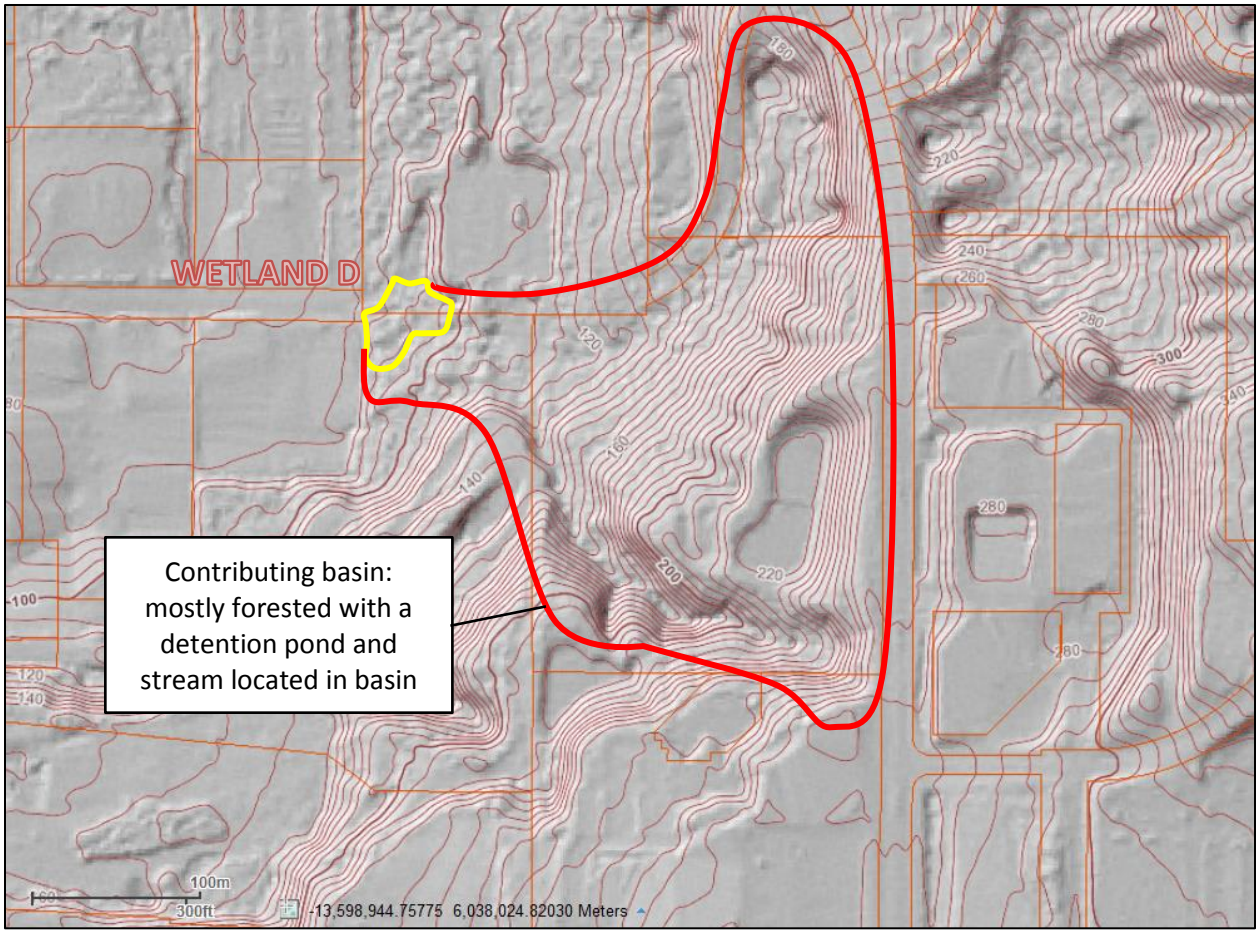


Figure 7. Map of the contributing basin (for Wetland D only) – R2.2, R2.3, R5.2

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

ALL WETLANDS

Figure 8. Undisturbed habitat and moderate-low intensity land uses within 1 km from wetland edge including polygon for accessible habitat – H2.1, H2.2, H2.3 (move to all).

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

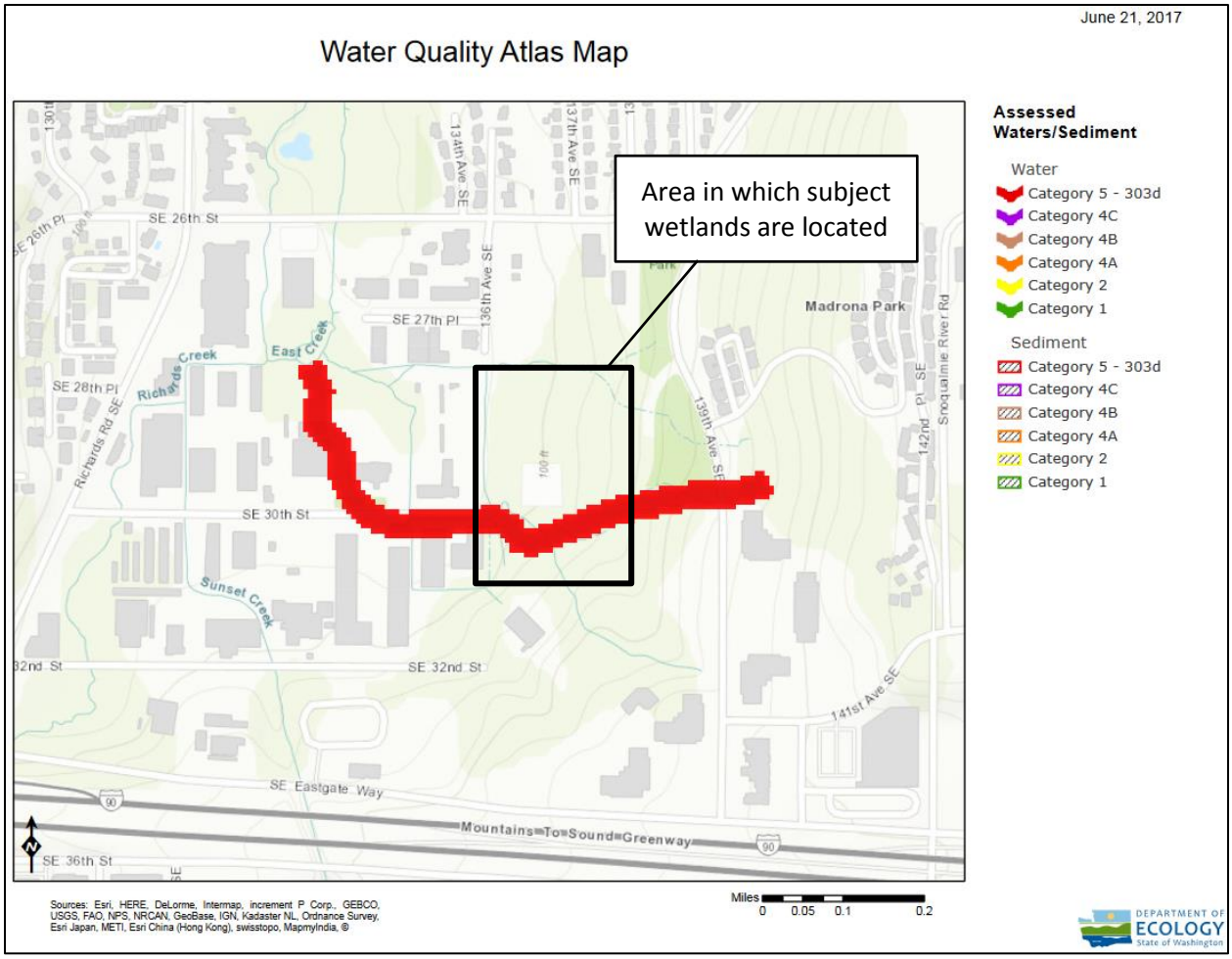


Figure 9. Screen-capture of 303(d) listed waters in basin – S3.1, S3.2

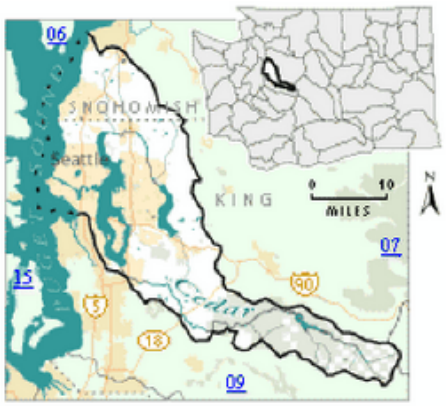
Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

Water Quality Improvement Projects (TMDLs)

Water Quality Improvement > Water Quality Improvement Projects by WRIA > WRIA 8: Cedar-Sammamish

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

All wetlands located in the Kelsey Creek / Mercer Slough Basin of WRIA 8

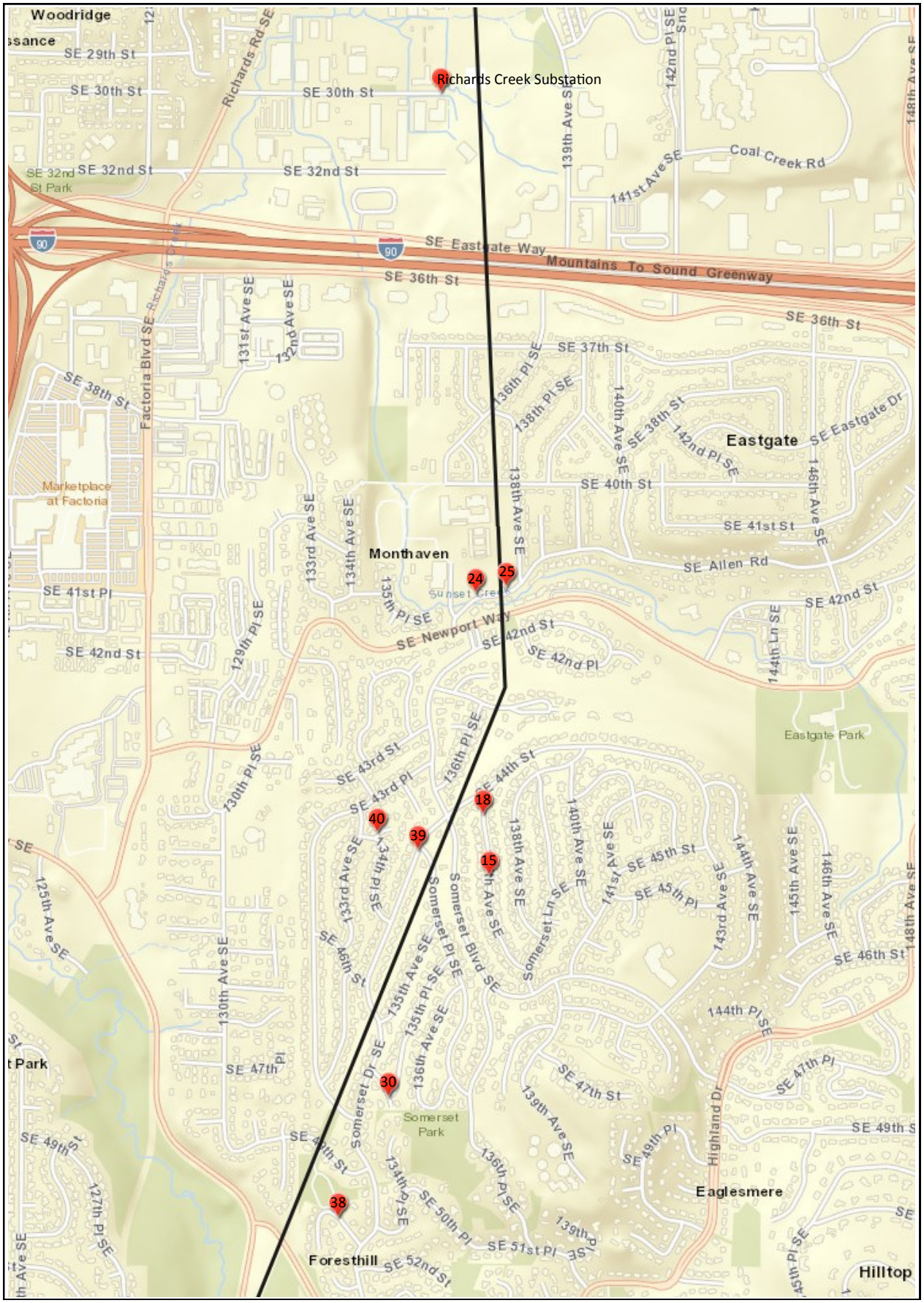
Waterbody Name	Pollutants	Status**	TMDL Lead
Ballinger Lake	Total Phosphorus	Approved by EPA	Tricia Shoblom 425-649-7288
Bear-Evans Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
	Dissolved Oxygen Temperature	Approved by EPA	
Cottage Lake	Total Phosphorus	Approved by EPA Has an implementation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

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

Figure 10. Screen-capture of TMDL list for WRIA in which unit is found – S3.3, R3.1

Features depicted are not be to scale. Sketches are based on available data and best professional judgment.

PSE EE230 Photo Simulations Reference Map



DSD 002406

Existing Conditions

Conceptual Project

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 8/4/2017

Address	**13440 SE 30th St, Bellevue**
Date	**7/24/2017**
Time	**1:23 PM**
Viewing Direction	**East**
Existing Pole Heights	**~65-70 feet**
Proposed Pole Heights	**~70-100 feet**

Richards Creek SUBSTATION

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002407

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 7/6/2017

Address	**4489 137th Ave SE, Bellevue**
Date	**4/10/2014**
Time	**9:32 AM**
Viewing Direction	**North**
Existing Pole Heights	**~55 feet**
Proposed Pole Heights	**~80 feet**

KOP CENTRAL 15 SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002408

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 7/6/2017

Address	**4489 137th Ave SE, Bellevue**
Date	**4/10/2014**
Time	**9:32 AM**
Viewing Direction	**North**
Existing Pole Heights	**~55 feet**
Proposed Pole Heights	**~80 feet**

KOP CENTRAL 15 SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002409

KOP CENTRAL 18
SEGMENT 2

Address	**4411 137th Ave SE, Bellevue**
Date	**5/7/2014**
Time	**10:53 AM**
Viewing Direction	**Northwest**
Existing Pole Heights	**~55 feet**
Proposed Pole Heights	**~80 feet**

energizeEASTSIDE

PUGET SOUND ENERGY

DSD 002410

KOP CENTRAL 18
SEGMENT 2

Address	**4411 137th Ave SE, Bellevue**
Date	**5/7/2014**
Time	**10:53 AM**
Viewing Direction	**Northwest**
Existing Pole Heights	**~55 feet**
Proposed Pole Heights	**~80 feet**

energizeEASTSIDE

PUGET SOUND ENERGY

DSD 002411

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 7/13/2017

Address	**13630 SE Allen Rd, Bellevue**
Date	**3/30/2016**
Time	**1:44 PM**
Viewing Direction	**Northeast**
Existing Pole Heights	**~60 feet**
Proposed Pole Heights	**~95 feet**

KOP SOUTH 24 SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002412

Existing Conditions

Conceptual Project

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 7/13/2017

Address	**4730 134th Place SE, Bellevue**
Date	**8/24/2016**
Time	**3:28 PM**
Viewing Direction	**West**
Existing Pole Heights	**~44 feet**
Proposed Pole Heights	**~75 feet**

KOP CENTRAL 30
SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002413

Existing Conditions

Conceptual Project

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 7/13/2017

Address	**4730 134th Place SE, Bellevue**
Date	**8/24/2016**
Time	**3:28 PM**
Viewing Direction	**West**
Existing Pole Heights	**~44 feet**
Proposed Pole Heights	**~75 feet**

KOP CENTRAL 30
SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002414

Existing Conditions

Conceptual Project

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 8/4/2017

Address	**13233 SE 51st Pl, Bellevue**
Date	**7/24/2017**
Time	**2:21 PM**
Viewing Direction	**Northwest**
Existing Pole Heights	**~55 feet**
Proposed Pole Heights	**~65 feet**

KOP CENTRAL 38 SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002415

Existing Conditions

Conceptual Project

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 8/4/2017

Address	**4411 Somerset Dr SE, Bellevue**
Date	**7/24/2017**
Time	**9:26 AM**
Viewing Direction	**South**
Existing Pole Heights	**~55 feet**
Proposed Pole Heights	**~75 feet**

KOP CENTRAL 39 SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002416

Address	**13300 SE 44th Pl, Bellevue**
Date	**7/24/2017**
Time	**2:05 PM**
Viewing Direction	**East**
Existing Pole Heights	**~55 feet**
Proposed Pole Heights	**~75 feet**

KOP CENTRAL 40 SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002417

Existing Conditions

Conceptual Project

Photo simulations are for discussion purposes only and may change pending public, regulatory and utility review 7/13/2017

Address	**13744 SE Allen Rd, Bellevue**
Date	**3/30/2016**
Time	**1:42 PM**
Viewing Direction	**Northeast**
Existing Pole Heights	**~65 feet**
Proposed Pole Heights	**~90 feet**

KOP SOUTH 25 SEGMENT 2

energizeEASTSIDE

PSE PUGET SOUND ENERGY

DSD 002418

PUGET SOUND ENERGY

Puget Sound Energy
P.O. Box 97034
Bellevue, WA 98009-9734
PSE.com

July 20, 2017

Heidi Bedwell
Environmental Planning Manager
City of Bellevue
450 110th Avenue NE
Bellevue, WA 98009-9012

Re: Reliability Certification for Energize Eastside 230-kV Project (LUC 20.20.255.E)

Dear Ms. Bedwell,

Puget Sound Energy, Inc. (PSE) hereby certifies that the proposed electrical utility facility referenced above improves reliability to the customers served and reliability of the system as a whole.

The 2013 Eastside Needs Assessment confirmed that by winter of 2017-18, there is a transmission supply need on the Eastside of Lake Washington which impacts PSE customers and communities in and around Kirkland, Redmond, Bellevue, and Newcastle along with Clyde Hill, Medina, and Mercer Island. The 2015 Needs Assessment reconfirmed that, by winter of 2017-18, there is a transmission capacity deficiency on the Eastside. The supply need focuses on the two 230 kV supply injections into central King County at Sammamish Substation in the north and Talbot Hill Substation in the south. Rigorous comprehensive reliability assessments have been performed under the mandatory North American Electric Reliability Corporation's (NERC) Transmission Planning Standards (TPL-standards) and the WECC Reliability Standards to determine if any potential adverse impacts to the reliability of delivery of electricity exist on the PSE transmission system. In addition to the mandatory reliability standards, PSE also adheres to PSE's Transmission Planning Guidelines which describe how to plan and operate PSE's electric transmission system. These guidelines are in place to encourage the optimal use of the transmission system for service to loads and generators while complying with the mandatory standards. These guidelines also support transfers between utilities, when applicable, to support economic use of available resources.

To address this deficiency, PSE plans to build a new 230-115 kV substation in the Bellevue area with a 230-115 kV transformer and upgrade the existing 115-kV lines to 230-kV lines to provide a reliable source to the new substation. The new substation will allow existing 115 kV lines to distribute the power into Eastside communities. This would provide increased capacity and reliability for more than 100,000 customers in the Bellevue, Redmond, Kirkland, Newcastle, Clyde Hill, Medina, Mercer Island, Renton and Issaquah areas.

Completing this infrastructure upgrade would eliminate PSE's reliance on corrective action plans (CAPs). These CAPs could include intentional shedding of the load under certain conditions when re-dispatching the generation and/or sectionalizing the transmission system would not help in reducing the load beyond

capacity limitations of the transmission equipment. Thus, ensuring reliable service to all the Eastside customers and beyond by preventing a large area outage.

Should you have further questions, please feel free to contact Brad Strauch, Energize Eastside Infrastructure Program Manager at 425-456-2556 or bradley.strauch@pse.com.

Sincerely,

Jens Nedrud, PE
Manager, System Planning
PUGET SOUND ENERGY

SOUTH BELLEVUE CRITICAL AREAS REPORT

Puget Sound Energy – Energize Eastside Project

Prepared for:

Bradley Strauch
PSE Energize Eastside
355 110th Avenue NE
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Prepared by:

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August 2017

The Watershed Company Reference Number:
111103.8

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or Katy Crandall, Ecologist / Arborist

Cite this document as:
The Watershed Company. August 2017. City of Bellevue Critical Areas Report: Puget Sound Energy – Energize Eastside Project South Bellevue Segment. Prepared for PSE.

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SOUTH BELLEVUE CRITICAL AREAS REPORT

PUGET SOUND ENERGY – ENERGIZE EASTSIDE

1 EXECUTIVE SUMMARY

PSE's Energize Eastside Project (the Project) proposes to build a new electric substation (Richards Creek Substation) and upgrade existing transmission lines in order to increase transmission system capacity to 230kV power to meet the growing need of the Eastside electric grid.

Regulated critical areas are present in the South Bellevue Segment of the Project area and include wetlands, streams, geologic hazard areas, flood hazard areas, and associated buffers and may sustain varying degrees of impact as a result of proposed activities.

The Project was designed to avoid and minimize impacts to critical areas. The following efforts described how critical area impacts were avoided to the extent feasible: new poles have been relocated outside of critical areas; the Richards Creek Substation design has considered nearby critical areas and utilizes the existing pole yard footprint; and construction access, pole construction work areas, and stringing sites have been strategically located outside of critical areas in most instances. Critical area impact minimization techniques include utilizing the existing transmission line corridor, limiting disturbance and implementing best management practices (BMPs) when working in critical areas, and installing transmission lines between poles with minimal site disturbance.

Impacts have been classified as permanent, vegetation conversion, and temporary and are expected to occur in wetlands, wetland/stream buffers, flood hazard areas, geologic hazard areas, and associated geologic hazard area buffers. The majority of critical area impacts occur in wetlands and wetland/stream buffers and will be mitigated accordingly. Proposed impacts to geologic and flood hazard areas have been quantitatively assessed; proposed activities have been determined to not significantly affect geologic and flood hazard areas or any associated buffers.

The overwhelming majority of permanent and vegetation conversion impacts proposed to wetland and wetland/stream buffer critical areas occur at the

proposed Richards Creek and Lakeside Substation parcels and are associated with the Richards Creek Substation development. Impacts generated in the transmission line corridor are significantly smaller by comparison. See Section 7 of this document for a detailed discussion of Project impacts. Mitigation is proposed at the Richards Creek Substation site and at the Somerset Substation in the form of stream channel restoration, wetland rehabilitation, and buffer restoration. These sites provide mitigation opportunities suitable for mitigating by sub-basin level impacts consistent with the City's code.

This report is intended to satisfy the requirements of the Bellevue Land Use Code and support PSE's Conditional Use Permit application for the South Bellevue Segment of the Project in the City of Bellevue.

2 Introduction and Project Description

Puget Sound Energy, Inc. (PSE) proposes the construction of a new 230 kV to 115 kV substation (Richards Creek Substation) and to upgrade approximately 18 miles of existing 115 kV transmission lines located within a 100-foot wide regional utility corridor to accommodate 230 kV power (collectively "the Project"). The Richards Creek Substation will be built to accommodate the 230kV to 115kV transformer needed to accommodate the transmission line upgrade, which is necessary to address a deficiency in electrical transmission capacity during peak periods. Combined with aggressive conservation, the Project will improve reliability for Eastside communities, including the City of Bellevue, and supply the needed electrical capacity for anticipated growth and development on the Eastside.

Within the City of Bellevue, the transmission line upgrade extends north-south for approximately 8.3 miles. This Critical Areas Report addresses the South Bellevue Segment of this line, which runs the approximate 3.4 miles between SE 26th Street and Newcastle Way (Figure 1). The South Bellevue Segment requires the removal of 44 H-frame, 6 triple-pole, and 9 monopole structures (consisting of 115 poles). PSE then plans to install 14 steel monopoles for single line circuit and 57 steel monopoles for the double circuit line. The North Bellevue Segment will be permitted at a later date.

The existing transmission lines are located in PSE's Sammamish-Lakeside-Talbot transmission line corridor, which was established in the late 1920s and early 1930s. Within the existing utility corridor, the proposed upgraded lines will place poles in generally the same locations as existing poles. In some instances, poles

DSD 002426

will be moved to accommodate landowner preferences and easement considerations, and to minimize impacts to critical areas. During construction, selective tree removal will occur within the corridor to meet federal vegetation management requirements and PSE standards.

The proposal also includes culvert and stream improvements on the new Richards Creek Substation site. The 8.46-acre site is located in south Bellevue north of I-90 and south of PSE's existing Lakeside 115 kV switching station.

The purpose of this Critical Areas Report is to document critical area impacts that are expected to occur as a result of the South Bellevue Segment.

DSD 002427

Figure 1. Map of the Energize Eastside South Bellevue Segment.

3 METHODS

A Critical Areas Impact Assessment (CAIA) was conducted for the South Bellevue Segment of the Energize Eastside Project. The analysis combined GIS-based assessment with field-verified conditions and evaluated proposed Project elements in relation to existing land cover types and regulated critical areas. The location and type of each proposed activity was used to determine impacts and mitigation needs and is based upon preliminary site plans provided by PSE (6/30/17). A detailed description of the CAIA process and methods is provided in Appendix D.

3.1 Study Area

For the purposes of this report, the study area is limited to the South Bellevue Segment, a segment of the proposed Energize Eastside corridor that spans approximately 3.4 miles from just south of SE 26th Street to Newcastle Way. The study area includes most of the existing Lakeside Substation parcel and the proposed Richards Creek Substation parcel. South of those substations the study area consists of an existing, approximately 100-foot wide regional utility corridor that extends south to the city limits with Newcastle (Figure 1). The study area is depicted in the attached maps (Appendix B).

3.2 Data Compilation

Critical areas evaluated as a part of the analysis include wetlands, streams, habitats for species of local importance, geological hazard areas, areas of special flood hazard, shorelines, and any associated critical area buffers. To facilitate the critical area impact analysis, the following data were compiled and reviewed: vegetation inventory, wetland and stream surveys, and publically available data.

Vegetation Inventory

Existing vegetation with the potential to reach a height greater than 15 feet located in the Project area corridor was inventoried between March and November 2015. Vegetation inventory methodology and results are available in the *City of Bellevue Tree Inventory Report: Puget Sound Energy – Energize Eastside Project* (The Watershed Company 2016b). Tree data used in this critical areas impact analysis were obtained and compiled from survey, GPS, and digitization using high-resolution imagery.

Wetland and Stream Surveys

Most wetlands and streams were delineated and classified between March and October 2015. The majority are documented in the *City of Bellevue Critical Areas Delineation Report: Puget Sound Energy – Energize Eastside Project* (The Watershed Company 2016). Wetland and stream data were obtained and compiled from

DSD 002429

GPS or survey data and are limited to the study area at the time of the original inventory which generally consisted a 100-foot wide corridor defined by an established PSE easement. Delineation study methodology is detailed in the previously-reference delineation report (The Watershed Company 2016).

In April 2017, a wetland and stream delineation study was conducted at the Richards Creek Substation site to update and supplement the findings of previous studies (The Watershed Company 2017). A subsequent delineation study was also conducted at the Somerset Substation site in January and February 2017 (The Watershed Company 2017b). The findings of these supplemental delineation studies have been incorporated into the critical areas impact analysis. For purposes of this critical areas analysis, data from the Somerset Substation delineation was only used in reference to work occurring in the existing transmission corridor; no work will occur at the Somerset Substation as part of this proposed Project.

Wetland and stream critical areas that were previously delineated on the Lakeside Substation parcel have also been incorporated into this analysis where appropriate. Wetland and stream locations documented in the referenced surveys were used in this analysis.

Publicly Available Data

Publicly available City of Bellevue GIS Map Data were utilized for mapping the following critical areas: coal zones, floodplains, and steep slopes. Data for landslide hazard areas was retrieved from King County's GIS Center.

As no coal mine hazard areas are located within the study area, this CAIA only assesses steep slopes and landslide hazard areas. The dataset for drainage basins was also utilized for characterizing wetland and wetland/stream buffer impacts and determining compensatory mitigation needs for these critical area types. Data used to map impervious surfaces and development include the King County Impervious and Impacted Surface data (King County 2009), supplemented with land survey data and high-resolution aerial photography provided by PSE.

3.3 Project Element Construction – Potential Impacts

Project elements that have the *potential* to impact critical areas are defined in this section and include the following:

- Permanent development of Richards Creek Substation
    - including Richards Creek culvert replacement and revised access driveway;
- Clearing limits for Richards Creek Substation;
- Pole replacement:

DSD 002430

    - removal of old poles
    - installation of new poles
        - pole buffer (6-foot radius outside of pole footprint),
        - pole construction work area (varies by pole type, see description below);
- Access routes (approximately 20 feet wide);
- Stringing sites; and
- Vegetation management requirements.

3.3.1 Richards Creek Substation

Directly south of the Lakeside Substation and within the existing transmission corridor, PSE owns a pole yard. The pole yard consists of an access driveway leading to a partially paved and hard packed gravel surface used to store equipment and park vehicles. The existing 115 kV corridor bisects the site, as well as an existing petroleum pipeline easement. As part of the proposed Project, this pole yard will be re-developed with the Richards Creek Substation. Construction of the substation will result in two types of impacts: permanent and temporary.

- Permanent impacts will be associated with the vegetation clearing and fill associated with the installation of the substation yard base, fence, walls and equipment that is located outside of the existing developed area. For report purposes, this permanent impact will be referenced as the substation footprint.

- Impacts associated with the relocation of the existing driveway and construction limits of the substation will be predominately temporary; these disturbed areas can be re-vegetated with appropriate vegetation and left to return to their natural state.

The impacts are further analyzed and quantified in Section 7 of this report.

Richards Creek Culvert Replacement

PSE is planning to replace and upgrade a culvert carrying Stream C, a small perennial stream, beneath a driveway that provides access to its existing pole yard site and proposed Richards Creek Substation (Appendix A). A pair of aging and undersized culverts (two side-by-side, 18-inch diameter corrugated metal pipe culverts) have proven inadequate to carry the combined flow and sediment loading along the stream.

Construction of the new culvert will also result in two types of impacts: permanent and temporary. Construction associated with proposed culvert replacement and stream realignment will result in temporary disturbance to the

DSD 002431

stream, wetlands, and associated buffers, but will also result in net habitat benefits following Project implementation.

- Permanent impacts will be associated with the installation of a new culvert; wetland fill along the edge of Wetlands A (downstream) and D (upstream) is limited to area immediately adjacent to the existing access driveway where the new culvert length will be greater than existing. However, the proposed culvert replacement and stream realignment will result in permanent improvements to Richards Creek, which will increase streamflow conveyance capacity, improve sediment transport, facilitate sediment removal from the system, replace undersized culverts, reduce flooding that now occurs on the adjoining property to the west, improve fish passage (including passage for cutthroat trout), and improve in-stream, riparian, and wetland habitat conditions.

- Temporary impacts will be associated with the construction limits of the culvert; these disturbed areas will be re-vegetated with appropriate vegetation as part of the overall restoration plan.

The impacts are further analyzed and quantified in Section 7 of this report.

3.3.2 Pole Replacement

Existing H-frames (consisting of 2 or 3 poles) will be replaced with new monopoles (*i.e.*, a single pole); in general relocation activities will occur in close proximity to the existing H-frames, but some of the replacement poles will be moved to accommodate landowner preferences and easement considerations, and to minimize impacts to critical areas. To conduct this work, PSE created construction scenarios specific to the type of structure being installed. Table 1 below describes the scenarios applicable to the Project. These scenarios provide assumptions used to assess impacts.

Table 1. PSE construction scenarios.

Description	Scenario	
No Critical or Recreation Area Present		
Direct embed-single pole • Temporary work area is generally 2,500 square feet • Create hole (hole will be larger than diameter of the new pole) • New pole and backfill delivered to site • Place pole in hole and backfill annulus • Stabilize site	A	A1
Foundation-single pole • Temporary work area is generally 5,000 square feet • Create hole (hole will be slightly larger to accommodate	C	C1

Description	Scenario	
foundation installation) • New pole and foundation materials delivered to site • Build foundation and install pole • Stabilize site		
Critical or Recreation Area Present		
Direct embed-single pole • Temporary work area is generally 2,500 square feet • Create hole (hole will be larger than diameter of the new pole) • New pole and backfill delivered to site • Place pole in hole and backfill annulus • Stabilize site • Establish construction buffer from critical area using appropriate Best Management Practices ("BMPs")	A	A2
Foundation-single pole • Temporary work area is generally 5,000 square feet • Create hole (hole will be slightly larger to accommodate foundation installation) • New pole and foundation materials delivered to site • Build foundation and install pole • Stabilize site • Establish construction buffer from critical area using appropriate BMPs	C	C2

While the work area for each pole type is defined as a consistent size to be conservative, the shape of the disturbed area will vary depending on the presence of critical areas or other sensitive features in the Project corridor. During construction, these areas will be excluded from the disturbance area. Pole replacement will potentially result in three types of impacts: permanent, conversion, and temporary.

- Permanent impacts will be associated with the installation of new poles; which will have a base diameter ranging from 4 feet to 6 feet depending on the pole type (direct imbed or new foundation). However, some existing poles (which also contribute to permanent fill) will be removed from the critical areas. The following permanent impact scenarios were considered with regards to poles in critical areas:
    - New poles at the Richards Creek and Lakeside Substation.
    - Replacement of existing H-frame, consisting of 2 or 3 poles approximately 3-feet in diameter, with one monopole (4- to 6- feet in diameter).

DSD 002433

- Conversion impacts will be associated with the removal of incompatible transmission line vegetation in the pole construction work area and pole buffer. After construction, the pole construction work areas will be re-vegetated and left to return to their natural state or enhanced (using transmission line appropriate vegetation). The transmission line corridor, and associated area surrounding the poles, will experience routine vegetation management. All vegetation in the transmission line corridor, when mature, will be fifteen feet or less. During typical inspections and maintenance of the poles vegetation is routinely disturbed; as such, no trees of any size will grow within close proximity (about 6 feet) of the new poles.

- Where pole construction work areas and pole buffer areas do not require the removal of trees, the resulting impacts will be temporary. The majority of pole construction work area and pole buffer impacts are expected to be temporary due to the existing use and management of the corridor (*i.e.,* lack of trees) and consideration that existing groundcover will be restored or regenerate on its own within one growing season. Outside of the Richards Creek Substation area, many of the critical areas are located in portions of the managed right of way ("ROW") that are developed with a regional trail, landscaped yards, or other improvements. After construction, the temporarily disturbed areas will be re-vegetated and left to return their natural state or enhanced, including the regional trail.

BMPs will be used to minimize impacts resulting from pole replacement activities. In critical areas or buffers, mats will be placed over existing vegetation where possible. Typically, crushed vegetation rebounds within one growing season resulting in only temporary impacts to vegetation. Post construction, all disturbed areas will be re-vegetated, if necessary, and left to return to their natural state.

The impacts are further analyzed and quantified in Section 7 of this report.

3.3.3 Access routes

Access to poles in critical areas located in the transmission corridor will generally occur using existing, partially vegetated access (established during original construction and re-used over time to maintain the corridor). BMPs will be used to minimize ground disturbance in these areas, and in new areas of access. In critical areas or buffers, mats will be placed over existing vegetation where possible. Typically, crushed vegetation rebounds within one growing season resulting in only temporary impacts to vegetation. Where access route alignment

DSD 002434

requires tree removal, impacts will be characterized as conversion. Post construction, all disturbed areas will be re-vegetated, if necessary, and left to return to their natural state in compliance with vegetation management requirements. Based on the existing conditions, proposed construction BMPs, and post-construction methods, disturbance associated with access in the transmission corridor will predominantly be temporary.

3.3.4 Stringing Sites

In order to replace the transmission conductor, stringing and tensioning equipment will be staged near new steel poles at specific locations along the corridor in preparation for the stringing of new wire. The disturbance area associated with the equipment and materials to restring the conductor wire will be isolated from wetlands and streams to the extent feasible. In critical areas and buffers, mats will be placed over existing vegetation where possible to allow access to poles for stringing activities. Typically crushed vegetation rebounds within one growing season resulting in only temporary impacts to vegetation. Tree removal activities necessary for the stringing of new wire (in the wire zone) will be performed in a manner to minimize impacts to underlying shrubs, groundcover and other trees, without disturbance to soil. The various techniques utilized to string the wire will not result in surface disturbance (*i.e.*, shooting the wire past obstacles, pulling it along established guide wire, etc.).

For this analysis, stringing sites have been identified as point locations and not polygons (Appendix B). However, each stringing site will be approximately 7,500 square feet of disturbance. Similar to pole construction work areas, the shape of the stringing site will depend upon the presence of adjacent critical areas, existing land conditions, and area needed for equipment staging based on the necessary angle needed to string the conductor. In many areas, this disturbance will overlap with various impacts quantified for proposed access, pole installation, and vegetation management. While impacts have not been quantified for stringing sites, stringing sites are expected to largely overlap other work areas and are not expected to require additional tree removal. Any additional impacts resulting from stringing sites, not already quantified in Section 7 through other Project elements, will be temporary in nature; temporary impact areas will be re-vegetated and left to return their natural state or enhanced following construction.

3.3.5 Vegetation Management

Vegetation in the existing corridor is routinely managed. The corridor was initially disturbed during the original transmission line construction (including soil compaction associated with construction activities for the line itself and pole yards, roads, parking lots, subdivisions, trails, and commercial development). Disturbance is regular and ongoing due to maintenance and pole replacement

DSD 002435

activities. With the exception of the Coal Creek Natural Area, the majority of trees in the existing corridor are ornamental and associated with existing property uses (such as residential yards and commercial landscaping).

Vegetation in a transmission line corridor that has an operational voltage of more than 200 kV must be managed in compliance with federal requirements. Vegetation management standards vary depending upon the location of vegetation management in relation to transmission wires. These specific locations are defined as follows:

- Wire Zone – Section of a utility transmission ROW extending to 10 feet from the outside transmission wire(s). Vegetation with a mature height of 15 feet or less is allowed in this zone.

- Managed ROW – The section of a transmission line ROW that extends 6 feet outside of the wire zone. Vegetation with a mature height of 15 feet or less is allowed in this zone.

- Legal ROW – The full width of the easement. While vegetation maintenance is permitted within the full extent of the legal ROW, based on communication with PSE, only a portion of the legal ROW is intended to be maintained; this area is described as the maintained legal ROW and generally extends 10 feet from the edge of the managed ROW. Maximum height of mature vegetation between the managed ROW and legal ROW is dependent upon tree species, tree health, and distance from the wires.

Consistent with federal standards, vegetation in the wire zone must have a mature height of no greater than 15 feet, unless the topographic change is sufficient to allow a 20-foot vertical clearance between the power lines and the mature height of trees under the power lines. The same vegetation requirement was applied to the managed ROW zone. The legal ROW is composed of existing and proposed easements; its width varies along the Project corridor. The area outside of the managed ROW, but still within the legal ROW, is also subject to select clearing of trees that pose a risk of damaging the lines. To facilitate the CAIA, in the maintained legal ROW, a maximum mature tree height of 70 feet was presumed. However, existing trees greater than 70 feet, or with a mature height of greater than 70 feet will not necessarily be removed. Impacts resulting from required vegetation management are characterized as conversion in Section 7 of this report.

For critical areas located within the transmission corridor, these vegetation management requirements will affect residential vegetation (predominately back yard ornamentals). PSE will be working with individual property owners to replace their vegetation with transmission line compatible ornamental species or

DSD 002436

tree replacement outside the corridor. In these areas, the function of the critical area will not change (maintained, back yard vegetation).

3.4 Critical Areas Impact Analysis

The CAIA was conducted by placing tree points/polygons and critical area polygons on a georeferenced base map and overlaying preliminary site plans to determine impacts. Impervious surfaces and other similar areas characterized as developed were removed from wetland and stream buffer areas for this CAIA. The resulting functioning wetland and stream buffers are shown in Appendix B.

Where Project elements (as discussed in Section 3.3) are located in critical areas or their functioning buffers, impacts are quantified based on area (square footage of impact). Impact results were generated based upon the expected long-term condition of the area compared to the existing condition and include permanent impacts, impacts that result in a vegetation conversion, temporary impacts, and activities that result in no change or no impact (see Section 7). For more detailed methodology on the CAIA, refer to Appendix C.

3.5 Limitations

The Watershed Company's technical expertise is specific to wetlands, streams, habitats for species of local importance, and shorelines. The geotechnical assessments and interpretation of impacts within geological hazard areas, including landslide hazards and steep slopes have been addressed by others and referenced into the report and incorporated as an appendix (Appendix B).

Limited availability of detailed site-specific topographic information makes it infeasible to determine top-of-bank adjacent to delineated streams. Stream buffers depicted on the accompanying delineation maps are measured from the ordinary high water mark (OHWM). The buffer limits may be revised if additional topographic data becomes available.

Off-site wetland and stream features were identified and sketched where possible; access and permission to enter properties (or lack thereof) along the corridor were secured by PSE (through an easement) with prior notification to property owners. Where critical areas extended outside of the designated study area limits, boundaries were approximated (as shown in Appendix B) using aerial imagery, topography, field notes, and best professional judgement for the purposes of mapping and wetland rating. Boundaries outside of study area limits have not been delineated or field-verified. However, Project area impacts outside of the study area limits have been quantified based on approximated boundaries. Trees located outside of study area limits have not been inventoried, assessed, or documented. An access route proposed to poles 7/1, north of Forest Drive SE, is located outside of the study area limits and in the vicinity of an area

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noted as possible wetland during field investigations. Due to property access limitations, this area has not been evaluated for presence or absence of wetland and stream critical areas. The construction access would primarily utilize the existing disturbed areas of the Foresthill Neighborhood Trail and would be located to avoid critical areas to the extent feasible. In the event that critical areas are located in the proposed construction access route, mats would be used to minimize disturbance; any additional impacts are expected to be temporary.

This document represents a point-in-time analysis of the proposed Project, potential impacts, and approach to critical area mitigation. Refinements made as a result of ongoing design are expected to decrease Project impacts moving forward. If design changes result in increased permanent or conversion impacts that cannot be addressed in the proposed preliminary mitigation plan, a critical areas Report Addendum will be prepared to address those impacts.

4 EXISTING CONDITIONS

4.1 Site Location

The Project corridor through the South Bellevue Segment study area bisects the Eastgate, Factoria, Somerset, and Newport neighborhoods in the City of Bellevue. The majority of the study area is zoned single-family residential at various densities; exceptions include the I-90 vicinity, generally zoned commercial and light industrial/office and limited business. The corridor is located in the following public land survey sections: Sections 15, 22, 27, and 34 of Township 25N, Range 05E; and Sections 3, 9, 10, 15, 16, 21, 22, and 28 of Township 24N, Range 05E.

The South Bellevue Segment study area is located in the Cedar-Sammamish Watershed (WRIA 8), and spans four drainage basins, which include the Bellevue-defined Richards Creek, Sunset Creek, Coal Creek, and Newport drainage basins.

4.2 Site Description

When the corridor was constructed in the late 1920s and early 1930s, the entire corridor was cleared; construction activities resulted in a compacted subsurface in those areas where the poles were installed. Since that time, the corridor has been continually maintained by PSE through easement rights; using existing access routes/paths, poles have been replaced and vegetation has been managed. To do so, vehicles and equipment (such as cranes) have been used in the corridor. Over time, development has occurred adjacent to and within the

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corridor, including residential development, roads, parking lots, commercial development, and the establishment of trails (using overgrown access routes).

Olympic Pipeline Company also utilizes the South Bellevue Segment corridor for operation and maintenance of a petroleum pipeline. In general, vegetation management requirements of pipelines is more restrictive than the previously-described vegetation management requirements for the transmission line. For example, trees and shrubs are expected to be mowed or removed on a more regular basis than for the transmission lines to prevent damage to the pipeline by large roots. In addition, a corridor of herbaceous vegetation may be maintained both to keep the area free of large tree and shrub roots and to be able to easily, visually inspect the pipeline corridor from the ground and/or air. The pipeline easement spans the length of the South Bellevue Segment transmission line easement and acts as a regular, contributing source of ongoing disturbance to the shared corridor.

On developed parcels, vegetation in the corridor is generally limited to landscaped beds and maintained yards. On parcels that have not been further developed to a commercial or residential property and remain the managed utility corridor, vegetation is often weedy and dominated by Himalayan blackberry and various grasses; young trees and shrubs are present in some locations where they have presumably grown from seed. These areas are often regularly mowed/cleared for utility access and maintenance purposes. Exceptions are the undeveloped City of Bellevue Parks parcels along Coal Creek Parkway; these parcels contain a densely wooded ravine.

4.3 Critical Areas

This section defines City of Bellevue-regulated critical areas per Part 20.25H Critical Areas Overlay District of Bellevue's Land Use Code (LUC) and describes the general location(s) of each critical area type in the proposed Energize Eastside corridor.

4.3.1 Wetlands

The City of Bellevue defines wetlands as follows (LUC 20.25H.095):

> *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial*

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> *wetlands intentionally created from nonwetland areas to mitigate the conversion of wetlands.*

A total of 21 wetlands are located along the South Bellevue Segment corridor. Wetlands are generally concentrated on or near the Richards Creek Substation parcel, and Coal Creek Natural Area. Wetland classifications and buffer widths are summarized in Section 5.1 (Table 2).

A detailed discussion of proposed Project impacts to wetlands is provided in Section 7 of this report.

4.3.2 Streams

The City of Bellevue defines streams as follows (LUC 20.25H.075):

> *An aquatic area where surface water produces a channel, not including a wholly artificial channel, unless the artificial channel is:*
>
> *1. Used by salmonids; or*
>
> *2. Used to convey a stream that occurred naturally before construction of the artificial channel.*

A total of 11 streams are located along the South Bellevue Segment corridor. Streams are generally concentrated near the Richards Creek Substation parcel and Coal Creek Natural Area. Stream classifications and buffer widths are summarized in Section 5.1 (Table 3).

Streams will not sustain direct impacts as a result of the Project.

4.3.3 Habitat Associated with Species of Local Importance

The City of Bellevue designates habitat associated with species of local importance and naturally occurring ponds of under 20 acres as critical areas. Habitat, according to LUC 20.50.024,

> *Refers to an individual, species-specific use of a wildlife-habitat type. "Habitat" is the place, including physical and biotic conditions, where a plant or animal usually occurs and is fundamentally linked to the distribution and abundance of species. Species may depend on a Habitat or structural characteristics for part or all of its life history or may exhibit a high degree of adaptability using more than one Habitat. The relationship of species to Habitat is scale-dependent and varies from geographic range, home range, to local or site-specific Habitat components. "Habitat" includes areas of high relative density or species richness, breeding Habitat, winter range, and movement corridors. These areas may also include Habitats that are of limited availability or high vulnerability to alteration. Other examples include: remnant patches of mature mixed Puget Sound lowland forest, caves and cliffs, snag-rich areas and downed logs, riparian areas, lakes and ponds, wetlands and their buffers, and heron rookeries.*

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Bellevue considers the following species as species of local importance (LUC 20.25H.150):

> *Birds – bald eagle, peregrine falcon, common loon, pileated woodpecker, Vaux's swift, merlin, purple martin, western grebe, great blue heron, osprey, green heron, and red-tailed hawk*
>
> *Mammals – western (Townsend's) big-eared bat, Keen's myotis, long-legged myotis, and long-eared myotis*
>
> *Amphibians and Reptiles – Oregon spotted frog, western toad, and western pond turtle*
>
> *Fish – Chinook salmon, bull trout, coho salmon, and river lamprey*

Each of these species are reviewed below with the exception of Oregon spotted frog, Chinook salmon, and bull trout which are addressed in detail in the Endangered Species Act (ESA) documentation for the south segment of the Project which includes the South Bellevue Segment, Newcastle, and Renton. As summarized in that document, there will be no effect on ESA-listed species based upon lack of documented use, lack of suitable habitat, and/or avoidance of in-water work and vegetation removal where listed species are known to occur (*i.e.*, the Cedar River in Renton). In the South Bellevue Segment Project area, no federally-listed species are known to occur or have designated critical habitat.

No naturally occurring ponds of under 20 acres are present in the Project area. The Project area, generally, is urban and mostly developed. The power line corridor is mostly vegetated. Vegetation in the Project area often consists of low-growing grasses, landscape plants and invasive plant species (Himalayan blackberry and reed canarygrass) typical of disturbed areas and generally offers little in terms of habitat value when compared to other urban parks and greenspaces. Exceptions, where more valuable habitat is present in the Project area, include forested areas on the Richards Creek Substation parcel and in the Coal Creek ravine. Even at these locations, existing maintenance activities associated with the power lines, established PSE programs and procedures, and the urban landscape setting reduces the likelihood that species of local importance (which require specific habitat features) will utilize power line corridor areas for breeding.

PSE implements an Avian Protection Plan to protect avian wildlife from harmful interactions with their utility equipment. The Plan includes preventing the creation of potentially harmful nests and monitoring known nest sites when construction activities occur in close proximity during the nesting season (Puget Sound Energy n.d.). Potential Project impacts to birds are mitigated through the PSE's bird protection programs and procedures.

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Of Bellevue's 23 species of local importance, coho salmon is the only species known to occur in the Project area, in Coal Creek. River lamprey have also been presumed to occur in Coal Creek, although this has not been confirmed. Species that could breed in the Project area, but are considered unlikely to do so based on site disturbance are pileated woodpecker, green heron, red-tailed hawk, and western toad. Bald eagle, pileated woodpecker, Vaux's swift, purple martin, merlin, green heron, red-tailed hawk, and Townsend's big-eared bat also have the potential to forage in the Project area. Justification for these assessments are provided in the species review summaries below.

Species of Local Importance Review

Professional knowledge and the following sources were utilized to describe preferred habitat for species of local importance in this section when not otherwise cited: All About Birds (Powell et al. 2010), BirdWeb (Seattle Audubon Society 2005), and *The Sibley Field Guide to Birds of Western North America* (Sibley 2003). The likelihood of species presence in the Project area was determined by comparing species' preferred habitat types to available habitat.

There are several known **bald eagle** nest sites in Bellevue (WDFW n.d.). Eagles are common near Lake Washington and Lake Sammamish, located within approximately 2 and 3 miles of the corridor, respectively. They often nest in tall, mature trees located near large bodies of water. A review of Washington's Priority Habitats and Species (PHS) data indicates the nearest mapped nest is located over one mile west of the corridor near Lake Washington (WDFW n.d.). The nesting eagles depicted in the PHS data are more likely to forage over the nearby lakes than on the corridor. Although it is possible for bald eagles to utilize poles and corridor areas to forage for small mammals. The Project area does not provide suitable nesting habitat. On occasion, eagle flyovers were observed during field work activities; however, breeding or foraging behavior was not observed.

Peregrine falcons are fast-flying birds of prey that are known to nest in urban areas of central Puget Sound. Typical nesting habitat is on cliffs located near large bodies of water. In urban settings, peregrine falcons may nest on buildings and bridges located near large bodies of water such as the State Route 520 and Interstate 90 floating bridges on Lake Washington where breeding areas have been documented (WDFW n.d.). Man-made structures like electrical transmission towers in the Project area could act as a source for potential nesting sites, but are generally not used by peregrine falcons for nesting. Peregrine falcons were not observed during field work activities.

Common loons and **western grebes** are waterbirds. They generally spend their winters in open lakes, bays, and ocean areas. Common loons prefer to nest on wooded lakes, while western grebes prefer to nest on lakes with marshy

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vegetation. Suitable habitat does not exist in the Project area. These species are not expected to nest in the vicinity of the Project.

Pileated woodpeckers most often nest in old-growth forest and mature forest stands. However, they are increasingly found in urban areas as long as there are large trees that can provide roosting and nesting habitat. In general, the Project area does not contain the appropriate vegetation to support this species due to the vegetation management requirements associated with the power lines, however, pileated woodpeckers have been known to use utility poles for nesting. Pileated woodpeckers were observed near the Project area in Bellevue during field work activities. Suitable habitat exists near the corridor in green spaces east of the proposed Richards Creek Substation and near Eastgate Park as well as in Coal Creek Park.

If pileated woodpeckers are observed excavating poles within the Project area, PSE avian biologists will be consulted to determine whether the pole is being used for nesting or foraging. If a pole is determined to be in use for foraging by pileated woodpeckers, the Project will have minimal effects by potentially causing temporary disturbance to foraging behavior. If pileated woodpecker nests are found, depending on nest occupancy, a PSE avian biologist will develop and implement a strategy to prevent impacts to the pileated woodpeckers during the nesting season in coordination with WDFW.

Vaux's swifts and **purple martins** are both small aerial songbirds that forage in open skies, most often over forest or aquatic habitats. Vaux's swifts are closely associated with old-growth forests requiring cavities in large snags or live trees for nesting and roosting, although they are also known to nest and roost in artificial structures like chimneys (Lewis, Whalen, and Milner 2002). Purple martins also historically nested in tree cavities, but more often nest in man-made structures over water near urban areas in the lowlands of western Washington (Hays and Milner 2003). The Project corridor generally lacks suitable nesting structures (man-made or natural) for these species; however, it is possible that they may use the corridor for foraging. Any disturbance from Project-related activities would be temporary and would not impede the foraging of nearby habitats.

PHS data were reviewed for documented breeding areas associated with these species in the vicinity of the Project area. The nearest mapped purple martin breeding area is located over two miles east of the corridor (WDFW n.d.). No Vaux's swift or purple martin were observed during field work activities.

Merlins rarely breed in the lowlands of western Washington (Seattle Audubon Society 2005), but are increasingly nesting in urban areas. King County is generally considered part of the species non-breeding range; nearby merlin year-

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round range, where they would be more likely to breed, includes Whatcom, Skagit, and Snohomish Counties (Seattle Audubon Society 2005). Typical breeding habitat is forests with nearby openings, however, during migration and in winter merlins may be found in a variety of habitats. The Project corridor does not provide suitable nesting habitat, however it is possible that merlins could use the Project area for foraging particularly during migration and winter. Any disturbance from Project-related activities would be temporary and would not impede the foraging of nearby habitats.

Great blue herons are large wading birds most often found near water. Great blue herons forage in a variety of habitats near streams, lakes, ponds, wetlands, saltwater shorelines, and upland fields. They nest in colonies, typically in trees near foraging habitat. There are no known great blue heron nest sites in close proximity to the Project area. The nearest documented breeding site is located over one mile from the Project corridor (WDFW n.d.). If an active heron rookery is identified along the power line corridor, a PSE avian biologist will develop and implement a strategy to prevent impacts to the heron rookery during the nesting season in coordination with WDFW.

Green herons are small wading birds that prefer secluded foraging and nesting habitat that consist of good forest or shrub cover in or near wet environments. Green herons are solitary nesters. Wetlands in the Project area are generally small and disturbed and lack qualities like large areas of seasonal/permanent ponding and connectivity to fish-bearing streams that would provide ideal habitat. Streams like Coal Creek and Richards Creek may provide nesting habitat in or adjacent to the corridor where vegetation structure is suitable. No green heron were observed during field work activities. If green heron are found nesting within the power line corridor, a PSE avian biologist will develop and implement a strategy to prevent impacts during the nesting season in coordination with WDFW.

Ospreys nest in dead trees or man-made structures located near large bodies of water where they forage for fish. Ospreys are fairly common in the greater Seattle area near lakes, rivers, and other large waterbodies. According to PHS on the Web (WDFW n.d.), the nearest breeding area is located next to Lake Washington over one mile from the Project corridor. The Project area in Bellevue provides suitable nest structures (utility poles) and while osprey typically prefer nest sites in close proximity to large water bodies, they can nest a mile or two from water. As such, the study area may provide suitable osprey habitat.

No ospreys were observed during field work activities in the corridor in Bellevue. If an osprey nest is observed within the Project area, depending on nest occupancy, the PSE avian biologists will develop and implement a strategy to

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prevent impacts to the osprey during the nesting season in coordination with WDFW.

Red-tailed hawks are quite common in western Washington and may be the most common hawk in North America. In western Washington nests are often built in large black cottonwood and red alder trees (Seattle Audubon Society 2005), but the species may also utilize artificial structures for nesting. Red-tailed hawks are often visible soaring over open areas or perching near roadsides. The Richards Creek Substation property may provide suitable habitat for nesting. Red-tailed hawks are generally considered unlikely to nest in the corridor due to limited availability of nest trees, but they may nest in trees near or adjacent to the Project area. It is more likely that the species utilizes the Project corridor for perching or foraging. Any disturbance from Project-related activities would be temporary and would not impede the foraging of nearby habitats.

Bats in Washington, including those listed as species of local importance, utilize a variety of habitats including caves and mines; cliffs, talus, and boulders; buildings and bridges; and trees (Hayes and Wiles 2013). Of the bat species considered here, only the Townsend's big-eared bat could potentially utilize habitat in the Project corridor. According to a Gap Analysis conducted for Washington State mammals, King County is not considered to provide core nor marginal habitat for Keen's myotis; this species is associated with old conifer forests. Furthermore, while long-legged and long-eared myotis species tolerate low-density development, mid- and high-intensity development are generally not considered good habitat (NatureMapping Foundation n.d.). All of Bellevue is mapped as Townsend's big-eared bat core habitat. Their presence in the study area is expected to be limited by available roosts most likely to be vacant buildings or trees based on the landscape setting. The Project area does not provide suitable roost sites; few vacant buildings are expected to occur in the Project area and managed vegetation in the power line corridor is generally not considered to allow for the development of tree roost sites.

Western toad range spans much of Washington state including western Washington and the greater Seattle area. The species reportedly remains common throughout much of its range but has experienced population declines. Western toad can be found in many habitats including desert springs and streams, meadows, woodland, mountain wetlands, and agricultural land (IUCN SSC Amphibian Specialist Group 2015). Western toad habitat in the study area is generally limited to aquatic and terrestrial habitats associated with Coal Creek and Richards Creek that could be used for breeding (*i.e.,* shallow slow-moving water). More suitable breeding habitat is expected to exist/extend outside the Project corridor and the likelihood of western toad in the disturbed and maintained utility corridor is expected to be low by comparison. PHS on the Web (WDFW n.d.) documents western toad occurrences in King County, but none are

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documented in the vicinity of the Project area. The Project avoids stream impacts, other than the culvert replacement and stream restoration activities, and minimizes wetland impacts to the extent feasible. Vegetation impacts to riparian areas will be limited to selective tree removal and will not result in destruction of western toad habitat.

The culvert replacement and stream restoration work occurring at Richards Creek will act as a source of temporary disturbance to the area, but is not expected to impact western toads. Stream restoration work will occur in a work-window defined by the Project permit, likely between July and September, to limit impacts to instream fishes. According to WDFW, western toads begin egg laying in approximately mid-April at low elevation sites in western Washington; eggs hatch within two weeks and tadpoles develop into toadlets over about two months. Using this timeline as a guide, toadlets would be expected to disperse from breeding sites in July. Instream restoration work may temporarily displace western toad, if present at this location. Young toads are likely to be terrestrially mobile and therefore would be expected to avoid proposed disturbance activities. If tadpoles are present in the stream, they would be removed with fish removal efforts associated with construction including capture by dipnets or small seines followed by electrofishing. Once work is complete, potential western toad habitat in the Richards Creek riparian area will be improved from existing conditions. Per the Richards Creek culvert replacement plan (Appendix A), the net result of the proposal to potential western toad habitat is an overall enhancement of the structural attributes and ecological functions of this habitat area, consistent with WDFW's general management recommendation goals for priority species.

Western pond turtle populations are known to occur in Klickitat and Skamania Counties; and recent individual sightings have been confirmed in Pierce and King Counties. One limiting factor in western pond turtle distribution is the availability of shallow water bodies that provide basking surfaces and vegetative cover (Nordstrom and Milner 1997). This habitat type is not present in the Project corridor. Therefore use of the corridor by this species is not anticipated.

Coho salmon and **river lamprey** are species of anadromous fish that could utilize streams and rivers in Bellevue as habitat. Historically, river lamprey likely occurred in most Washington rivers. Current species distribution is not well-known but is presumed to include Puget Sound rivers (WDFW 2015) and the Lake Washington basin (USFWS n.d.). River lamprey spawn in gravel substrates in riffle and side channel habitats of clear, cool streams. Larvae use fine silt and mud substrates and require good water quality year-round. Although not identified to species, lamprey have been observed in Coal Creek in Bellevue (City of Bellevue 2009). For the purpose of this study, river lamprey are presumed to occur in Coal Creek. Coho salmon are also known to occur in Coal Creek in the

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corridor (City of Bellevue 2009). No in-water work will occur as part of this Project and best management practices will be implemented to minimize the potential for sediment laden runoff; therefore impacts to these species is not anticipated.

Summary

To summarize, Coal Creek is considered a Habitat Associated with Species of Local Importance. The associated stream buffer and critical area regulations for streams are expected to adequately protect this habitat area for the duration of the Project. No other Habitats Associated with Species of Local Importance have been identified at this time. While there is some potential for certain species to breed in the Project area, it is considered to be unlikely. The foraging habitat present in the Project area is not expected to change as a result of the Project and is not recommended for regulation as Habitat Associated with Species of Local Importance.

4.3.4 Geologic hazard areas

Geologic hazard areas includes landslide hazards, steep slopes, and coal mine hazard areas; City of Bellevue defines them as follows (LUC 20.25H.120):

> *1. Landslide Hazards. Areas of slopes of 15 percent or more with more than 10 feet of rise, which also display any of the following characteristics:*
>
> > *a. Areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides.*
> >
> > *b. Areas that have shown movement during the Holocene Epoch (past 13,500 years) or that are underlain by landslide deposits.*
> >
> > *c. Slopes that are parallel or subparallel to planes of weakness in subsurface materials.*
> >
> > *d. Slopes exhibiting geomorphological features indicative of past failures, such as hummocky ground and back-rotated benches on slopes.*
> >
> > *e. Areas with seeps indicating a shallow ground water table on or adjacent to the slope face.*
> >
> > *f. Areas of potential instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.*
>
> *2. Steep Slopes. Slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.*
>
> *3. Coal Mine Hazards. Areas designated on the Coal Mine Area Maps or in the City's coal mine area regulations, LUC 20.25H.130, as potentially affected by abandoned coal mines; provided, that compliance with the coal mine area regulations shall constitute compliance with the requirements of this chapter in regard to coal mines.*

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Landslide and steep slope hazards areas are present in the South Bellevue Segment corridor. They have been assessed and evaluated separately by in the *Revised Targeted Critical Areas Geologic Hazard Evaluation*, dated July 11, 2017, by GeoEngineers (hereafter GeoEngineers Report). This document was supplemented with information contained in a draft *Critical Area Supplement for Energize Eastside Bellevue* memorandum dated August 21, 2017. Both documents are included as Appendix C.

According to GeoEngineers, mapped steep slopes in Bellevue that include slopes 40 percent or greater were observed locally within the Project area, however many of these areas are developed and include rockeries, landscaped residential or commercial development slopes and cut slopes associated with paved roadways. GeoEngineers states that the following areas (described in terms of proposed activity) are unlikely to be adversely impacted by the Project and are excluded from the analysis:

- Two trees removed from just north of 132nd Avenue SE.
- Multiple trees removed and access just east of the intersection of Somerset Drive SE and 134th Place SE, north to Somerset Place SE.
- Multiple trees removed just east of the intersection of Somerset Drive SE and Somerset Boulevard SE.
- Multiple trees removed just east of 136th Place SE between SE 43rd Place and SE 43rd Street; and two trees between this area and the intersection of Somerset Drive SE and Somerset Boulevard SE.
- Two trees removed and access north of the intersection of SE 43rd St. and the PSE right-of-way.
- Multiple trees removed south of SE 42nd Street.
- Multiple trees removed between SE 37th Street and SE 36th Street.
- Access east of SE 32nd Street.
- Multiple trees removed in the Richards Creek Substation and Lakeside Substation area.
- Multiple trees removed and access south of SE 26th Street.

A localized natural area of steep slopes and mapped landslide hazards is present in the Project area that includes the Coal Creek drainage east and west along Coal Creek Parkway, and required review by the Project geotechnical consultant. The priority geologic hazard areas of the Coal Creek drainage are shown in the attached critical area maps (Appendix B). A detailed discussion of proposed Project impacts to geologic hazard areas is provided in Section 7 of this report.

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As stated previously, no coal mine hazard areas are located along the Project corridor in the South Bellevue Segment.

4.3.5 Areas of Special Flood Hazard

The City of Bellevue defines areas of special flood hazard as follows (LUC 20.25H.175):

> *1. Land Subject to One-Hundred-Year Flood. The land in the floodplain subject to the flood having a one percent chance or greater of being equaled or exceeded in any given year as determined by customary methods of statistical analysis defined in the City of Bellevue Storm and Surface Water Engineering Standards, January 2011, or as hereafter amended. Also referred to as the 100-year flood.*
>
> *2. Areas Identified on the Flood Insurance Rate Map(s). Those areas identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for King County" dated April 19, 2005, with an accompanying flood insurance map(s) and any revisions thereto. The Flood Insurance Study and accompanying map(s) are hereby adopted by reference, declared part of this part, and are available for public review at the City of Bellevue.*
>
> *3. Additional Areas. Other areas designated by the Director pursuant to this section shall be considered areas of special flood hazard.*
>
> *4. Designation of Areas of Special Flood Hazard. Flood Insurance Rate Maps are to be used as a guide for the City of Bellevue, project applicants, and/or property owners to identify areas of special flood hazard. Flood Insurance Rate Maps may be continuously updated as areas are reexamined or new areas are identified. Newer and more restrictive information for flood hazard area identification shall be the basis for regulation.*
>
> *5. Use of Additional Information. The Director may use additional flood information that is more restrictive or detailed than that provided in the Flood Insurance Study to designate areas of special flood hazard, including data on channel migration, historical data, high water marks, photographs of past flooding, location of restrictive floodways, maps showing future build-out conditions, maps that show stream habitat areas, or similar information.*
>
> *6. Flood Elevation Data. When base flood elevation data is not available (A and V zones), the Director shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal, state, or other source, in order to administer provisions for the area of special flood hazard. In areas of special flood hazard where the BFE has increased due to remapping efforts, the new BFE will establish the regulatory limit. (Ord. 6013, 8-1-11, § 1; Ord. 5680, 6-26-06, § 3)*

Areas of special flood hazard in the South Bellevue Segment Project area include relatively small areas associated with Sunset Creek and Coal Creek, as determined by the Federal Emergency Management Agency (FEMA).

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The mapped Sunset Creek floodplain is shown in an area where Sunset Creek is conveyed underground. The mapped floodplain in the corridor is located north and south of SE Allen Rd in areas developed with apartment buildings, parking areas, sidewalks, and includes some landscaped trees and mowed grass; none of which are associated with a riparian environment.

The mapped Coal Creek floodplain in the Project area includes portions of Coal Creek Parkway and natural forested vegetation associated with the riparian zone of Coal Creek.

A detailed discussion of proposed Project impacts to flood hazard areas is provided in Section 7 of this report.

4.3.6 Shorelines

The City of Bellevue designates the following water bodies as shoreline critical areas (LUC 20.25E.017):

> *1. Lake Washington, including Mercer Slough upstream to Interstate 405 – The lake waters, underlying lands, plus associated floodways, floodplains, marshes, bogs, swamps and river deltas;*
>
> *2. Lake Sammamish – The lake waters and underlying lands, plus associated floodways, floodplains, marshes, bogs, swamps and river deltas;*
>
> *3. Lower Kelsey Creek – The creek waters, underlying lands, plus associated floodways, floodplains, marshes, bogs, swamps and river deltas; and*
>
> *4. Phantom Lake – The lake waters, underlying lands, plus associated floodways, floodplains, marshes, bogs, swamps and river deltas.*

The Project area does not include City of Bellevue shoreline critical areas.

5 REGULATIONS

5.1 Local Regulations

As noted above, critical areas are regulated under the Critical Areas Overlay District (Bellevue Land Use Code [LUC] 20.25H).

5.1.1 Wetlands and Streams

A summary of relevant wetland and stream critical area classifications and standard buffer widths provided in referenced delineation reports are presented again in Tables 2 and 3, below.

The original Delineation Report (The Watershed Company 2016) for the Project identifies Stream JB03 as a Type O stream. Since that report was issued, this

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feature has been determined to be a drainage feature constructed by respective home-owners (email communication between PSE and Don McQuilliams, City of Bellevue Operations Manager, August 2017). As such, JB03 was not included in this impact analysis.

Standard buffer widths for wetlands are based upon the wetland category, whether the site is undeveloped or developed, water quality and habitat scores, and wetland size. In this instance, Bellevue defines an "undeveloped site" as follows:

> *An undeveloped site is any site where the wetland and wetland buffer have not previously been included within a Native Growth Protection Area (NGPA) or Native Growth Protection Easement (NGPE), regardless of whether the site contains a primary structure.*

The Project area generally includes developed areas like the pole yard, roads, and trails. However, these conditions are not consistent with the city's definition of "developed" for determining wetland buffer widths. Furthermore, existing development along the corridor likely preceded the critical areas regulations and associated requirements for NGPEs. For the purposes of this report and in the context of wetland buffer widths, the Project corridor is considered undeveloped.

Standard buffer widths for streams are based upon the stream type and whether or not the Project site contains a primary structure. To determine the latter, delineated streams were reviewed by parcel and buffer widths were determined based upon the presence or absence of a primary structure (Table 3).

Functioning buffers are shown in Appendix B. Functioning buffers are generally characterized as vegetated upland areas in the standard buffer area of wetland and stream critical areas. Impacts to existing impervious surfaces and development were excluded from the impacts analysis as they are considered to provide insignificant functions and values to wetland and/or stream critical areas. Data used to map impervious surfaces and development include the King County Impervious and Impacted Surface data (King County 2009), supplemented with land survey data and high-resolution aerial photography provided by PSE, as well as review from staff biologists that conducted the wetland delineations. Functioning buffers are the basis for the critical areas impact analysis in order to determine Project impacts and mitigation needs.

No structures will be constructed as part of the proposed Project, so no structure setbacks are required from wetland or stream buffers.

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Table 2. Summary of wetland critical area classifications and buffer widths.

Wetland Name[1]	2004 Ecology Wetland Rating				Category	Standard Buffer Width (feet)
	Water Quality	Hydrologic Function	Habitat	Total		
I (Lakeside)	20	8	5	33	III	60
EE (Lakeside)	6	10	14	30	III	60
D (Lakeside)	16	12	16	44	III	60
A (Richards)	6	10	21	37	III	110
B (Richards)	6	12	16	34	III	60
C (Richards)	6	12	20	38	III	110
D (Richards)	20	22	21	63	II	110
H (Richards)	6	16	21	43	III	110
JB02	0	0	7	7	IV	N/A[2]
JB03	0	0	7	7	IV	N/A[2]
JB04	2	6	9	17	IV	40
A (Somerset)	4	12	13	29	IV	40
C (Somerset)	12	4	9	25	IV	N/A[2]
D (Somerset)	12	4	11	27	IV	40
E (Somerset)	4	12	12	28	IV	40
JB05	2	6	13	21	IV	N/A[2]
JB08	8	12	21	41	III	110
MB04	4	0	17	21	IV	40
MB03	0	4	9	13	IV	N/A[2]
MB02	2	4	9	15	IV	N/A[2]
MB01	16	20	12	48	III	60

[1] Lakeside = delineated for Lakeside Substation rebuild in 2014.
Richards = delineated in anticipation of Energize Eastside Project in 2016 and 2017.
Somerset = delineated study conducted in January and February 2017.

[2] Category IV wetlands that are less than 2,500 SF are not regulated by City of Bellevue.

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Table 3. Summary of stream critical area classifications and buffer widths.

Stream Name	Type	Primary Structure?	Buffer (feet)
D (Lakeside)	Type F	Yes – parcel 5453300146 No – parcel 1024059083	50 100
B (Lakeside)	Type F	No – parcels 1024059083, 1024059130	100
F (Lakeside)	Type F	No – parcels 1024059083, 1024059130	100
A (Richards)	Type N	No – parcel 1020459083, 1024059130	50
C (Richards) – Richards Creek	Type F	No – parcels 1024059130, 8135300110	100
JB02	Type F	No – parcel 8135300110	100
JB04	Type F	No	100
JB05 – Coal Creek	Type F	No	100
MB03	Type N	No	50
MB02	Type F	No	100
MB01	Type N	Yes – parcel 1951830050 No – parcels 2824059050, 1951830100	25 50

5.1.2 Priority Geologic Hazard Areas

Geologic hazard areas also require buffers per LUC 20.25H.035. According to this provision, landslide hazard areas and steep slopes require a 50-foot buffer from the top of the slope. In order to map top-of-slope buffers, steep slopes and landslide hazard areas were visually evaluated relative to 10-foot contour data provided by the City of Bellevue, and buffers were clipped to top-of-slope. (Appendix B).

No structures will be constructed as part of the proposed Project, so no structure setbacks are required from priority geologic hazard areas, as determined in the GeoEngineers Report.

5.1.3 Flood Hazard Areas

Vegetation removal in the floodplain requires documentation that describes proposed impacts on the floodplain and instream habitat functions and processes and how the Project will ensure there will be no adverse effect on listed salmonids in accordance with FEMA requirements. In compliance with federal Endangered Species Act (ESA) requirements, a Biological Evaluation (BE) is

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being completed for the Project which will include a discussion of floodplain impacts.

5.2 Alteration of Critical Areas and Buffers

In general, the City of Bellevue will not allow critical areas to be filled, graded, or altered. The LUC requires that an applicant adjust proposed site plans to avoid and/or minimize impacts to critical areas and their respective buffers. New or expanded utility facilities and utility systems are allowed within a critical area or critical area buffer if no technically feasible alternative with less impact on the critical area or critical area buffer exists and if certain other criteria are met (see Section 8 for a review of how the Project meets these criteria).

Proposed alterations to habitat in flood hazard areas are described in detail in the ESA documentation for the Project. Requirements associated with proposed alterations to wetland, streams, landslide hazard areas, steep slopes, and associated buffers are described below.

5.2.1 Wetlands

Mitigation is required for impacts to wetlands and their buffers in order to ensure equivalent or greater protection of critical area functions and values from existing conditions. Bellevue outlines mitigation actions in order of preference, subject to location requirements, as follows (LUC 20.25H.105.A.1):

a. *Restoring wetlands on upland sites that were formerly wetlands.*

   (= Re-establishment)

b. *Creating wetlands on disturbed upland sites such as those with vegetative cover consisting primarily of nonnative introduced species. This should only be attempted when there is a consistent source of hydrology and it can be shown that the surface and subsurface hydrologic regime is conducive for the wetland community that is being designed.*

   (= Creation)

c. *Enhancing significantly degraded wetlands.*

   (= Rehabilitation). Applicants proposing rehabilitation must justify use of this mitigation measure according to LUC 20.25H.105.D.

Per LUC 20.25H.105.B, compensatory mitigation shall be in-kind and onsite or, if onsite is not feasible, in-kind and within the same drainage sub-basin. Location of mitigation actions may be conducted off-site and outside of the drainage sub-basin if certain criteria can be met.

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Mitigation ratios for permanent wetland impacts required by the LUC are provided in Table 5 by type of wetland impact. Temporary wetland impacts are typically restored in-place at a 1:1 ratio.

Table 5. Mitigation ratio requirements per City of Bellevue Land Use Code.

Type of Wetland Impact	Re-establishment or Creation[1]	Rehabilitation[2]
Category II	3:1	6:1
Category III	2:1	4:1
Category IV	1.5:1	3:1

[1] Ratios apply to mitigation that is in-kind, is onsite, is the same category of wetland, is timed prior to or concurrent with alteration and has a high probability of success.

[2] While Bellevue allows for rehabilitation as a mitigation option, mitigation ratios are not provided in the LUC. Recommended mitigation ratios are presented in this table are derived from the Ecology publication, *Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance* (Ecology et. Al 2006), and are presumed to suffice.

Guidance for Project Scenarios not captured in the Bellevue LUC

Mitigation requirements resulting from Project impacts may be most effectively satisfied through a combination of mitigation approaches not specifically described in the LUC. Furthermore, Project impacts are expected to include wetland conversion through PSE's necessary vegetation management activities. For these scenarios, Ecology publication, *Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance* (Ecology et al. 2006), was referenced to determine appropriate wetland mitigation ratios.

Table 6 presents mitigation ratios recommended by the Ecology document. These are consistent with Bellevue's requirements, but also provide additional options including enhancement only and strategies that incorporate a combination of mitigation techniques.

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Table 6. Wetland mitigation ratios based upon interagency guidance (Ecology et al. 2006).

Type of Wetland Impact	Re-establishment or Creation	Rehabilitation only	Re-establishment or Creation (R/C) and Rehabilitation (RH)	Re-establishment or Creation (R/C) and Enhancement (E)	Enhancement only
Category II	3:1	6:1	1:1 R/C and 4:1 RH	1:1 R/C and 8:1 E	12:1
Category III	2:1	4:1	1:1 R/C and 2:1 RH	1:1 R/C and 4:1 E	8:1
Category IV	1.5:1	3:1	1:1 R/C and 1:1 RH	1:1 R/C and 2:1 E	6:1

In addition to permanent impacts to wetlands (conversion to a developed condition), the Project will impact some wetland areas through conversion of forested vegetation communities to shrub or emergent wetland communities. Interagency guidance for mitigating this type of impact is as follows (Ecology et al. 2006):

> *Loss of functions due to the permanent conversion of wetlands from one type to another also requires compensation. For example, when a forested wetland is permanently converted to an emergent or shrub wetland (e.g., for a utility right-of-way) some functions are permanently lost or reduced.*
>
> *The ratios for conversion of wetlands from one type to another will vary based on the type and degree of the alteration, but they are generally one-half of the typical ratios for permanent impacts* (shown in Table 5 above).

5.2.2 Streams

Streams may be modified when associated with a new or expanded utility facility or system; new or expanded public right-of-way, private roads, access easements or driveways; and habitat improvement projects (LUC 20.25H.080). PSE proposes to replace and upgrade the culvert carrying a small, perennial stream (Stream C, also known as Richards Creek) beneath the relocated access driveway to the Richards Creek Substation site as a part of the Project. This Project element will include channel realignment and restoration activities that will compensate for critical area impacts incurred by the Project.

5.2.3 Wetland and Stream Buffers

Functioning wetland and stream buffers converted to a developed condition by the Project shall be replaced at a ratio of 1:1. Mitigation for buffer impacts shall

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occur in the following order of preference and in the following locations (LUC 20.25H.105.A.2 and LUC 20.25H.085.A):

> *a. Onsite, through replacement of lost critical area buffer;*
>
> *b. Onsite, through enhancement of the functions and values of remaining critical area buffer;*
>
> *c. Off-site, through replacement or enhancement, in the same sub-drainage basin;*
>
> *d. Off-site, through replacement or enhancement, out of the sub-drainage basin but in the same drainage basin.*

Where functioning wetland or stream buffers are impacted by a conversion of vegetation (not fill), the proposed mitigation ratio to off-set impacts is 0.5:1, consistent with the guidance for this type of impact to wetland areas.

Temporary wetland and stream buffer impacts are typically restored in-place at a 1:1 ratio.

5.2.4 Landslide Hazard Areas and Steep Slopes

Where construction activities or vegetation removal is proposed in geologic hazard areas, assessment by a qualified professional is required. Proposed alterations to geologic hazard areas are discussed in the GeoEngineers Report (2017) included as Appendix C. In their report, GeoEngineers recommends implementation of specific BMPs and mitigation strategies in order to minimize impacts to geologic hazard areas. BMPs and mitigation strategies are discussed in more detail in Section 8 of this report.

Required performance standards for these areas are outlined in the GeoEngineers Report as well as in Section 9 of this document.

6 MITIGATION SEQUENCING

Pursuant to LUC 20.25H.215, the substation design and pole replacement locations avoid and minimize impacts to critical areas and associated buffers located in the Project corridor to the greatest extent feasible.

Avoidance

Every effort has been made to relocate poles out of critical areas where possible. Completely avoiding impacts to all critical areas and associated buffers as part of the South Bellevue Segment is not achievable. For example, the location of the Richards Creek Substation is dependent upon proximity to existing

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infrastructure, the existing location of other developed substations such as the Lakeside Substation to the north, and the required connections to other PSE transmission lines. The substation has been located outside of the critical areas to the extent possible, re-using as much of the existing pole yard as feasible. Furthermore, construction access has been modified to avoid impacting critical areas and pole construction areas have been adjusted to exclude critical areas on a pole by pole basis.

Even though poles have been moved outside of critical areas, some pole locations and pole replacement activities associated with the transmission line upgrade must occur in specific locations for proper functioning of the electrical system due to complex engineering considerations. Where avoidance is not possible, PSE worked with engineers to locate poles to minimize impacts.

Minimization

Minimization techniques were utilized during the design process in order to limit impacts to critical areas and their associated buffers. Minimization measures included the following:

1. Utilizing the existing transmission line corridor; which has experienced significant disturbance as a result of adjacent development and ongoing corridor maintenance.

2. When working within a critical area, limiting the construction disturbance to the minimum feasible size around each pole and access point.

3. Installing 230 kV transmission lines between poles with minimal site disturbance. Where feasible given maximum distance allowed between poles, the poles will be located outside of critical areas. Transmission lines will span above critical areas, minimizing ground disturbance, vegetation removal, and loss of critical area function.

Mitigation

To off-set unavoidable critical area impacts associated with the Project, mitigation will occur. Mitigation is expected to include restoration of temporary impacts (including maintenance of slope stability), stream restoration, wetland rehabilitation, and critical area buffer enhancement in order to achieve equivalent or greater critical area functions and values compared to existing conditions. Mitigation needs have been calculated based upon anticipated impacts. A detailed wetland mitigation plan is in progress; the preliminary scope and approach are documented in this report.

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7 UNAVOIDABLE PROJECT IMPACTS

Impact types resulting from the Project have been quantified based upon the long-term condition of the proposed work and existing land cover types in the corridor. Quantified impacts have been characterized as one of four types using this analysis and include permanent, conversion, temporary, and no change. A summary of the impact types based on proposed work and existing land cover is provided in Table 7.

Permanent impacts are characterized as a change from a vegetated critical area to a utility pole, culvert footprint, substation footprint, or other associated developed condition. The quantity of permanent impacts occurring in wetlands and wetland/stream buffers will be used to determine mitigation needs based upon the mitigation ratios presented in Tables 5 or 6. No permanent impacts are proposed in geologic hazard areas. Quantified permanent impacts to flood hazard areas (pole footprints) are provided for thoroughness and to aid in the qualitative discussion of impacts; however, there is no direct mitigation requirement associated with flood hazard areas as there is for wetlands or wetland/stream buffers.

Impacts that result in vegetation conversion are caused by vegetation management activities resulting in a shift from forested to shrubby or herbaceous vegetation. These impacts will be limited to disturbance of vegetation; soils will remain intact. These types of impacts also require mitigation for wetlands and wetland/stream buffers, but since the magnitude of impact is less than permanent impacts, a reduced mitigation ratio is proposed using interagency guidance (Ecology et al. 2006). Impacts that result in a vegetation conversion will be mitigated at one-half the typical ratios for permanent impacts (Tables 5 and 6) when they occur in wetlands and wetland/stream buffers.

Quantified vegetation conversion impacts are also presented for geologic and flood hazard areas. However, this measure of impact was not relied upon by respective professionals when assessing Project impacts in these critical areas. For example, GeoEngineers based their analysis on a review of geologic maps and geologic hazard maps, digital imagery, site visits, and PSE site plans (which included trees to be removed but not canopy loss). Conversion impacts are presented for consistency in geologic and flood hazard areas and to also provide the reader's with a comprehensive understanding of Project impacts. Conversion impacts in geologic hazard areas and flood hazard areas do not directly correlate to mitigation requirements as they do for wetlands and wetland/stream buffers.

Temporary impacts will occur as part of the following activities: pole installation, maintenance, and removal; construction access route re-establishment/use; and

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construction limits of the Richards Creek Substation and the culvert replacement. These areas will be restored in-place after construction work is complete.

Where no change is anticipated, due to the existing land cover type in the Project area, no mitigation is required. Impacts results categorized as no change have not been reported.

Project impacts will occur in wetlands, flood hazard areas, landslide hazards, and steep slope critical areas as well as critical area buffers. In addition to quantifying impacts by area, impacts have been qualitatively assessed by a qualified professional for each critical area type to be impacted. The results of the quantitative and qualitative analyses are discussed in the following sub-sections.

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Table 7. Matrix used for determining impact types based upon long-term condition of proposed activities and existing land cover types in critical areas and associated buffers.

			Existing Land Cover Types					
			Forested to be Removed		Forested to Remain		Understory only	Other (mostly lawn)
	Impact Description	**Long Term Condition[1]**	with understory	no understory	with understory	no understory		
Proposed Activities	Pole footprint (actual footprint of pole structure based on engineering drawings from PSE)	Developed	P	P	P	P	P	P
	Permanent development of the Richards Creek Substation	Developed	P	P	P	P	P	P
	Clearing limits for Richards Creek Substation	Mixed vegetation[2]	C	C	T	T	T	T
	Pole buffer (6 foot radius outside of pole footprint)	Mixed vegetation[2]	C	C	T	T	T	T
	Access routes (20 foot width based on alignments from PSE)	Mixed vegetation[2]	C	C	T	T	T	T

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		Existing Land Cover Types					
Impact Description	**Long Term Condition[1]**	Forested to be Removed		Forested to Remain		Understory only	Other (mostly lawn)
		with understory	no understory	with understory	no understory		
Wire Zone	Mixed vegetation[2]	C	C	NC	NC	NC	NC
Managed ROW	Mixed vegetation[2]	C	C	NC	NC	NC	NC
Pole construction work area	Mixed vegetation[2]	C	C	T	T	T	T
Limits of Vegetation Management for Richards Creek Substation	Mixed vegetation[2]	C	C	NC	NC	NC	NC
Legal ROW	Mixed vegetation[2]	C	C	NC	NC	NC	NC

Type of Impact based on proposed activity, long term condition, and existing land cover type: P = Permanent, C = Conversion, T = Temporary, NC = No Change

[1] Long term condition determined in coordination with PSE.
[2] Subject to varying height restrictions described in Section 3.3.5.

7.1 Critical Area Impacts

7.1.1 Wetlands

Impacts are proposed to a Category II, Category III, and Category IV wetlands; no Category I wetlands are located in the Project limits. No impacts will occur in the Sunset Creek and Newport drainage basins. Wetland impacts are quantified in Tables 8 through 11, below. Impacts characterized as permanent and conversion will be mitigated according to the ratios presented in Section 5.2.

The vast majority of Project impacts occur in the Richard's Creek sub-basin and, more specifically, at or immediately adjacent to the proposed Richards Creek Substation parcel (including impacts at Lakeside Substation to the north) (Table 8). Of the total permanent impacts, 98 percent occur on the Richards Creek or Lakeside Substation properties. Similarly, 88 percent of vegetation conversion impacts occur on the Richards Creek or Lakeside Substation properties.

Project impacts generated in the transmission line corridor are relatively minor. This is due to the existing maintenance of the corridor for 115kV transmission lines and the petroleum pipeline. Impacts in the transmission line corridor (from new pole footprints) are also offset by the removal existing poles. Two poles contributing 12 SF of fill will be removed from Wetland A (Richards); one pole contributing 6 SF of fill will be removed from the buffer of Wetland A (Richards) near Lakeside Substation. The area of pole removal in wetland and wetland/stream buffer critical areas has been removed from the total impact area and is reported as area of *net* impact in Tables 8 through 11.

A qualitative description of impacts can be found in Section 7.2 (Functional Lift Analysis) followed by a description of the mitigation activities proposed to compensate for the proposed impact.

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Table 8. Project impacts at the Richards Creek Substation (including impacts at Lakeside Substation) versus transmission line corridor by sub-basin.

	Location	Net Permanent Impact	Vegetation Conversion
Richards Creek sub-basin	Richards Creek Substation	2,531 SF (98 %)	10,045 SF (88 %)
	Transmission Line Corridor	44 SF (2 %)	73 SF (1 %)
Coal Creek sub-basin	Transmission Line Corridor	0	1,223 SF (11 %)
	TOTALS:	2,575 SF	11,341 SF

Table 9. Project impacts to Category II wetlands by sub-basin.

	Category II Wetland Impacts	Area of Net Impact (SF)	Source of Impact
Richards Creek Sub-basin	Permanent	41	Development of Richards Creek Substation in Wetland D (Richards)
	Conversion	100	Legal ROW in Wetland D (Richards)
	Temporary	731	Clearing limits of Richards Creek Substation in Wetland D (Richards)

Table 10. Project impacts to Category III wetlands by sub-basin.

	Category III Wetland Impacts	Area of Net Impact (SF)	Source of Impact
Richards Creek Sub-basin	Permanent	2,534	Development of Richards Creek Substation in Wetlands A and B (Richards) and pole footprints in Wetlands A and H (Richards)
	Conversion	10,018	Legal ROW, managed ROW, wire zone, pole work area, access route, and/or pole buffer in the following Wetlands: A (Richards)and H (Richards)
	Temporary	8,252	Clearing limits of Richards Creek Substation, pole work area, pole buffer, and/or access route in Wetland A (Richards) and Wetland H (Richards)

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	Category III Wetland Impacts	Area of Net Impact (SF)	Source of Impact
Coal Creek Sub-basin	Permanent	0	None
	Conversion	1,145	Wire zone and managed ROW in Wetland MB01
	Temporary	0	None

Table 11. Project impacts to Category IV wetlands by sub-basin.

	Category IV Wetland Impacts	Area of Net Impact (SF)	Source of Impact
Coal Creek Sub-basin	Permanent	0	None
	Conversion	0	None
	Temporary	1,155	Pole buffer in Wetland A (Somerset); pole work area in Wetland D (Somerset)

7.1.2 Wetland and Stream Buffer Impacts

Impacts are proposed to wetland and stream buffers in the South Bellevue Segment. Buffer impacts are largely generated by proposed activities occurring at the Richards Creek Substation parcel and required vegetation management. Wetland and stream buffer impacts are quantified in Table 12, below. Impacts characterized as permanent and conversion will be mitigated according to the ratios presented in Section 5.2.3.

A qualitative description of buffer impacts can be found in Section 7.2 (Functional Lift Analysis) followed by a description of the mitigation activities proposed to compensate for the proposed impact.

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Table 12. Wetland and stream buffer impacts by sub-basin.

	Wetland and Stream Buffer Impacts	Area of Net Impact (SF)	Source of Impact
Richards Creek Sub-basin	Permanent	23,893	Development of Richards Creek Substation and pole footprint
	Conversion	22,885	Richards Creek Substation limit of vegetation management, Richards Creek Substation clearing limits, legal ROW, managed ROW, pole buffer, pole work area, access route, and wire zone
	Temporary	35,362	Richards Creek Substation clearing limits, pole buffer, pole work area, and access route
Coal Creek Sub-basin	Permanent	35	Pole footprint
	Conversion	7,734	Legal ROW, managed ROW, and wire zone.
	Temporary	5,407	Access route, pole buffer, and pole work area

7.1.3 Geologic Hazard Area Impacts and Associated Buffer Impacts

Impacts to geologic hazard areas and associated buffers have been reviewed by GeoEngineers based on PSE's proposed activities. As stated previously, many areas of mapped steep slopes were eliminated from the impact analysis because of their existing land use (engineered road slopes, engineered landscaping, etc.) and the proposed activities at those locations.

Quantified impacts to landslide hazard areas and steep slopes result from vegetation management in the legal ROW, managed ROW, and wire zone in the Coal Creek drainage area and total 5,031 SF and 4,447 SF, respectively. No permanent or temporary impacts are proposed in the priority geologic hazard areas. Buffer impacts to priority geologic hazard areas are also proposed, resulting from access routes, pole buffer, pole work area, and vegetation management. One new pole is proposed in geologic hazard area buffers to replace 5 existing poles to be removed resulting in an overall decrease in fill in this critical area type.

GeoEngineers' review of priority geologic hazard areas included a site visit to the legal ROW in the Coal Creek drainage in which they observed no indication of slope movement. Additionally, the utility corridor was found to be actively maintained as a result of the existing utilities, especially the pipeline (regularly

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mowed grass, no trees). GeoEngineers determined that PSE's proposed work would be consistent with management activities of the existing pipeline and was not anticipated to impact the mapped geologic hazard areas of the Coal Creek drainage. This assessment was made in conjunction with recommendations aimed at mitigating potential impacts through implementation of BMPs and TESC measures. Those recommended mitigation strategies are discussed in Section 8 of this report.

Refer to GeoEngineers Report (2017) for additional details (Appendix C).

7.1.4 Flood Hazards Areas

As part of the proposed Project, two existing H-frame structures which include a total of four poles, will be removed from a flood hazard area associated with Sunset Creek and replaced with two new poles. The existing H-frame poles are currently situated in a highly developed area with medium to high density residential development and paved roads and parking areas. Existing pole footprints are approximately 6 SF each, totaling approximately 24 SF of area. The proposed new pole footprints[1] total 56 SF (Table 13). According to LUC 20.25H.180 "post and piling techniques are preferred and are presumed to produce no increase in the Base Flood Elevation (BFE). Demonstration of no net rise in the BFE through calculation is not required." There will be no impact to the flood storage capacity of the flood hazard area.

Vegetation management impacts to 100-year floodplains in the Project area are also anticipated. Vegetation impacts may result from a number of proposed activities that can be characterized as a conversion of vegetation. Vegetation conversion impacts in the Sunset Creek floodplain are resulting from activities associated with installation of new poles and vegetation management in the legal ROW, managed ROW, and wire zone. The trees that will be removed are located in maintained landscaped areas on Bellevue School District property and nearby apartment buildings. They are not considered to be located in a riparian landscape setting (Sunset Creek flows underground at this location) and are not considered to provide significant habitat value to the mapped floodplain.

Similarly, vegetation management activities will require selective removal of trees located in the Coal Creek floodplain. The Coal Creek floodplain differs in character than the Sunset Creek floodplain; vegetation is predominantly native trees associated with an above-ground stream channel. Vegetation removal will be selective and not significantly impact the canopy cover of the stream at this location. Minimization measures to limit impacts to the floodplain will be

[1] New poles will range in size from 4 to 6 feet in diameter. For the purposes of this analysis, the largest diameter was used to calculate Project impacts. If it is determined that the Project intent can be accomplished using smaller-diameter poles at this location, impacts would be reduced accordingly.

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utilized for tree removal and include foot-access only and BMPs to limit erosion and sediment-laden runoff. Stumps will be left in the ground and cut vegetation will be chipped, dispersed, or removed as appropriate. As stated previously, in compliance with federal ESA requirements, a BE is being completed for the Project which will expand upon floodplain habitat impacts summarized previously.

Table 13. 100-year floodplain and floodplain vegetation impacts.

	Floodplain Impacts	Area of Net Impact (SF)	Source of Impact
Zone AE (Sunset Creek)	Permanent	32	Pole footprints in floodplain associated with Sunset Creek
	Conversion	4,508	Pole buffer, pole work area, access route, legal ROW, managed ROW, and wire zone in Sunset Creek floodplain
	Temporary	1,679	Access route, pole buffer, and pole work area
Zone A (Coal Creek)	Permanent	0	None
	Conversion	2,777	Legal ROW, managed ROW, and wire zone in Coal Creek floodplain.
	Temporary	0	None

7.2 Functional Lift Analysis

Wetland and stream critical areas and their associated functional buffers have been qualitatively assessed, in addition to the quantitative analysis presented above. For the purposes of this section, the pre-existing condition of the Project area is compared against the post-Project condition to ensure that no net loss of critical area functions is achieved. With mitigation, a net increase in functions is expected post-Project in accordance with LUC 20.25H.

In general, proposed permanent wetland impact and mitigation areas are disturbed and dominated by invasive plants such as non-native blackberry and reed canarygrass. Wetland impacts classified as vegetation conversion involve removal of native and non-native trees from wetland areas. Table 14 below summarizes impacts, existing conditions, and proposed conditions. An analysis and comparison of the specific functions and values provided by the pre-existing sites and the post-Project sites is provided in Table 15. The functional lift analysis

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describes how the mitigation plan will provide equivalent or greater critical area functions when compared to existing conditions.

Proposed mitigation will maintain wetland and buffer functions and values through wetland and buffer restoration and temporary impact restoration. Permanent wetland impacts will be mitigated through rehabilitation of degraded wetland areas. Mitigation is designed to meet or exceed the referenced Ecology recommendations.

A greater area of native habitat will result from the proposal. The property will be more suitable overall for urban songbird and small mammal species than it is presently; the understory will contain more woody vegetation and a greater structural complexity, which is more attractive to songbirds and small mammals than is low-growing, homogeneous vegetation. As well, a greater mix of flowering, fruiting and seeding plants will provide forage over a longer yearly timespan than the relatively uniform existing invasive vegetation and sparse understory areas. Wildlife species of the Pacific Northwest are also better adapted to forage provided by native plants than non-native species.

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Table 14. Descriptions of general impact area conditions and proposed changes.

Impact Location and Quantity	Existing condition	Proposed action
Wetland A (Richards) Permanent Impacts: 397 SF Vegetation Conversion: 9,945 SF	Wetland A is a large slope wetland that crosses existing PSE transmission line corridor. As a result, areas that have experience past impacts or disturbance from the transmission line are degraded and consist of Himalayan blackberry and reed canarygrass monocultures.	Wetland fill associated with development of Richards Creek Substation, including culvert replacement and pole footprints. Conversion from forested wetland area to shrub wetland area to accommodate new, higher voltage transmission lines and substation. Temporary impacts associated with clearing limits for Richards Creek Substation and pole work areas. Stream & wetland enhancement: wetland enhanced with realigned stream channel, installation of LWD, removal of invasive vegetation, installation of native vegetation. The stream realignment allows for the creation of more complex and higher quality riparian wetlands and buffers of substantial width along both sides of the stream, whereas the existing alignment is straight, borders a paved area, and is largely lined with reed canarygrass and nightshade.
Wetland B (Richards) Permanent Impacts: 2,060 SF	Wetland B is a small slope wetland that is dominated by an understory of dense Himalayan blackberry. Some native plants are present to a lesser extent and include Pacific willow, red alder, salmonberry, giant horsetail, and lady fern.	Wetland fill associated with development of Richards Creek Substation.

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Impact Location and Quantity	Existing condition	Proposed action
Wetland D (Richards) Permanent Impacts: 41 SF Vegetation Conversion: 100 SF	Wetland D is a riverine wetland dominated by Pacific willow, red alder, lady fern, small-fruited bulrush, reed canarygrass, and giant horsetail with some Himalayan blackberry rooted along the fringes.	Wetland fill associated with development of Richards Creek Substation culvert replacement. Conversion from forested wetland area to shrub wetland area to accommodate new, higher voltage transmission lines. Temporary impacts associated with clearing limits for Richards Creek Substation. Stream & wetland enhancement: wetland enhanced with realigned stream channel, removal of invasive vegetation, installation of native vegetation. The stream realignment allows for the creation of more complex and higher quality riparian wetlands and buffers of substantial width along both sides of the stream.
Wetland H (Richards) aka Wet JB01 Permanent Impacts: 77 SF Vegetation Conversion: 73 SF	Wetland H is a slope wetland that consists of native and non-native plant species. Prevalent invasive, non-native species are located in the existing transmission line corridor and include reed canarygrass, birdsfoot trefoil, and Himalayan blackberry.	Wetland fill associated with pole footprints. Conversion from forested wetland area to shrub wetland area to accommodate new, higher voltage transmission lines. Temporary impacts associated with clearing limits for Richards Creek Substation, pole work areas, and access routes.
Wetland MB01 (Coal Creek sub-basin) Vegetation Conversion: 1,146 SF	Wetland MB01 is a depressional wetland located in the existing transmission line corridor and adjacent to a well-used trail. It is dominated by a mix of native and non-native species that includes Pacific willow, red-osier dogwood, bittersweet nightshade, and Himalayan blackberry.	Conversion from forested wetland area to shrub wetland area to accommodate new, higher voltage transmission lines. Wetland enhancement at Somerset Substation: removal of invasive vegetation, installation of native vegetation.

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Impact Location and Quantity	Existing condition	Proposed action
Wetland & stream buffers (Richards sub-basin) Permanent Impacts: 23,893 SF Vegetation Conversion: 22,886 SF	Buffer impacts are generally located on the Lakeside or Richards Creek Substation parcels or in the existing transmission line corridor. Due to previous development/disturbance and existing land uses, buffer areas are mostly degraded, consisting of compact soils and invasive vegetation (predominantly Himalayan blackberry and reed canarygrass).	Buffer loss associated with development of Richards Creek Substation and pole footprints. Conversion from forested buffer area to shrub buffer area to accommodate new, higher voltage transmission lines. Temporary impacts associated with clearing limits for Richards Creek Substation and pole work areas. Stream & wetland buffer enhancement: removal of invasive vegetation, installation of native vegetation. The stream realignment allows for the creation of more complex and higher quality riparian wetlands and buffers of substantial width along both sides of the stream, whereas the existing alignment is straight, borders a paved area, and is largely lined with reed canarygrass and nightshade.
Wetland & stream buffers (Coal Creek sub-basin) Permanent Impacts: 35 SF Vegetation Conversion: 7,734 SF	Buffer impacts are generally located in the existing transmission line corridor. Due to previous development/disturbance and existing land uses, buffer areas are mostly degraded, consisting of compact soils and invasive vegetation (predominantly Himalayan blackberry and reed canarygrass).	Buffer loss associated with pole footprints. Conversion from forested buffer area to shrub buffer area to accommodate new, higher voltage transmission lines. Temporary impacts associated with access route and pole work areas. Wetland buffer enhancement at Somerset Substation: removal of invasive vegetation, installation of native vegetation.

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Table 15. Functional lift analysis.

Critical Area/ Buffer Functions	Existing Conditions	Proposed Conditions	Functional Improvement?
Water Quality	Much of the upstream drainage basin at the Richards Creek Substation site is built-out and urbanized. Stream flow includes storm runoff from significant areas of paved, pollution-generating surfaces, and so can be assumed to carry a variety of pollutants typical of urban runoff. Existing stream channel and limited (one side of channel only) riparian areas are not optimized to provide effective biofiltration to remove these pollutants and so improve water quality. Most of existing wetland and buffer impact area is dominated by invasive vegetation including blackberry, reed canarygrass, and nightshade. Soils are compacted. These invasive weedy plant species prevent the growth of native plants, which are generally more efficient at filtering stormwater.	The stream channel will be relocated such that functional riparian buffers can be provided along both sides of the stream instead of only one. Functional buffers will also be wider, and the prevalence of invasive plant cover will be reduced. Native trees, shrubs, and groundcover will be added to the existing and expanded wetland, stream and buffer areas.	Wider and more fully vegetated buffers along both sides of the stream will increase their capacity to provide biofiltration function. This will help to improve water quality from stormwater originating off-site upstream as well as helping to filter storm water originating onsite prior to it reaching the stream onsite. See also sediment transport, below. Preventing flows from spilling out onto a lower, paved industrial area adjoining to the west during high-flow events (and even from pervasive seepage) will reduce the entrainment of pollutants from this pollution-generating surface.
Hydrologic	Areas of dense invasive species along the existing stream channel, typically reed canarygrass, water-cress, and Himalayan blackberry, are impeding proper drainage and habitat functions.	Invasive, channel-clogging vegetation will be removed and replaced with native trees, shrubs, and live stakes. Restore degraded wetland, and wetland/ stream buffer areas with native shrubs and groundcover.	New native plantings will provide increased soil stability and native vegetation that could potentially reduce velocity of peak flows; thereby improving wetland and stream buffer functions, along with increased channel dimensions and flow-

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Critical Area/ Buffer Functions	Existing Conditions	Proposed Conditions	Functional Improvement?
			carrying capacity.
Habitat	Blackberry and some existing native vegetation provides limited food and cover for birds and small mammals. The lack of plant species and structural diversity limits food sources and cover opportunities for most wildlife species. The stream channel segment is used by some cutthroat trout, but it is straight and choked with grass and vines in places. It lacks deep pool habitat with intervening riffles, and there is very little wood for protective cover or to provide scour to form and maintain pools. It has a western exposure due to an adjoining paved industrial supply storage area. As a result, it is exposed to direct afternoon sunlight from the west which has a tendency to harmfully increase water temperatures.	While some of the non-native blackberry will remain, native shrubs, and groundcover will be added to wetland and buffer enhancement areas. A meandering channel design combined with woody debris placement, native revegetation, and wetland enhancements will create a complex and diverse aquatic habitat beneficial for fish and macroinvertebrates as well as other wildlife. This approach also produces varied flow velocities allowing for natural sediment movement and deposition patterns to occur. The channel alignment has been laid out to minimize impacts to wetlands and to preserve as many trees onsite as feasible. The original stream bed along the west property line of the subject site will not be filled in after stream flow is diverted into the new channel. The remnant channel is anticipated to continue to capture seepage and shallow groundwater and will continue to provide ecological diversity and function as a wetland given the nature of the site hydrology. Tree trunks and roots wads will be strategically located along the restored reach to create and maintain scour pools and areas of refuge for fish	Stream, wetland, and buffer areas will be enhanced with new native plantings, which will provide a net increase in species and structural diversity. Culvert replacement and stream restoration will result in net habitat benefits following Project implementation. It will improve fish passage, and improve in-stream and riparian habitat conditions. Additionally, temporary impact areas will be restored. New plantings will provide organic matter and foraging and nesting opportunities for terrestrial wildlife, including several songbird species.

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Critical Area/ Buffer Functions	Existing Conditions	Proposed Conditions	Functional Improvement?
		as well as provide channel diversity and stability.	
Sediment Transport and Management	The stream channel gradient is much steeper upstream of the existing pair of culverts and becomes flatter below, causing sediments to accumulate at the culvert inlet, blocking flow. Frequent maintenance is needed to unclog the culverts to maintain flow. The channel downstream of the culverts also fills with sediment, causing flows to spill out onto an adjacent, lower paved industrial area.	The proposed replacement culvert for the access route crossing will meet current design standards for fish passage (WDFW, 2013), provide flow conveyance for up to the 100-year peak flow rate, and facilitate sediment management. The replacement culvert will contain a sediment trap beneath the access route with a road-accessible cleanout.	The proposed culvert replacement and stream realignment will increase streamflow conveyance capacity, improve sediment transport, facilitate sediment removal from the system, replace undersized culverts, reduce flooding that now occurs on the adjoining property to the west. The completed Project will contain all flows from large storms within a stable channel and floodplain and trap sediments in a planned location for relatively easy, low-impact removal.
Net Condition	Degraded stream, wetland, and buffer areas on PSE properties and existing transmission line corridor.	Enhanced and restored ecological condition of stream, wetland, and buffer areas as described above.	Stream, wetland, and buffer areas restored with an increase in native vegetation; filtering of stormwater by native plantings; increased habitat structural and compositional complexity, LWD, and an increase in organic material to the food chain. Proposed mitigation will maintain and improve wetland and buffer functions and values. Permanent wetland and buffer impacts will be mitigated through rehabilitation of degraded wetland and buffer areas. Mitigation is designed to meet or exceed the referenced Ecology recommendations.

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7.3 Cumulative Impacts

Impacts from past actions have shaped the project vicinity since the mid-19th century, and continue to shape how Seattle and the Eastside are changing in response to development activities and trends. In general, landscape-scale and basin-level functions and processes are negatively impacted by increased impervious surface, critical area and buffer vegetation removal, and buffer area losses. This is common to urban areas like Bellevue which have experienced a general loss of upland forested, riparian, and wetland habitat areas due to development. Urbanization, which Bellevue has experienced in recent decades, tends to cause flashy stream hydrology, increased pollutant loads, sedimentation, and overall habitat loss, resulting in only a few areas of high-value fish and wildlife habitat remaining. Other large projects such as Sound Transit's East Link Light Rail overlap with the proposed Energize Eastside project and contribute to these ongoing trends and cumulative impacts on high-value uplands and wetlands in the vicinity. These changes, along with additional urban development, continue to incrementally reduce remaining habitat areas and aquatic resources.

Although urbanization has resulted in an overall loss and degradation of available fish and wildlife habitat throughout the study area, current regulations have slowed the trend of habitat loss to a degree, and in the case of fish passage in particular, future permitted projects are likely to incrementally provide net benefit to habitat. Mitigation measures for these projects may include restoration or enhancement of degraded streams and wetlands and their associated buffers, thus providing water quality treatment for impervious surfaces that currently receive no treatment, removal of fish passage barriers, and planting of disturbed areas with native vegetation. These mitigation measures benefit fish and wildlife habitat when compared to existing conditions and improve conditions for federally listed threatened or endangered species, if present.

The Energize Eastside Project would contribute to the trend of degradation directly by removing trees and altering available habitat conditions, and indirectly by continuing to supply energy to support a growing, developing region. Project mitigation would help to reduce cumulative impacts, but will not immediately replace all habitat lost. Replacing large significant trees with smaller planting-sized trees would not fully replace the habitat functions provided by the existing conditions. Including snags and large woody debris in mitigation plans will help to address the loss of forested habitat values in the short term, and over time the loss of function would be further addressed as mitigation areas mature.

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The Project also includes a culvert replacement and stream channel realignment and restoration. These activities are expected to improve both fish habitat and alleviate current sedimentation problems from existing conditions. Permanent wetland and buffer impacts will be appropriately mitigated in order to minimize the Project's cumulative impacts to each sub-basin (Richards Creek and Coal Creek). No long-term impacts to water resources are expected as a result of the Project. A mitigation plan to compensate for impacts identified in this report is in progress. While the vegetation structure within the Project area will be altered, a net increase in native habitat area is expected in the long-term with mitigation.

8 PRELIMINARY MITIGATION PLAN

8.1 Wetland and (Wetland and Stream) Buffer Mitigation

As stated in Section 5, Bellevue requires that compensatory wetland mitigation is developed to satisfy the City's preferred mitigation location followed by preferred mitigation action. Bellevue prioritizes onsite mitigation followed by mitigation in the same drainage sub-basin; the City also prefers wetland restoration or creation over rehabilitation.

In order to determine a mitigation strategy and satisfy city preferences, locations for potential mitigation actions were first determined. Since the Project is long and linear in nature, it passes through, and generates impacts, across many "sites." However, the overwhelming majority of Project impacts occur at the Richards Creek Substation/Lakeside Substation site. As such, the Richards Creek Substation parcel was reviewed for mitigation potential. Wetland restoration and creation was considered for the property, but determined to be infeasible due to existing site conditions (most of the remaining vegetated area onsite is already wetland or stream) and the inability to appropriately buffer any new or restored wetland area. Existing wetland and wetland/stream buffers are degraded on the Richards Creek Substation site and provide ample opportunity for enhancement/rehabilitation.

The Richards Creek Substation site provides enough opportunity and area to mitigate for all wetland and wetland/stream buffer impacts that occur in the Richards Creek sub-basin. It is also the site in the South Bellevue Segment that sustains the majority of Project impacts (by a significant margin). In general, mitigation sites are more successful when combined into fewer larger areas, rather than piecemealed across several smaller sites. Furthermore, the wetlands located at the Richards Creek site are situated in a landscape position (adjacent to streams) that makes mitigation more valuable at this location than at small isolated wetlands in the corridor. Lastly, PSE's ownership of the Richards Creek

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Substation parcel will allow for mitigation areas to be easily accessed, installed, maintained, and monitored without requiring special property access or homeowner coordination, which could be a complicating factor for other areas along the corridor if a strict mitigation-by-site approach was taken.

Similarly, impacts generated by the Project in the Coal Creek sub-basin will be mitigated for within that sub-basin, but combined into one accessible area that appropriately mitigates for the functions and values affected by the Project in this sub-basin.

The proposed mitigation plan is designed to restore and enhance wetland and stream critical areas in the study area. The plan will account for long-term pole access and maintenance needs, the existing gas pipeline easement, site topography, habitat connectivity, and vegetation height restrictions.

The final permit plan set will include notes that fulfill the requirements of LUC 20.25H.220.B and provide clear direction for mitigation goals, performance standards, monitoring and maintenance protocols, and contingencies for the duration of the required five-year monitoring period. Mitigation strategies are outlined and a suggested mitigation plant list and typical is provided in this section.

The mitigation plan for the Project will be developed further as the Project progresses. For this preliminary plan, needs have been calculated based upon critical area impacts and the required mitigation ratios presented in Section 5.2 (Tables 4 and 5).

Rehabilitation (RH) is currently the proposed mitigation strategy. Tables 16 and 17 summarize the wetland mitigation required to compensate for Project impacts by drainage sub-basin. Table 18 summarizes the wetland and stream buffer mitigation required by drainage sub-basin.

Potential rehabilitation efforts consist of removing/reducing the presence of non-native plant species and installing a diverse native plant community consistent with the vegetation management requirements of the particular site.

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Table 16. Calculation of mitigation needs for wetland impacts in Richards Creek sub-basin.

	Impact	Impact Quantity (SF)	Mitigation Ratios by Preferred/Feasible Avenue*			Mitigation Required (SF)
			Re-establishment or Creation	Rehabilitation only	Re-establishment or Creation (R/C) and Rehabilitation (RH)	
Category II	Permanent	41	3:1	**6:1**	1:1 R/C and 4:1 RH	246 RH
	Conversion	100	1.5:1	**3:1**	0.5:1 R/C and 2:1 RH	300 RH
Category III	Permanent	2,534	2:1	**4:1**	1:1 R/C and 2:1 RH	10,136 RH
	Conversion	10,018	1:1	**2:1**	0.5:1 R/C and 1:1 RH	20,036 RH
Category IV	Permanent	0	1.5:1	**3:1**	1:1 R/C and 1:1 RH	0
	Conversion	0	0.75:1	**1.5:1**	0.5:1 R/C and 0.5:1 RH	0
					Total:	30,718 RH (0.71 acres)
	*Preferred mitigation strategy is rehabilitation and used to generate the amount of mitigation required.					

Table 17. Calculation of mitigation needs for wetland impacts in Coal Creek sub-basin.

	Impact	Impact Quantity (SF)	Mitigation Ratios by Preferred/Feasible Avenue*			Mitigation Required (SF)
			Re-establishment or Creation	Rehabilitation only	Re-establishment or Creation (R/C) and Rehabilitation (RH)	
Category III	Permanent	0	2:1	**4:1**	1:1 R/C and 2:1 RH	0
	Conversion	1,145	1:1	**2:1**	0.5:1 R/C and 1:1 RH	2,290 RH

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	Impact	Impact Quantity (SF)	Mitigation Ratios by Preferred/Feasible Avenue*			Mitigation Required (SF)
			Re-establishment or Creation	Rehabilitation only	Re-establishment or Creation (R/C) and Rehabilitation (RH)	
Category IV	Permanent	0	1.5:1	**3:1**	1:1 R/C and 1:1 RH	0
	Conversion	0	0.75:1	**1.5:1**	0.5:1 R/C and 0.5:1 RH	0
					Total:	2,290 RH (0.05 acres)
	*Preferred mitigation strategy is rehabilitation and used to generate the amount of mitigation required.					

Table 18. Calculation of mitigation needs for wetland and stream functioning buffer impacts.

	Wetland and Stream Buffer Impacts (overlapping)	Area of Impact (SF)	Proposed Mitigation Ratio	Buffer Mitigation Required (SF)
Richards Creek Sub-basin	Permanent	23,893	1:1	23,893
	Conversion	22,885	0.5:1	11,443
			Total:	35,336 (0.81 acres)
Coal Creek Sub-basin	Permanent	35	1:1	35
	Conversion	7,734	0.5:1	3,867
			Total:	3,902 (0.09 acres)

8.1.1 Richards Creek Drainage Sub-basin Mitigation Strategy

Wetland Mitigation

As stated previously, wetland impacts occurring the Richards Creek sub-basin will be mitigated for at the Richards Creek Substation site based upon the location of the majority of wetland impacts, site access considerations, and in an effort to limit the number of small disconnected mitigation sites in the corridor. The wetland mitigation required in the Richards Creek sub-basin based on calculated impacts consists of 30,718 SF (0.71 acres) of rehabilitation. The Richards Creek Substation site provides opportunities for both wetland and buffer mitigation. Some wetland mitigation (16,417 SF) is currently planned, and described in the section below.

Outside of the planned Richards Creek improvements, a total of 13,925 SF (0.32 acres) will still be necessary to properly mitigate for Project impacts in the Richards Creek sub-basin. This additional mitigation is expected to be achieved by rehabilitating degraded areas of Wetland A, also located on the Richards Creek Substation (Figure 2).

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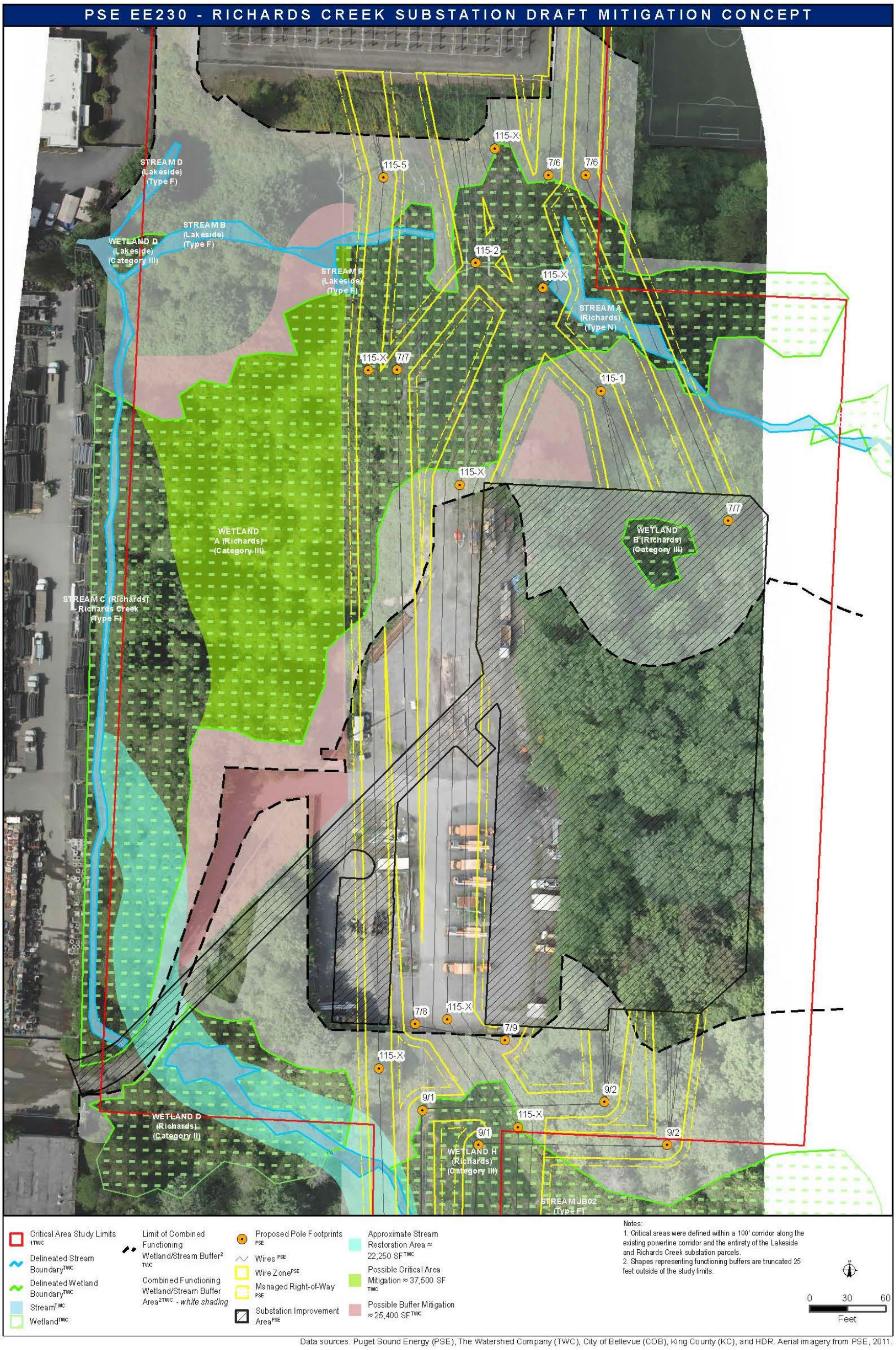

Figure 2. Conceptual mitigation figure depicting areas where mitigation may potentially occur.

Richards Creek Improvements in Wetlands A and D at Richards Creek Substation Site

Currently, planned Project mitigation activities consist of rehabilitation of Wetlands A and D (Richards) through stream realignment and replanting (Appendix A). Current plans include 16,417 SF of wetland rehabilitation associated with this stream realignment and restoration activities described below.

PSE is planning to replace and upgrade the culvert carrying a small, perennial stream beneath the access driveway to the existing pole yard located beyond the east end of SE 30th Street in the City of Bellevue, just north of I-90 and 0.75 miles east of I-405. A pair of aging and undersized culverts (two side-by-side, 18-inch diameter corrugated metal pipe culverts) have proven inadequate to carry the combined flow and sediment loading along the stream. The scope of the proposed work includes a new culvert crossing and restoring or enhancing affected adjoining habitat areas. These include affected wetlands and the realigned and enhanced stream sections extending upstream and downstream of the crossing.

Construction associated with proposed culvert replacement and stream realignment will result in temporary disturbance to streams, wetlands, and their associated buffers, but will also result in net habitat benefits following Project implementation. During construction, any fish isolated in the localized instream work area will be removed by the stream restoration specialist in the work area. Given the size and characteristics of the existing stream, it is expected that stranded fish can be located and captured using dipnets or small seines followed by electrofishing. Efforts to capture and relocate fish by netting methods will precede electrofishing. Captured fish will be released in unaffected reaches downstream of the Project area.

The proposed culvert replacement and stream realignment will increase streamflow conveyance capacity, improve sediment transport, facilitate sediment removal from the system, replace undersized culverts, reduce flooding that now occurs on the adjoining property to the west, improve fish passage, and improve in-stream and riparian habitat conditions.

The restored stream will have a defined channel and floodplain benches, as well as the capacity to convey the predicted 100-year peak flow rate. A meandering channel design combined with woody debris placement, native revegetation, and wetland enhancements will create a complex and diverse aquatic habitat beneficial for fish and macroinvertebrates as well as other wildlife. This approach also produces varied flow velocities allowing for natural sediment movement and deposition patterns to occur. The channel alignment has been laid out to

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minimize impacts to wetlands, preserve as many trees onsite as feasible, and provide a more functional buffer. The original stream bed along the west property line of the subject site will not be filled in after stream flow is diverted into the new channel. The remnant channel is anticipated to continue to capture seepage and shallow groundwater and will continue to provide ecological diversity and function as wetland given the nature of the site hydrology. Tree trunks and roots wads will be strategically located along the restored reach to create and maintain scour pools and areas of refuge for fish as well as provide channel diversity and stability.

Wetland and Stream Buffer Mitigation

Required buffer mitigation in the Richards Creek sub-basin is 35,336 SF or approximately 0.81 acres. As stated previously, buffer mitigation opportunities exist on the Richards Creek Substation parcel and consist of approximately one acre. It is expected that the required buffer mitigation could be achieved at the Richards Creek Substation parcel, in part, with the removal of the existing access driveway and restoration of this area.

8.1.2 Coal Creek Drainage Sub-basin Mitigation Strategy

Wetland Mitigation

Required wetland mitigation in the Coal Creek sub-basin is 2,290 SF (0.05 acres) of rehabilitation. Opportunity to accomplish the wetland mitigation required exists on the Somerset Substation parcel located east of Coal Creek Parkway. Approximately one-quarter acre of mitigation opportunity in degraded wetland area has been identified on the parcel. Future development at the Somerset Substation (not part of the Project) will be considered as mitigation planning in this area progresses.

Wetland and Stream Buffer Mitigation

Required buffer mitigation in the Coal Creek sub-basin is 3,902 SF (0.09 acres) of rehabilitation. Opportunity to fulfill this buffer mitigation need exists on the Somerset Substation parcel located east of Coal Creek Parkway. Future development at the Somerset Substation (not part of the Project) will be considered as mitigation planning in this area progresses.

8.1.3 Example Plant Lists and Typicals

Proposed mitigation associated with the Richards Creek Substation culvert replacement is included in Appendix A. Presented below (Figures 3a and 3b) is a transmission line typical mitigation planting plan. All plants to be installed will need to meet the vegetation management requirement of a given mitigation site. Maximum species heights will be considered when creating site-specific plant species lists.

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Figure 3a. Example typical and plant species list.

SEED SCHEDULE

SEED MIXES

PRO-TIME 840 NATIVE BIO-FILTER MIX

SCIENTIFIC NAME/COMMON NAME	% BY WEIGHT	APPLICATION RATE
ELYMUS GLAUCUS / BLUE WILDRYE	47	AVAILABLE FROM HOBBS AND HOPKINS, PORTLAND OREGON, (503) 239-7518.
FESTUCA RUBRA / RED FESCUE	40	SEEDING RATE: SEED AT A RATE OF 1LB PER 1000
DESCHAMPSIA CAESPITOSA / TUFTED HAIRGRASS	10	SQUARE FEET, 15-30 LBS/ACRE. HYDROMULCH
GLYCERIA OCCIDENTAILS / WESTERN MANNAGRASS	2	SHALL BE 100% ECO-FIBER WOOD MULCH AT MINIMUM RATE OF 2000 LBS/ACRE.
BECKMANNIA SYZIGACHNE / AMERICAN SLOUGHGRASS	1	TACKIFIER SHOULD BE USED ON ALL SLOPED AREAS STEEPER THAN 5:1 AT MANUFACTURERS SUGGESTED RATE.

SCIENTIFIC NAME/COMMON NAME	% BY WEIGHT	APPLICATION RATE
SCIRPUS MICROCARPUS / SMALL FRUITED BULRUSH	25	AVAILABLE FROM SUNMARK SEEDS CO., PORTLAND, OR
JUNCUS EFFUSUS / SOFT RUSH	25	
JUNCUS ENSIFOLIUS / DAGGERLEAF RUSH	25	SEEDING RATE: SEED AT A RATE OF 22 LB PER ACRE
JUNCUS TENUIS / SLENDER RUSH	25	

Figure 3b. Example typical and plant species list.

8.2 Geologic Hazard Area Mitigation

GeoEngineers has proposed mitigation strategies to minimize impacts to geologic hazard areas in the corridor in their analysis report (Appendix C). As stated previously, and in their report, with implementation of these strategies, proposed activities are not expected to impact the geologic hazard areas in the Coal Creek drainage; proposed activities are consistent with the management activities of the existing corridor.

Where vegetation clearing is required to reestablish access on existing trails or old access routes, BMPs will be implemented; these BMPs may include, but are not limited to, outsloping road surfaces, crowning road surfaces (where appropriate, such as at ridge tops and where roads climb gently inclined surfaces) and installing water bars or rolling dips at regularly spaced intervals to avoid concentrating surface water flow along the road surface. After construction, disturbed areas should be graded to a stable free-draining configuration, treated with appropriate erosion control measures, and seeded. Grading associated with reestablishment and post construction stabilizing will be conducted on an as needed basis and limited in vertical and horizontal extent. Most, if not all, access routes can be abandoned following construction using erosion control measures and seeding.

BMPs for pole installation will be implemented during construction and the disturbed area will be restored after pole installation by seeding or revegetating,

essentially covering the disturbed areas. In the event that work areas are wet or have standing water, driving mats should be used under all equipment. Additionally, for poles located in geological hazard areas, the old poles should be cut off approximately 1-2 feet below the ground surface and the remaining portion of each pole left in place.

Options for mitigation of vegetation management and tree removal in geologic hazard areas include limiting disturbance to these areas by large equipment (only by foot and hand-cutting with chainsaws), leaving cut stumps in place, and chipping or scattering tree debris where feasible. In areas where tree removal is clustered, erosion control BMPs, such as grass seeding, leaving stumps, scattering straw and/or replacement planting of native shrubs or small trees, should be implemented to reduce concentrated flows and minimize disturbance. On private property, coordination with the property owner will direct mitigation strategies to be implemented.

9 CODE COMPLIANCE

When a project proposes impacts to critical areas, compliance with applicable city code provisions (LUC 20.25H – Critical Areas) must be demonstrated. New or expanded utility facilities and utility systems, including all structures and improvements, are allowed within critical areas and their associated buffers pursuant to LUC 20.25H.055, provided applicable performance standards for new and expanded uses or development (LUC 20.25H.055.C.2) and for each critical area type to be impacted, are met. Specific code provisions applicable to this project are presented below (italicized), followed by a Project-specific description that documents compliance.

Any proposal to modify a stream channel must be approved through a Critical Areas Report process. Therefore, as the Project proposes to modify the stream on the Richards Creek Substation parcel as part of the mitigation for Project impacts, compliance with the Critical Areas Report submittal requirements and decision criteria are also described below.

Specific mitigation and restoration requirements (LUC 20.25H.210 through 20.25H.225) and associated performance standards (LUC 20.25H.085, 20.25H.105, 20.25H.135) have been considered in the preparation of the conceptual mitigation plan and specific requirements will be incorporated into the Final Mitigation Plan (in progress). These code sections will be addressed in the Mitigation Plan design and notes and are not specifically addressed here.

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9.1 LUC 20.25H.055 Uses and development allowed within critical areas – Performance standards

Compliance with applicable performance standards for allowed new uses and development is described below.

C. Performance Standards.

The following performance standards apply as noted in the table in subsection B of this section. The critical areas report may not be used to modify the performance standards set forth in this subsection C:

2. *New and Expanded Uses or Development. As used in this section, "facilities and systems" is a general term that encompasses all structures and improvements associated with the allowed uses and development described in the table in subsection B of this section:*

   a. *New or expanded facilities and systems are allowed within the critical area or critical area buffer only where no technically feasible alternative with less impact on the critical area or critical area buffer exists. A determination of technically feasible alternatives will consider:*

      i. *The location of existing infrastructure;*

Response: The proposed route is within an existing corridor with 115 kV transmission lines. These lines are supported by H-frame poles, which are grouped in sets of two or three and generally run two to three feet in diameter. The location of the existing poles in the South Bellevue Segment can be seen on the Critical Areas Assessment Maps in Appendix B.

      ii. *The function or objective of the proposed new or expanded facility or system;*

Response: The objective of the Energize Eastside Project, including the Richards Creek Substation and South Bellevue Segment, is to increase the capacity of the Eastside electric grid to keep pace with projected increases in electricity demands during peak periods. This need was independently verified by the City of Bellevue (Utility System Efficiencies, Inc. 2015 and Exponent 2012).

      iii. *Demonstration that no alternative location or configuration outside of the critical area or critical area buffer achieves the stated function or objective, including construction of new or expanded facilities or systems outside of the critical area;*

Response: Given the location of existing facilities, legal ROW, and surrounding critical area encumbrances, impacts have been avoided and minimized to the extent feasible. Alternative routes were evaluated prior to selection of the proposed route. The alternative routes would also require critical area impacts. No feasible alternate routes were identified that could completely avoid critical area impacts. The chosen route utilizes the existing utility corridor which helps

to minimize new impacts to critical areas. Additionally, the Project design has been modified to remove impacts from critical areas and buffers to the greatest extent possible. Complete avoidance of wetlands is not possible in this area due to the fixed location of the substation parcel. The substation will be located at the proposed Richards Creek parcel due to the proximity of existing infrastructure, the existing location of other developed substations such as the Lakeside Substation to the north, and the required connections to other PSE transmission lines. Access has been sited to use existing routes to the extent feasible. Furthermore, use of the existing corridor and locating the new poles generally close to the existing poles allows use of existing access points in many instances.

iv. Whether the cost of avoiding disturbance is substantially disproportionate as compared to the environmental impact of proposed disturbance; and

Response: To avoid the proposed critical area impacts and achieve the utility service improvement objectives, relocation of existing infrastructure and creation of new infrastructure would be required. This would be more expensive than the proposed Project; and critical area impacts would likely be incurred nonetheless. As a linear project spanning 3.4 miles, with specific siting requirements, total avoidance of all critical areas is not achievable. Use of the existing, maintained corridor, which is generally within urban/developed areas, helps to reduce both the cost of the Project and the environmental impacts. No feasible alternate routes were identified that could completely avoid critical area impacts.

v. The ability of both permanent and temporary disturbance to be mitigated.

Response: Temporary critical area disturbance will be restored in place and permanent disturbance, including conversion from one vegetation community to another, will be mitigated in accordance with the City of Bellevue's code and methods supported by the best available science as described in Section 8 of this report.

b. If the applicant demonstrates that no technically feasible alternative with less impact on the critical area or critical area buffer exists, then the applicant shall comply with the following:

i. Location and design shall result in the least impacts on the critical area or critical area buffer;

Response: Impacts to critical areas and critical area buffers will be avoided and minimized through design practices and engineering controls. For example, the PSE design has located poles out of wetlands wherever technically feasible in order to avoid most direct wetland impact and pole construction work areas will be adjusted to avoid critical areas on a pole by pole basis. Construction access has been planned to exclude critical areas and/or provide only temporary impact wherever feasible.

ii. Disturbance of the critical area and critical area buffer, including disturbance of vegetation and soils, shall be minimized;

Response: Critical area and critical area buffer disturbances will be minimized through design practices and engineering controls. BMPs will be used to minimize ground disturbance during construction, including during the use of existing, vegetated access routes. Access to poles which must be located in critical areas will generally occur using existing, partially vegetated access (established during original construction and re-used over time to maintain the corridor). Post construction, disturbed areas will be re-vegetated and left to return to their natural state.

In critical areas, mats will be placed over existing vegetation where possible to allow access for installation of new poles. Typically crushed vegetation rebounds within one growing season resulting in only temporary impacts to vegetation. Tree removal activities are performed in a manner to minimize impacts to underlying shrubs, groundcover and other trees, without disturbance to soil.

Any equipment or vehicles will be staged and refueled outside of critical areas and critical area buffers. If this is not possible, a "safe area" within the buffer will be identified and used for staging and refueling. Containment measures will be included in the Project specific Spill Prevention, Control and Countermeasure (SPCC) plan.

Areas disturbed for temporary access and staging will be restored in place following completion of construction activities. Only native seed mixes and/or native plantings will be installed in critical areas or critical area buffers.

iii. Disturbance shall not occur in habitat used for salmonid rearing or spawning or by any species of local importance unless no other technically feasible location exists;

Response: Construction associated with the proposed culvert replacement and stream realignment will result in temporary disturbance to the stream. However, no permanent adverse impacts are expected. Rather, long-term improvements to salmonid habitat will occur as a result of the stream re-alignment and enhancement. During construction, any fish isolated in the localized instream work area will be removed by the Project specific fish biologist in the work area. Given the size and characteristics of the existing stream, it is expected that stranded fish can be located and captured using dipnets or small seines followed by electrofishing. Efforts to capture and relocate fish by netting methods will precede electrofishing. Captured fish will be released in unaffected reaches downstream of the project area.

The Project will not result in impacts to habitats associated with species of local importance (see Section 4.3.3). Proposed mitigation will result in net habitat

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benefits following Project implementation. In addition to reducing flooding, increasing streamflow conveyance capacity and improving sediment transport and removal, the proposed culvert replacement and stream realignment will improve fish passage and in-stream and riparian habitat conditions.

iv. Any crossing over of a wetland or stream shall be designed to minimize critical area and critical area buffer coverage and critical area and critical area buffer disturbance, for example by use of bridge, boring, or open cut and perpendicular crossings, and shall be the minimum width necessary to accommodate the intended function or objective; provided, that the Director may require that the facility be designed to accommodate additional facilities where the likelihood of additional facilities exists, and one consolidated corridor would result in fewer impacts to the critical area or critical area buffer than multiple intrusions into the critical area or critical area buffer;

Response: No new permanent wetland or stream crossings are proposed. The Project includes replacing and upgrading the culvert carrying a small, perennial stream beneath the access driveway to the Richards Creek Substation site. In addition to the new culvert crossing, the Project will restore and/or enhance adjoining habitat areas. This includes realigning and enhancing the stream sections extending upstream and downstream of the crossing and enhancing the new stream buffer including associated wetland areas.

As part of the Project, access to poles in critical areas of the transmission corridor will generally occur using existing, partially vegetated access (established during original construction and re-used over time to maintain the corridor). BMPs will be used to minimize ground disturbance in these areas, and in areas of new access. In critical areas or buffers, mats will be placed over existing vegetation where possible. When installing the new conductor, techniques will be used to avoid impacts to critical areas (*i.e.,* shooting the wire from pole to pole or using guide wires). Stringing sites will be located outside of critical areas where possible. Any additional critical area impacts resulting from stringing sites, not already quantified in other Project elements described herein, will be temporary in nature; temporary impact areas will be re-vegetated and left to return their natural state or enhanced following construction.

Typically crushed vegetation rebounds within one growing season resulting in only temporary impacts to vegetation. Post-construction, all disturbed areas will be re-vegetated, if necessary, and left to return to their natural state. Based on the existing conditions, proposed construction BMPs, and post construction methods; disturbance associated with access in the transmission corridor will be temporary.

v. All work shall be consistent with applicable City of Bellevue codes and standards;

Response: This Project will comply with applicable City of Bellevue codes and standards.

vi. The facility or system shall not have a significant adverse impact on overall aquatic area flow peaks, duration or volume or flood storage capacity, or hydroperiod;

Response: Project element impacts and associated mitigation measures will be designed to maintain or improve critical area hydrology and water quality to the extent possible. The proposed stream restoration project will result in an improvement in hydrologic function. It is designed to increase streamflow conveyance capacity, improve sediment transport, facilitate sediment removal from the system, and reduce flooding that now occurs on the adjoining property to the west.

vii. Associated parking and other support functions, including, for example, mechanical equipment and maintenance sheds, must be located outside critical area or critical area buffer except where no feasible alternative exists; and

Response: Project elements which must be located within critical areas or buffers are limited to pole footprints, portions of the Richards Creek Substation including the culvert replacement at the entry road, and access driveway. The Project has gone through multiple design revisions, and no other feasible alternative exists for the location of these features. Other proposed critical area impacts are due to required vegetation maintenance activities in the vicinity of the power lines which, in some areas, will result in long term changes to vegetation composition.

viii. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.

Response: The final Mitigation Plan will fulfill the requirements of LUC 20.25H.210, including mitigation goals, performance standards, monitoring and maintenance protocols, and contingencies for the duration of the monitoring period. See Section 8 for a discussion of the proposed mitigation approach and preliminary mitigation plan. Preliminary plans for the stream re-alignment and enhancement activities proposed on the Richards Creek Substation parcel as part of the overall mitigation for this Project are included in Appendix A.

9.2 LUC 20.25H.080 Performance Standards for Streams

Compliance with applicable performance standards for projects on sites with streams is described below.

LUC 20.25H.080.A- General

Development on sites with a type S or F stream or associated critical area buffer shall incorporate the following performance standards in design of the development, as applicable:

1. *Lights shall be directed away from the stream.*

Response: New lighting is only proposed at the substation site. It will be contained within the fenced, developed area, and will be directed away from the stream restoration area.

2. *Activity that generates noise such as parking lots, generators, and residential uses shall be located away from the stream or any noise shall be minimized through use of design and insulation techniques.*

Response: Noise generated from the Project after completion is expected to be minimal and limited mainly to the substation. Noise generated from the substation will be within the noise thresholds for the zoning district. The proposed substation is consistent with other uses in the area and all equipment will be located within an enclosed area mainly upslope and away from onsite critical areas. Transmission lines within the corridor will generate noise similar to the existing condition of the corridor.

3. *Toxic runoff from new impervious area shall be routed away from the stream.*

Response: New impervious area is limited to the Richards Creek Substation. New transformers will be constructed on top of - and within an engineered pad lined with a berm to contain potential releases, referred to as a SPCC curb. The engineered pad beneath the transformers will be lined with a bentonite layer at an appropriate depth that (with the aid of the berm/SPCC curb that surrounds the transformer pad) will collect and hold unanticipated releases; preventing off-site migration to sensitive areas.

As such, containment measures at the substation will prevent toxic runoff from entering the stream. Additionally, there will be a stormwater vault located beneath the substation which will discharge into flow dispersion riprap before entering into the stream. Additional water quality treatment is not proposed as the site should be classified as an "infrequently used maintenance access route" (for both access driveway and internal substation driveway) per the City's definition of PGIS and "vehicular use".

4. *Treated water may be allowed to enter the stream critical area buffer.*

Response: There will be a stormwater vault located beneath the substation which will discharge into flow dispersion riprap before entering into the stream.

5. *The outer edge of the stream critical area buffer shall be planted with dense vegetation to limit pet or human use. Preference shall be given to native species.*

Response: The final mitigation plan will include dense, native critical area buffer plantings. Realigning Stream C and enhancing the new buffer area will create a dense, functional buffer more protective of the stream than the existing condition.

6. *Use of pesticides, insecticides and fertilizers within 150 feet of the edge of the stream critical area buffer shall be in accordance with the City of Bellevue's "Environmental Best Management Practices," now or as hereafter amended.*

Response: Generally, weed control efforts in stream buffer will employ manual removal. If any persistent weed or pest problems require pesticide control, the City would be contacted to verify compliance with City of Bellevue BMPs and, if allowed, a licensed pesticide applicator would be hired.

LUC 20.25H.080.B- Modification of Stream Channel

1. *When Allowed. A stream channel shall not be modified by relocating the open channel, or by closing the channel through pipes or culverts unless in connection with the following uses allowed under LUC 20.25H.055:*

   a. A new or expanded utility facility or system;

   b. A new or expanded essential public facility;

   c. Public flood control measures;

   d. In-stream structures;

   e. New or expanded public right-of-way, private roads, access easements or driveways;

   f. Habitat improvement project; or

   g. Reasonable use exception; provided, that a modification may be allowed under this section for a reasonable use exception only where the applicant demonstrates that no other alternative exists to achieve the allowed development.

A critical areas report may not be used to modify the uses set forth in this subsection B.1.

Response: Stream channel modification is proposed on the Richards Creek substation parcel in conjunction with the culvert replacement work and to enhance fish and wildlife habitat on site, increase streamflow conveyance capacity, improve sediment transport, facilitate sediment removal from the system, and reduce flooding that now occurs on the adjoining property to the west. This work is proposed as mitigation for the Project. As a habitat improvement Project related to development of a utility facility, it meets the definition of an allowed use under LUC 20.25H.055.

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2. *Critical Areas Report Required. Any proposal to modify a stream channel under this section may be approved only through a critical areas report.*

Response: This narrative is intended to satisfy the critical areas report requirement and details how the stream channel modifications will improve stream, stream buffer, and associated wetland functions and values. See subsections 9.6 through 9.7 below addressing compliance with specific critical areas report submittal requirements and decision criteria.

9.3 LUC 20.25H.100 Performance Standards for Wetlands

Compliance with performance standards for projects on sites with wetlands is described below.

LUC 20.25H.100

Development on sites with a wetland or wetland critical area buffer shall incorporate the following performance standards in design of the development, as applicable:

A. *Lights shall be directed away from the stream (or wetland).*

Response: New lighting is only proposed at the substation site. It will be contained within the fenced, developed area, and will be directed away from the stream restoration area.

B. *Activity that generates noise such as parking lots, generators, and residential uses shall be located away from the wetland or any noise shall be minimized through use of design and insulation techniques.*

Response: Noise generated from the Project after completion is expected to be minimal and limited mainly to the substation. The proposed stream restoration and buffer/wetland enhancement plantings at the substation site will help to screen the critical areas from the developed area and reduce any noise within critical areas. Noise generated from the substation will be within the noise thresholds for the zoning district. The proposed substation is consistent with other uses in the area and all equipment will be located within an enclosed area mainly upslope and away from onsite critical areas. Transmission lines within the corridor will generate noise similar to the existing condition of the corridor.

C. *Toxic runoff from new impervious area shall be routed away from the wetland.*

Response: New impervious area is limited to the Richards Creek substation. New transformers will be constructed on top of - and within an engineered pad lined with a berm to contain potential releases, referred to as a SPCC curb. The engineered pad beneath the transformers will be lined with a bentonite layer at an appropriate depth that (with the aid of the berm/SPCC curb that surrounds the transformer pad) will collect and hold unanticipated releases; preventing off-site migration to sensitive areas. As such, containment measures at the substation will prevent toxic runoff from entering the stream.

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Additionally, there will be a stormwater vault located beneath the substation which will discharge into flow dispersion riprap before entering into Stream C. Additional water quality treatment is not proposed as the site should be classified as an "infrequently used maintenance access road" (for both access driveway and internal substation driveway) per the City's definition of PGIS and "vehicular use".

D. Treated water may be allowed to enter the wetland critical area buffer.

Response: There will be a stormwater vault located beneath the substation which will discharge into flow dispersion riprap before entering into the stream.

E. The outer edge of the wetland critical area buffer shall be planted with dense vegetation to limit pet or human use. Preference shall be given to native species.

Response: The final mitigation plan will include dense, native critical area buffer plantings. Realigning Stream C and enhancing the new buffer area will create a dense, functional buffer more protective of the stream than the existing condition. Additionally, the Richards Creek Substation property is owned and operated by PSE; as such, human use outside of the developed substation is discouraged. Wetlands and buffers elsewhere in the corridor are generally degraded as a result of human development and extensive use of the corridor. Buffer mitigation planting will be directed to sites in the Richards Creek and Coal Creek basins that will allow for the greatest functional improvement to the overall critical areas functions in the Project area, and will allow for limiting human and pet intrusion into the mitigation areas.

F. Use of pesticides, insecticides and fertilizers within 150 feet of the edge of the wetland critical area buffer shall be in accordance with the City of Bellevue's "Environmental Best Management Practices," now or as hereafter amended.

Response: Generally, weed control efforts in wetland buffer will employ manual removal. If any persistent weed or pest problems require pesticide control, the City would be contacted to verify compliance with City of Bellevue BMPs and, if allowed, a licensed pesticide applicator would be hired. However, PSE cannot control how private property owners in the corridor manage the vegetation within their properties.

9.4 LUC 20.25H.180.C- General performance standards for development in the area of special flood hazard

Compliance with applicable performance standards for general development in the area of special flood hazard described below.

LUC 20.25H.180.C

Where use or development is allowed pursuant to LUC 20.25H.055, the following general performance standards apply:

> *1. Intrusion Over the Area of Special Flood Hazard Allowed. Any structure may intrude over the area of special flood hazard if:*
>
> > *a. The intrusion is located above existing grade, and does not alter the configuration of the area of special flood hazard;*
> >
> > *b. The intrusion is at an elevation and orientation which maintains the existing vegetation of the area of special flood hazard in a healthy condition. Solar access to vegetation must be maintained at least 50 percent of daylight hours during the normal growing season; and*
> >
> > *c. The intrusion does not encroach into the regulated floodway except in compliance with subsection C.5 of this section.*

Response: The proposal does not include any structures. Impacts within the Area of Special Flood Hazard are limited to vegetation removal and the installation of one new pole which will be replacing four existing poles that are currently situated in a highly developed area with medium to high density residential development and paved roads and parking areas. Areas of special flood hazard include relatively small areas associated with Sunset Creek and Coal Creek, as determined by the Federal Emergency Management Agency (FEMA).

The mapped Sunset Creek floodplain is shown in an area where Sunset Creek is conveyed underground. The mapped floodplain in the corridor is located north and south of SE Allen Rd in areas developed with apartment buildings, parking areas, sidewalks, and includes some landscaped trees and mowed grass; none of which are associated with a riparian environment.

The mapped Coal Creek floodplain in the Project area includes portions of Coal Creek Parkway and natural forested vegetation associated with the riparian zone of Coal Creek. Floodplain habitat is discussed in detail in the ESA documentation for the Project.

Development not meeting the requirements of this subsection C.1 may be allowed pursuant to LUC 20.25H.055 and only in accordance with the requirements set forth in the remainder of this section C.

> *3. Construction Materials and Methods.*
>
> > *a. Site Design. All structures, utilities, and other improvements shall be located on the buildable portion of the site out of the area of special flood hazard unless there is no buildable site out of the area of special flood hazard. For sites with no buildable area out of the area of special flood hazard, structures, utilities, and other improvements shall be placed on the highest land on the site, oriented parallel to flow rather than perpendicular, and sited as far from the stream and*

other critical areas as possible. Located in flood-fringe where flood flow velocities are less than three feet per second and flood depths are less than three feet. If the Director detects any evidence of active hyporheic exchange on a site, the development shall be located to minimize disruption of such exchange.

b. Methods That Minimize Flood Damage. All new construction and substantial improvements shall be constructed using flood-resistant materials and using methods and practices that minimize flood damage.

c. Utility Protection. Electrical, heating, ventilation, plumbing, air-conditioning equipment, and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

d. Anchoring. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.

Response: Alterations within the floodplain are limited to vegetation removal and installation of one new utility pole. The pole is sited as far from critical areas as possible. The pole is not expected to impact flood flows and is constructed such that it will not be susceptible to flood damage.

4. No Rise in the Base Flood Elevation (BFE). Any allowed use or development shall not result in a rise in the BFE.

a. Post and Pile. Post and piling techniques are preferred and are presumed to produce no increase in the BFE. Demonstration of no net rise in the BFE through calculation is not required.

b. Compensatory Storage. Proposals using compensatory storage techniques to assure no rise in the BFE shall demonstrate no net rise in the BFE through the calculation by methods established in the Utilities Storm and Surface Water Engineering Standards, January 2011, Section D4-04.5, Floodplain/Floodway Analysis, now or as hereafter amended.

Response: Impacts in the Area of Special Flood Hazard are limited to vegetation removal and pole installation (replacement of two existing H-frame structures which include a total of four poles, with two new poles). As noted in a) above, post and piling techniques are preferred and are presumed to produce no increase in the Base Flood Elevation. Pole installation is considered to be a post and piling technique. Demonstration of no net rise in the BFE through calculation is not required. As such, there will be no impact to the flood storage capacity of the flood hazard area. Vegetation removal would not result in a rise in the BFE.

5. Development in the Regulatory Floodway.

a. Encroachment into Regulatory Floodway Prohibited. Encroachments, including, but not limited to, fill, new construction, substantial improvements, and other development, are prohibited, unless a registered professional engineer certifies that the proposed encroachment into the regulatory floodway shall not result in any rise in the BFE using hydrological and hydraulic analysis performed

in accordance with City of Bellevue Storm and Surface Water Engineering Standards, January 2011, or as hereafter amended. All new construction and substantial improvements shall comply with this section.

Response: No development is proposed in the regulatory floodway. Pole installation is a post and piling technique which is presumed to produce no increase in the Base Flood Elevation. And based on #4 above, the Project does not require a demonstration of no net rise in the BFE.

6. Modification of Stream Channel. Alteration of open stream channels shall be avoided, if feasible. If unavoidable, the following provisions shall apply to the alteration:

a. Modifications shall only be allowed in accordance with the habitat improvement projects.

b. Modification projects shall not result in blockage of side channels.

c. The City of Bellevue shall notify adjacent communities, the state departments of Ecology and Fish and Wildlife, and the Federal Insurance Administration about the proposed modification at least 30 days prior to permit issuance.

d. The applicant shall maintain the altered or relocated portion of the stream channel to ensure that the flood-carrying capacity is not diminished. Maintenance shall be bonded for a period of five years, and be in accordance with an approved maintenance program.

Response: The Project proposes to modify the open stream channel adjacent to the culvert replacement on the Richards Creek substation parcel. As part of the mitigation for Project impacts, the stream will be realigned and enhanced upstream and downstream of the crossing. Adjacent habitat areas, including wetlands will also be enhanced.

The modification and enhancement will result in net habitat benefits following Project implementation. The proposed culvert replacement and stream realignment will increase streamflow conveyance capacity, improve sediment transport, facilitate sediment removal from the system, replace undersized culverts, reduce flooding that now occurs on the adjoining property to the west, improve fish passage, and improve in-stream and riparian habitat conditions.

The completed Project will contain all flows from large storms within a stable channel and floodplain and trap sediments in a planned location for relatively easy, low-impact removal. The design includes channel grading and realignment, culvert replacement, and sediment removal/management features and protocol.

The restored stream will have a defined channel and floodplain benches, as well as the capacity to convey the predicted 100-year peak flow rate. A meandering channel design combined with woody debris placement, native revegetation, and wetland enhancements will create a complex and diverse aquatic habitat

beneficial for fish and macroinvertebrates as well as other wildlife. This approach also produces varied flow velocities allowing for natural sediment movement and deposition patterns to occur. The channel alignment has been laid out to minimize impacts to wetlands, preserve as many trees onsite as feasible, and provide a more functional buffer. The original stream bed along the west property line of the subject site will not be filled in after stream flow is diverted into the new channel. The remnant channel is anticipated to continue to capture seepage and shallow groundwater and will continue to provide ecological diversity and function as wetland given the nature of the site hydrology. Tree trunks and roots wads will be strategically located along the restored reach to create and maintain scour pools and areas of refuge for fish as well as provide channel diversity and stability.

PSE has had coordination with WDFW and affected Tribes and is seeking all appropriate state and federal permits for this work. A five year maintenance and monitoring plan will be included with the final Mitigation Plan.

7. Compensatory Storage. Development proposals must not reduce the effective base flood storage volume of the area of special flood hazard. Grading or other activity that would reduce the effective storage volume must be mitigated by creating compensatory storage on the site. The compensatory storage must:

a. Provide equivalent elevations to that being displaced;

b. Be hydraulically connected to the source of flooding;

c. Be provided in the same construction season and before the flood season begins on September 30th;

d. Occur on site or off site if legal arrangements can be made to assure that the effective compensatory storage volume will be preserved over time;

e. Be supported by a detailed hydraulic analysis that:

i. Is prepared by a licensed engineer;

ii. Demonstrates that the proposed compensatory storage does not adversely affect the BFE; and

f. Meet all other critical areas rules subject to this part. If modification to a critical area or critical area buffer is required to complete the compensatory storage requirement, such modification shall be mitigated pursuant to an approved mitigation and restoration plan, LUC 20.25H.210.

Response: Project actions within the floodplain are not expected to reduce flood storage capacity.

9.5 LUC 20.25H.125- Performance Standards for landslide hazards and steep slopes

Compliance with applicable performance standards for geologic hazard areas has been described by the Project's geotechnical experts. Note that the responses below have been revised slightly by PSE to correct and clarify language based on changes in Project description. The complete geologic hazard evaluation is included in Appendix B.

In addition to generally applicable performance standards set forth in LUC 20.25H.055 and 20.25H.065, development within a landslide hazard or steep slope critical area or the critical area buffers of such hazards shall incorporate the following additional performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.

A. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;

Response: No structures will be constructed as part of the proposed Project. Site improvements (pole removal, pole replacement, access routes, and vegetation management) are not anticipated to adversely impact the natural contour of the slope. The proposed site activities that include vegetation management, tree removal, and temporary access routes (associated with the proposed pole replacement activities) will maintain overall existing site topography. The grade changes associated with the substation development are discussed below in the responses for code requirements LUC 20.25H. 125 D through J.

B. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;

Response: No structures will be constructed as part of the proposed Project. Site improvements include localized vegetation management, including tree removal, and use of existing access routes (associated with the proposed pole replacement activities). The proposed tree removal and surface disturbance will be limited to reduce potential impacts to natural landforms and vegetation. The grade changes associated with the substation development are discussed below in the responses for code requirements LUC 20.25H. 125 D through J.

C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;

Response: The proposed development includes vegetation management, including tree removal and use of existing access routes (associated with the proposed pole replacement activities) that will be followed by mitigation measures to reduce potential impacts to geologic hazards that include landslide and steep slope hazards. Mitigation measures include a variety of BMPs to

reduce potential impacts to geologic hazards in the vicinity of neighboring properties. BMPs include plant replacement, scattering trimmed or removed tree debris, and chipping wood to reduce potential impacts to work areas as appropriate. Removal of vegetation by hand and/or using limited access machinery will reduce potential impacts to landslide and steep slope hazard areas. It is our opinion that the proposed Project will not require additional buffers. The grade changes associated with the substation development are discussed below in the responses for code requirements LUC 20.25H. 125 D through J.

D. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall;

Response: In the transmission corridor, no retaining walls or grading activities are proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities). The development of soldier pile walls and retaining walls for the Richards Creek Substation is discussed in detail in the substation-specific geotechnical engineering report dated September 23, 2016, and in an addendum report dated April 4, 2017. The use of retaining walls for the new substation will reduce disturbance and grading of the existing natural slopes, which would be otherwise necessary without construction of the walls.

E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer;

Response: No new impervious surfaces are proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities) within mapped critical area and mapped critical area buffers of the transmission corridor. Five narrow, and relatively small (low square footage), steep slopes are located on the future Richards Creek Substation property (comprising 8.46 acres), which is partially developed with an existing pole yard (existing hard surface/impervious surface of 1.58 acres). As discussed previously, many areas of mapped steep slopes were eliminated from the impact analysis because of their existing land use (engineered road slopes, engineered landscaping, etc.) and the proposed activities at those locations. None of the steep slopes on the Richards Creek Substation property have been identified as priority steep slopes. Therefore, no increase in impervious surface will occur to mapped priority steep slope areas.

F. Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with this criteria;

Response: No change in grade is proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities) within the transmission corridor. Within the new substation, grade transitions along the east side (up to 24 feet in height) will be supported with a soldier pile wall (cantilever and with tiebacks). Grade transitions along the west side (up to 6 feet in height) will be supported by fill slopes and a cast-in-place retaining wall.

G. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation;

Response: No retaining walls are proposed relative to the proposed vegetation management and tree removal activities associated with the proposed pole replacement activities within the transmission corridor. However, for stability purposes, drilled pier foundations will be utilized on select poles in the corridor where appropriate. The new substation is not a building and, thus, does not have typical foundation walls; as such, soldier pile and retaining walls will be necessary to retain the required grade changes. PSE does not propose the use of rockeries.

H. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification;

Response: No pole-type structures are proposed relative to the proposed vegetation management and tree removal activities. The new poles will meet the preferred construction type (which is pole-type construction). The new substation cannot be tiered and was situated east of the existing Olympic pipeline. This requires construction of a soldier pile wall east of the existing steep slope area. While this results in grading in the steep slope area, the area of disturbance is minimized by construction of a vertical wall.

I. On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types; and

Response: No structures requiring pile deck support are proposed relative to the proposed vegetation management and tree removal activities. The new poles will meet the preferred construction type (which is pole-type construction). No parking or garage structures are planned for the new substation. Pile-supported

deck structures are not feasible for a substation. The substation grades will require cutting into the steep slope on the east side, which will then be retained with a soldier pile wall.

J. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.

Response: Temporary disturbance for the proposed vegetation management and tree removal activities and access routes (associated with the proposed pole replacement activities) within the existing transmission corridor will be mitigated by scattering and/or chipping trimmed limbs and logs, replanting vegetation, and using limited access equipment or accessing only by foot as appropriate. For steep slope areas in the vicinity of the new substation that will be disturbed during construction, the disturbed areas should be restored by seeding/revegetating and covering the planted area with mulch or other appropriate BMPs.

9.6 LUC 20.25H.250 Critical areas report – Submittal requirements

The proposal includes modification of a stream channel at the Richards Creek Substation site. The realignment and enhancement of Stream C and adjoining buffer areas, including wetland, is proposed as part of the mitigation for Project impacts. As noted above, LUC 20.25H.080.B allows for modification of a stream channel when certain performances standards are met. Any proposal to modify a stream channel under this section may be approved only through a Critical Areas Report. Therefore, compliance with the applicable Critical Areas Report submittal requirements and decision criteria is described below.

A. Specific Proposal Required.

A critical areas report must be submitted as part of an application for a specific development proposal. In addition to the requirements of this section, additional information may be required for the permit applicable to the development proposal.

Response: This report is being submitted as part of a Critical Areas Land Use Application package for the PSE Energize Eastside Project – South Bellevue segment.

B. Minimum Report Requirements.

The critical areas report shall be prepared by a qualified professional and shall at minimum include the content identified in this section. The Director may waive any of the report requirements where, in the Director's discretion, the information is not necessary to assess the impacts of the proposal and the level of protection of critical area function and value accomplished. At a minimum, the report shall contain the following:

1. *Identification and classification of all critical areas and critical area buffers on the site;*

Response: See Section 4.3 and 5.1.

2. *Identification and characterization of all critical areas and critical area buffers on those properties immediately adjacent to the site;*

Response: See Section 4.3 and 5.1.

3. *Identification of each regulation or standard of this code proposed to be modified;*

Response: CAR Section 9 contains a detailed Project-based review of all applicable city code provisions.

3. *A habitat assessment consistent with the requirements of LUC 20.25H.165;*

Response: Discussion of habitat, in accordance with the requirements of LUC 20.25H.165 (below), is discussed throughout this CAR and summarized below. The Project will not impact known habitats associated with species of local importance. Therefore, no modifications to the performance standards for habitat associated with species of local importance are proposed.

Detailed description of vegetation and habitat on and adjacent to the site;

Response: See Sections 4.2 and 4.3.

Identification of any species of local importance that have a primary association with habitat on or adjacent to the site and assessment of potential project impacts to the use of the site by the species;

Response: See Section 4.3.3.

A discussion of any federal, state, or local special management recommendations, including Washington Department of Fish and Wildlife habitat management recommendations, that have been developed for species or habitats located on or adjacent to the site;

Response: See Section 4.3.3.

A detailed discussion of the direct and indirect potential impacts on habitat by the project, including potential impacts to water quality;

Response: Section 7 provides a description of impacts in relation to critical area functions. The functional lift analysis (Section 7.2) describes the expected net change in critical area functions overall once mitigation is considered.

A discussion of measures, including avoidance, minimization, and mitigation, proposed to preserve existing habitats and restore any habitat that was degraded prior to the current proposed use or activity and to be conducted in accordance with the mitigation sequence set forth in LUC 20.25H.215*; and*

Response: See Section 6 for a discussion of mitigation sequencing.

A discussion of ongoing management practices that will protect habitat after the site has been developed, including proposed monitoring and maintenance programs.

Response: See Section 4.3.3 for a discussion of standard PSE habitat protection practices. See also Section 8. The Final Mitigation Plan will include monitoring and maintenance provisions in accordance with LUC 20.25H.220.B.

4. *An assessment of the probable cumulative impacts to critical areas resulting from development of the site and the proposed development;*

Response: See Section 7.3.

5. *An analysis of the level of protection of critical area functions and values provided by the regulations or standards of this code, compared with the level of protection provided by the proposal. The analysis shall include:*

    a. *A discussion of the functions and values currently provided by the critical area and critical area buffer on the site and their relative importance to the ecosystem in which they exist;*

Response: See Section 7.2.

    b. *A discussion of the functions and values likely to be provided by the critical area and critical area buffer on the site through application of the regulations and standards of this Code over the anticipated life of the proposed development; and*

Response: As described above, the regulations and standards of LUC 20.25H allow the proposed Project to occur within critical areas and their associated buffers, provided certain criteria are met. Additionally, the stream modification, proposed as mitigation for the Project, is also allowed as it is a habitat improvement project, but must be approved through a Critical Areas Report process. Through the avoidance and minimization measures and the proposed

compensatory mitigation discussed in this CAR, critical area functions overall will be preserved or improved in the Project area. Furthermore, without the proposed critical area alterations, and resulting proposed mitigation, existing degraded critical areas and associated buffers would remain in their present condition with no enhancement.

c. discussion of the functions and values likely to be provided by the critical area and critical area buffer on the site through the modifications and performance standards included in the proposal over the anticipated life of the proposed development;

Response: See Section 7.2. Stream, wetland, and buffer areas are proposed to be restored which will result in an increase in native vegetation; filtering of stormwater by native plantings; increased habitat structural and compositional complexity, LWD, and an increase in organic material to the food chain.

Proposed mitigation will maintain and improve wetland and buffer functions and values. Permanent wetland and buffer impacts will be mitigated through rehabilitation of degraded wetland and buffer areas. Mitigation is designed to meet or exceed the referenced Ecology recommendations.

6. A discussion of the performance standards applicable to the critical area and proposed activity pursuant to LUC 20.25H.160, and recommendation for additional or modified performance standards, if any;

Response: Not applicable; the Project will not cause impacts to habitat associated with species of local importance.

7. A discussion of the mitigation requirements applicable to the proposal pursuant to LUC 20.25H.210, and a recommendation for additional or modified mitigation, if any; and

Response: See Section 8. Consistent with the description above, mitigation for the Project is being designed to be in compliance with LUC 20.25H.210 through 25.25H.225.

8. Any additional information required for the specific critical area as specified in the sections of this part addressing that critical area.

Response: A delineation report has been prepared which documents wetlands and streams in the proposed Project area (The Watershed Company 2016). Additional delineation reports were prepared for the Richards Creek Substation sites (The Watershed Company 2017 and 2017b, respectively).

C. Additional Report Submittal Requirements.

1. Unless otherwise provided, a critical areas report may be supplemented by or composed, in whole or in part, of any reports or studies required by other laws and

regulations or previously prepared for and applicable to the development proposal site, as approved by the Director.

Response: This report includes the plans for the stream re-alignment and enhancement project proposed as partial mitigation for Project impacts. Additional mitigation plans, including the full mitigation proposed for the Richards Creek Substation parcel and additional mitigation in the Coal Creek sub-basin, are in development. This CAR relies on two relevant environmental reports (City of Bellevue Critical Areas Delineation Report: Puget Sound Energy – Energize Eastside Project (The Watershed Company 2016) and City of Bellevue Tree Inventory Report: Puget Sound Energy – Energize Eastside Project (The Watershed Company 2016b)) and will be supplemented by the BE drafted as part of the Project's ESA review.

2. *Where a project requires a critical areas report and a mitigation or restoration plan, the mitigation or restoration plan may be included with the critical areas report, and may be considered in determining compliance with the applicable decision criteria, except as set forth in subsection C.4 of this section.*

Response: A final mitigation plan will be prepared and submitted to the City. Preliminary plans for the stream re-alignment and enhancement project at the Richards Creek substation site are included with this report.

3. *The applicant may consult with the Director prior to or during preparation of the critical areas report to obtain approval of modifications to the required contents of the report where, in the judgment of a qualified professional, more or less information is required to adequately address the potential critical area impacts and required mitigation.*

Response: PSE standards and federal regulations require vegetation management compatible with overhead 230 kV transmission lines. Where mitigation is proposed under transmission lines, the proposed mitigation plan will provide for species that will enhance existing buffers and wetlands, while meeting vegetation management standards.

D. Incorporation of Previous Study.

Where a valid critical areas report or report for another agency with jurisdiction over the proposal has been prepared within the last five years for a specific site, and where the proposed land use activity and surrounding site conditions are unchanged, said report may be incorporated into the required critical areas report. The applicant shall submit an assessment detailing any changed environmental conditions associated with the site. (Ord. 5680, 6-26-06, § 3)

Response: The City of Bellevue Critical Areas Delineation Report: Puget Sound Energy –Energize Eastside Project (The Watershed Company 2016) and City of Bellevue Tree Inventory Report: Puget Sound Energy – Energize Eastside Project (The Watershed Company 2016b) have been prepared for the proposed Project.

In addition, updated delineation reports for the Richards Creek Substation site and Somerset Substation site were recently prepared (The Watershed Company 2017 and 2017b, respectively). No environmental conditions are known to have changed from the conditions documented in those reports. Additionally, the Revised Targeted Critical Areas Geologic Hazard Evaluation (GeoEngineers 2017) was prepared to evaluate the Project's potential impact to geologic hazard areas.

9.7 LUC 20.25H.255 Critical areas report – Decision criteria

Compliance with applicable critical areas report decision criteria is described below.

A. General.

Except for the proposals described in subsection B of this section, the Director may approve, or approve with modifications, the proposed modification where the applicant demonstrates:

1. *The modifications and performance standards included in the proposal lead to levels of protection of critical area functions and values at least as protective as application of the regulations and standards of this code;*

Response: As explained above, as required by the City's code, Project mitigation requires the rehabilitation of 0.76 acres of wetland split between Richards Creek and Coal Creek drainage sub-basins (the majority of wetland rehabilitation to occur in the Richards Creek sub-basin). The proposed functional lift described in Section 7.2 details the anticipated net gain in critical areas functions expected to result from the proposed restoration work on the Richards Creek Substation parcel. Construction associated with the proposed culvert replacement and stream realignment will result in temporary disturbance to streams, wetlands, and their associated buffers, but will also result in net habitat benefits following Project implementation. Instream enhancements, creation of a more functional buffer/riparian area than currently exists, and enhancement of adjacent wetland areas is proposed.

The restored stream will have a defined channel and floodplain benches, as well as the capacity to convey the predicted 100-year peak flow rate. A meandering channel design combined with woody debris placement, native revegetation, and wetland enhancements will create a complex and diverse aquatic habitat beneficial for fish and macroinvertebrates as well as other wildlife. This approach also produces varied flow velocities allowing for natural sediment movement and deposition patterns to occur. The channel alignment has been laid out to minimize impacts to wetlands, preserve as many trees onsite as feasible, and provide a more functional buffer. The original stream bed along the west property line of the subject site will not be filled in after stream flow is diverted into the new channel. The remnant channel is anticipated to continue to capture seepage and shallow groundwater and will continue to provide ecological

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diversity and function as wetland given the nature of the site hydrology. Tree trunks and roots wads will be strategically located along the restored reach to create and maintain scour pools and areas of refuge for fish as well as provide channel diversity and stability. In sum, the Project will provide a net increase in critical area functions and values in the Project area.

2. *Adequate resources to ensure completion of any required mitigation and monitoring efforts;*

Response: PSE has adequate resources to ensure completion of any required mitigation and monitoring efforts.

3. *The modifications and performance standards included in the proposal are not detrimental to the functions and values of critical area and critical area buffers off-site; and*

Response: No part of the proposal will be detrimental to off-site areas. Enhancement of the stream, wetland and buffer areas will increase the overall habitat function of the area, thereby potentially improving habitat functions on adjacent properties. The culvert replacement and stream realignment will increase streamflow conveyance capacity, improve sediment transport, facilitate sediment removal from the system, and reduce the flooding that now occurs on the adjoining property to the west. Fish passage will also be improved.

4. *The resulting development is compatible with other uses and development in the same land use district.*

Response: This issues was analyzed in detail in Chapter 3.1 of the Energize Eastside Project Phase 2 Draft Environmental Impact Statement. The proposed Project will be compatible with adjacent properties and surrounding development. The substation site is located within the Light Industrial (LI) zoning district and the site is surrounded by compatible uses including an existing substation, the King County Transfer Station and a water and wastewater supply company. The transmission corridor is predominantly surrounded by residential uses with some commercial and park/public open space uses. The corridor currently contains transmission lines. . The purpose of the Project is to serve homes and businesses with higher capacity transmission lines. As the proposed transmission line facilities upgrades are in areas that already house such facilities, the likelihood of a materially detrimental impact is significantly reduced. Furthermore, as the transmission line facilities support adjacent uses (residences and businesses), they are not materially detrimental.

9.8 LUC 20.30P.140- Critical Areas Land Use Permit decision criteria

Compliance with the critical areas land use permit decision criteria is described below.

LUC 20.30P.140

The Director may approve or approve with modifications an application for a Critical Areas Land Use Permit if:

Development on sites with a type S or F stream or associated critical area buffer shall incorporate the following performance standards in design of the development, as applicable:

A. The proposal obtains all other permits required by the Land Use Code; and

Response: In addition to the Critical Areas Land Use Permit (LO) which is being applied for to modify critical area/buffers and to provide mitigation for impacts, the Project will apply for a Conditional Use Permit. No other City of Bellevue land use permits will be required of the Project at this time.

B. The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer; and

Response: The Project has been through multiple design revisions and has considered alternate routes in order to ensure the least impact to critical areas that is reasonably feasible. Unavoidable impacts will be minimized through design practices and engineering controls. PSE is not aware of any less impactful construction, design and development techniques and regularly reviews its practices consistent with this goal.

C. The proposal incorporates the performance standards of Part 20.25H LUC to the maximum extent applicable; and

Response: See above Sections 9.2 through 9.6 for compliance with applicable performance standards for each critical area type to be impacted by the Project.

D. The proposal will be served by adequate public facilities including streets, fire protection, and utilities; and

Response: The objective of the Energize Eastside Project is to increase the capacity of the Eastside electric grid, to ensure reliable utility service is available. The Project will be served by adequate public facilities. Temporary and some potentially permanent access routes will be needed to service the Project but no new streets are necessary. Fire and police protection are currently available in the Project vicinity. This issues was analyzed in detail in Chapter 3 of the Energize Eastside Project Phase 2 Draft Environmental Impact Statement.

E. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC 20.25H.210; except that a proposal to modify or remove vegetation pursuant to an approved Vegetation Management Plan under LUC 20.25H.055.C.3.i shall not require a mitigation or restoration plan; and

Response: The final mitigation plan will be prepared in accordance with the requirements of LUC 20.25H.210.

F. The proposal complies with other applicable requirements of this code.

Response: The proposed Project complies with all other applicable City of Bellevue Land Use Codes.

10 DISCLAIMER

The information contained in this report is based on the application of technical guidelines currently accepted as the best available science. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, state and federal regulatory authorities. No other warranty, expressed or implied, is made.

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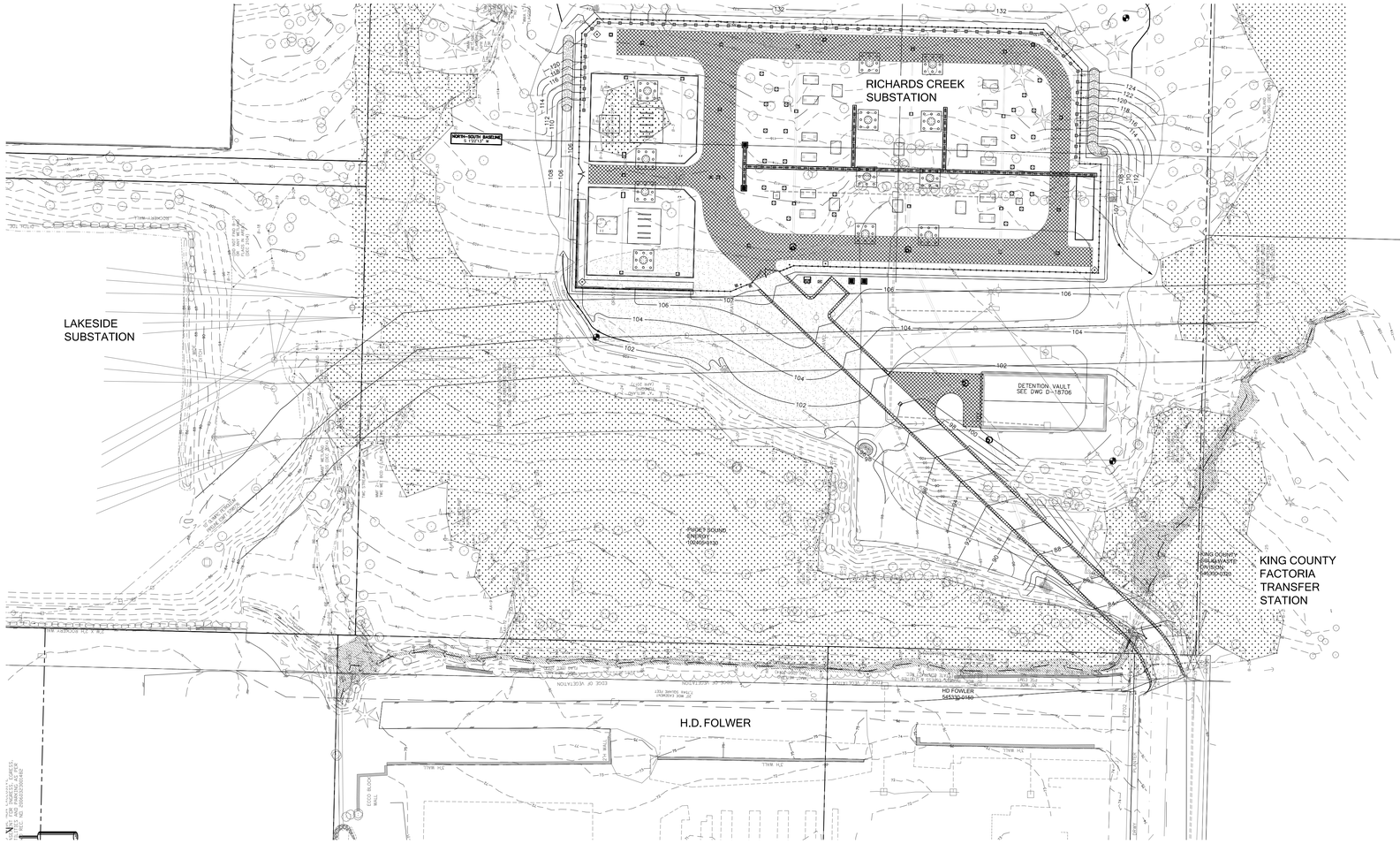
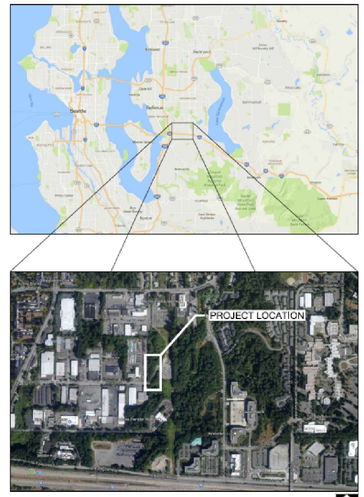
APPENDIX A

Richards Creek Plans

RICHARDS CREEK SUBSTATION:
STREAM RESTORATION AND CULVERT REPLACEMENT





EXISTING CONDITIONS

MAP LEGEND

- EXISTING TREE
- EXISTING SURVEYED STREAM CHANNEL (OHWM)
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PSE PROPERTY BOUNDARY

NOTES

TOPOGRAPHIC SURVEY PROVIDED BY:
APS SURVEYING AND MAPPING
13221 SE 26TH STREET, SUITE A
BELLEVUE, WA 98005
TEL.425-746-3200

VERTICAL DATUM: CITY OF BELLEVUE
BENCHMARK 104

SHEET INDEX

1.0 COVER
2.0 GENERAL NOTES, TESC & QUANTITIES
2.1 CONSTRUCTION SEQUENCE
2.2 EXISTING CONDITIONS
3.0 CHANNEL GRADING PLAN
3.1 TESC & DEMOLITION PLAN
3.2 TESC & DEMOLITION DETAILS
4.0 PROPOSED PLAN
5.0 CULVERT DESIGN
6.0 STATIONING & CROSS-SECTIONS
6.11 STREAM CROSS-SECTIONS
6.12 STREAM CROSS-SECTIONS
6.13 STREAM CROSS-SECTIONS
6.21 LARGE WOODY DEBRIS DETAILS
6.22 LARGE WOODY DEBRIS ANCHOR DETAILS
7.0 PLANTING PLAN (1 OF 3)
7.1 PLANTING PLAN (2 OF 3)
7.2 PLANTING PLAN (3 OF 3)
7.3 PLANTING NOTES & DETAILS (1 OF 2)
7.4 PLANTING NOTES & DETAILS (2 OF 2)

COVER SHEET

SCALE 1"=50'

50 0 50 100 200
GRAPHIC SCALE
(IN FEET)

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-1.0 COVER SHEET

DRAWING NO D-18172 | REV NO
SHEET: 1 OF 22
FILE NO: 111103
CLASS: SITE
CODE: RIC
CADD NO:

KING COUNTY STANDARD PLAN NOTES, RECOMMENDED CONSTRUCTION SEQUENCE, AND ADDITIONAL NOTES FROM KING COUNTY 2016 SURFACE WATER DESIGN MANUAL - APPENDIX D.4.1 STANDARD ESC AND SWPPS PLAN NOTES

STANDARD ESC PLAN NOTES

OMITTED TEXT HAS A STRIKE-THROUGH. TEXT ADDED BY THE WATERSHED COMPANY HAS AN UNDERLINE.

THE STANDARD ESC PLAN NOTES MUST BE INCLUDED ON ALL ESC PLANS. AT THE APPLICANT'S DISCRETION, NOTES THAT IN NO WAY APPLY TO THE PROJECT MAY BE OMITTED; HOWEVER, THE REMAINING NOTES MUST NOT BE RENUMBERED. FOR EXAMPLE, IF ESC NOTE #3 WERE OMITTED, THE REMAINING NOTES SHOULD BE NUMBERED 1, 2, 4, 5, 6, ETC.

1. APPROVAL OF THIS EROSION AND SEDIMENTATION CONTROL (ESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G., SIZE AND LOCATION OF ROADS, PIPES, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
2. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/ESC SUPERVISOR UNTIL ALL CONSTRUCTION IS APPROVED.
3. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED BY SURVEY TAPE OF FENCING, IF REQUIRED, PRIOR TO CONSTRUCTION (SWDM APPENDIX D). DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE CLEARING LIMITS SHALL BE PERMITTED. THE CLEARING LIMITS SHALL BE MAINTAINED BY THE APPLICANT/ESC SUPERVISOR FOR THE DURATION OF CONSTRUCTION.
4. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES, SUCH AS CONSTRUCTED WHEEL WASH SYSTEMS OR WASH PADS, MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN AND TRACK OUT TO ROAD RIGHT OF WAY DOES NOT OCCUR FOR THE DURATION OF THE PROJECT.
5. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED PRIOR TO OR IN CONJUNCTION WITH ALL CLEARING AND GRADING SO AS TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEMS, FLOW CONTROL BMP LOCATIONS (EXISTING AND PROPOSED), AND ADJACENT PROPERTIES IS MINIMIZED.
6. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND MODIFIED TO ACCOUNT FOR CHANGING SITE CONDITIONS (E.G. ADDITIONAL COVER MEASURES, ADDITIONAL SUMP PUMPS, RELOCATION OF DITCHES AND SILT FENCES, PERIMETER PROTECTION ETC.) AS DIRECTED BY KING COUNTY.
7. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/ESC SUPERVISOR AND MAINTAINED TO ENSURE CONTINUED PROPER FUNCTIONING. WRITTEN RECORDS SHALL BE KEPT OF WEEKLY REVIEWS OF THE ESC FACILITIES.
8. ANY AREAS OF EXPOSED SOILS, INCLUDING ROADWAY EMBANKMENTS, THAT WILL NOT BE DISTURBED FOR TWO CONSECUTIVE DAYS DURING THE WET SEASON OR SEVEN DAYS DURING THE DRY SEASON SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED ESC METHODS (E.G., SEEDING, MULCHING, PLASTIC COVERING, ETC.).
9. ANY AREA NEEDING ESC MEASURES THAT DO NOT REQUIRE IMMEDIATE ATTENTION SHALL BE ADDRESSED WITHIN SEVEN (7) DAYS.
10. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH DURING THE DRY SEASON, BY-MONTHLY DURING THE WET SEASON, OR WITHIN TWENTY FOUR (24) HOURS FOLLOWING A STORM EVENT.
11. AT NO TIME SHALL MORE THAN ONE (1) FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSTREAM SYSTEM.
12. ~~ANY PERMANENT RETENTION/DETENTION FACILITY USED AS A TEMPORARY SETTLING BASIN SHALL BE MODIFIED WITH THE NECESSARY EROSION CONTROL MEASURES AND SHALL PROVIDE ADEQUATE STORAGE CAPACITY. IF THE FACILITY IS TO FUNCTION ULTIMATELY AS AN INFILTRATION SYSTEM, THE TEMPORARY FACILITY MUST BE ROUGH GRADED SO THAT THE BOTTOM AND SIDES ARE AT LEAST THREE FEET ABOVE THE FINAL GRADE OF THE PERMANENT FACILITY. FLOW CONTROL BMP AREAS (EXISTING OR PROPOSED) SHALL NOT BE USED AS TEMPORARY FACILITIES AND SHALL BE PROTECTED FROM SEDIMENTATION AND INTRUSION.~~
13. COVER MEASURES WILL BE APPLIED IN CONFORMANCE WITH APPENDIX D OF THE KING COUNTY SURFACE WATER DESIGN MANUAL.
14. PRIOR TO THE BEGINNING OF THE WET SEASON (OCT. 1), ALL DISTURBED AREAS SHALL BE REVIEWED TO IDENTIFY WHICH ONES CAN BE SEEDED IN PREPARATION FOR THE WINTER RAINS. DISTURBED AREAS SHALL BE SEEDED WITHIN ONE WEEK OF THE BEGINNING OF THE WET SEASON. A SKETCH MAP OF THOSE AREAS TO BE SEEDED AND THOSE AREAS TO REMAIN UNCOVERED SHALL BE SUBMITTED TO THE DPER INSPECTOR.

ESC PLAN RECOMMENDED CONSTRUCTION SEQUENCE

OMITTED TEXT HAS A STRIKE-THROUGH. TEXT ADDED BY THE WATERSHED COMPANY HAS AN UNDERLINE.

A DETAILED CONSTRUCTION SEQUENCE IS NEEDED TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURES ARE APPLIED AT THE APPROPRIATE TIMES. A RECOMMENDED CONSTRUCTION SEQUENCE IS PROVIDED BELOW:

1. HOLD THE PRE-CONSTRUCTION MEETING.
2. POST SIGN WITH NAME AND PHONE NUMBER OF CSWPP/ESC SUPERVISOR (MAY BE CONSOLIDATED WITH THE REQUIRED NOTICE OF CONSTRUCTION SIGN).
3. FLAG OR FENCE CLEARING LIMITS.
4. ~~INSTALL CATCH BASIN PROTECTION, IF REQUIRED. INSTALL FLOW CONTROL BMP AREA PROTECTION, IF REQUIRED.~~
5. GRADE AND INSTALL CONSTRUCTION ENTRANCE(S).
6. INSTALL PERIMETER PROTECTION (SILT FENCE, BRUSH BARRIER, ETC.).
7. ~~CONSTRUCT SEDIMENT PONDS AND TRAPS.~~
8. GRADE AND STABILIZE CONSTRUCTION ROADS.
9. CONSTRUCT SURFACE WATER CONTROLS (INTERCEPTOR DIKES, PIPE SLOPE DRAINS, ETC.) SIMULTANEOUSLY WITH CLEARING AND GRADING FOR PROJECT DEVELOPMENT. CONSTRUCT SWPPPS IN ANTICIPATION OF SCHEDULED CONSTRUCTION ACTIVITY (E.G., CONRETE-RELATED PH MEASURES FOR UTILITY, VAULT OR ROADWAY CONSTRUCTION).
10. MAINTAIN EROSION CONTROL AND SWPPS MEASURES IN ACCORDANCE WITH KING COUNTY STANDARDS AND MANUFACTURER'S RECOMMENDATIONS.
11. RELOCATE EROSION CONTROL AND SWPPS MEASURES, OR INSTALL NEW MEASURES SO THAT AS SITE CONDITIONS CHANGE, THE EROSION AND SEDIMENT CONTROL AND POLLUTANT PROTECTION IS ALWAYS IN ACCORDANCE WITH THE KING COUNTY CONSTRUCTION STORMWATER POLLUTION PREVENTION STANDARDS.
12. COVER ALL AREAS THAT WILL BE UNWORKED FOR MORE THAN SEVEN DAYS DURING THE DRY SEASON OR TWO DAYS DURING THE WET SEASON WITH STRAW, WOOD FIBER MULCH, COMPOST, PLASTIC SHEETING, OR EQUIVALENT.
13. STABILIZE ALL AREAS WITHIN SEVEN DAYS OF REACHING FINAL GRADE.
14. SEED, SOD, STABILIZE, OR COVER ANY AREAS TO REMAIN UNWORKED FOR MORE THAN 30 DAYS.
15. UPON COMPLETION OF THE PROJECT, STABILIZE ALL DISTURBED AREAS AND REMOVE BMPS IF APPROPRIATE.

FROM KING COUNTY 2016 SURFACE WATER DESIGN MANUAL - APPENDIX D.4.2 RECOMMENDED CONSTRUCTION SEQUENCE.

GENERAL CONSTRUCTION SEQUENCE

1. INSTALL ALL BMPS INDICATED IN CONSTRUCTION PLAN SET.
2. GRADE AND INSTALL CONSTRUCTION ENTRANCE(S).
3. GRADE AND STABILIZE ALL ACCESS ROADS.
4. INSTALL TREE PROTECTION FENCING.
5. CLEAR AND GRUB AREAS WITHIN GRADING LIMITS (SHEET 3.0).
6. INSTALL SANDBAGS AND FLOW DIVERSION PIPE(S).
7. CONSTRUCT STREAM ACCORDING TO PROPOSED GRADES (SHEET 4.0).
8. INSTALL CULVERT AND BRING SURROUNDING AREA TO FINAL GRADES.
9. REPAIR ACCESS ROAD PAVING REMOVED FOR CULVERT INSTALLATION.
10. INSTALL LARGE WOODY DEBRIS (SHEETS 3.0, 6.1, AND 6.2).
11. APPLY GRAVEL/ COBBLE/ BOULDER MIX AND TOPSOIL TO BRING SITE TO FINAL GRADES (SHEET 4.0 AND 6.1).
12. APPLY TOPSOIL AND COMPOST.
13. INSTALL PLANTINGS (SHEETS 7.0 - 7.4).
14. APPLY MULCH AND SOIL STABILIZATION MATERIALS.
15. REMOVE ALL BMPS, REFUSE, AND FENCES.

CLEARING, GRADING & TEMPORARY EROSION CONTROL - GENERAL

1. ALL CLEARING AND GRADING WORK SHALL MEET THE REQUIREMENTS AS SET FORTH IN APPLICABLE CITY CODE SECTIONS.
2. TEMPORARY EROSION/SEDIMENT CONTROLS SHALL BE INSTALLED AND OPERATING PRIOR TO ANY GRADING OR CONSTRUCTION-RELATED SOIL DISTURBANCE. THESE CONTROLS MUST BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION IS COMPLETE AND ALL EXPOSED SOILS ARE STABILIZED BY HYDROSEEDING OR MULCHING.
3. ADDITIONAL EROSION-CONTROL MEASURES MAY BE REQUIRED BY CITY REPRESENTATIVES DEPENDING ON SITE AND WEATHER CONDITIONS. ANY WORK PERFORMED DURING THE RAINY SEASON, OCTOBER 1 THROUGH APRIL 30, SHALL REQUIRE A PLAN TO LIMIT THE EXTENT OF SOIL EXPOSURE.
4. AT THE DISCRETION OF THE RESPONSIBLE BUILDING OFFICIAL, WORK MAY BE SUSPENDED DURING PERIODS OF INCLEMENT WEATHER TO REDUCE ACTUAL OR POTENTIAL EROSION AND/OR SEDIMENTATION.
5. WHEN WORK IS STOPPED OR COMPLETED IN AN AREA, ADDITIONAL EROSION CONTROL MAY BE REQUIRED, INCLUDING SEEDING OR OTHER MEASURES.
6. ANY WATER RUNOFF FROM THE PROJECT AREA BEING DISCHARGED TO A STORMWATER SYSTEM DURING CONSTRUCTION SHALL NOT EXCEED TURBIDITY VALUES OF 50 NTU'S AND, IN ADDITION, SHALL MEET THE REQUIREMENTS OF THE 1972 CLEAN WATER ACT.
7. LOCATIONS SHOWN OF EXISTING UTILITIES MAY BE INCOMPLETE AND ARE APPROXIMATE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, CORRECT AND DETERMINE ANY ADDITIONAL LOCATIONS SO AS TO AVOID DAMAGE OR DISTURBANCE.
8. ALL NATIVE VEGETATION IS TO REMAIN UNDISTURBED OUTSIDE OF GRADED AREAS, ACCESS CORRIDORS, AND/OR TO-BE-REPLANTED AREAS.
9. FLOW FROM IMPERVIOUS SURFACES, INCLUDING TRAILS AND ACCESS ROADS, SHALL BE CONNECTED TO A DRAINAGE SYSTEM AS SOON AS POSSIBLE.

CLEARING, GRADING & TEMPORARY EROSION AND SEDIMENTATION - SPECIFIC

1. LOCATING AND DELINEATING THE GRADING LIMITS AND ALL EXISTING TREES AND OTHER BEGETATION TO BE PRESERVED WITHIN THE WORK AREA AS INDICATED ON THE PLAN VIEW DRAWINGS AND AS DIRECTED BY THE STREAM RESTORATION CONSULTANT.
2. INSTALLING CONSTRUCTION ACCESS PAD(S) AT LOCATION(S) IDENTIFIED ON PLAN AND PER APPROPRIATE DETAIL.
3. MAINTAINING A SWEEPER ON-STE AND IMMEDIATELY REMOVING ANY SOIL THAT IS TRACKED ONTO PAVED SURFACES AS A RESULT OF CONSTRUCTION.
4. STABILIZING ALL EXPOSED SOILS BY SUITABLE APPLICATION OF BEST MANAGEMENT PRACTICES (CMPS), INCLUDING, BUT NOT LIMITED TO, PLASTIC COVERING, MULCHING, OR SODE OR OTHER VEGETATION. SEEDING AND STRAW MULCHING (3" DEPTH) OF EXPOSED SOILS IS TO OCCUR WITHIN SEVEN DAYS OF CHANNEL WORK AND RESTORATION FEATURE COMPLETION FRO EACH DISTINCT STREAM SEGMENT OR SEPARATE WORK AREA. FROM OCTOBER 1 THROUGH APRIL 30, NO UNWORKED SOIL SHALL REMAIN EXPOSED FOR MORE THAN 48 HOURS. FROM MAY1 THROUGH SEPTEMBER 30, NO UNWORKED SOIL SHALL REMAIN EXPOSED FOR MORE THAN SEVEN DAYS.
5. PUMP SYSTEM TO TREAT OR INFILTRATE TURBID SEEPAGE WATER BEFORE DISCHARGING BACK INTO THE CREEK.
6. FUELING OF BEHICLES AT LEAST 100 FEET FROM OPEN WATER, AND SPILL KITS FOR THOSE VEHICLES.
7. POSTING A PUBLIC INFORMATION SIGN LISTIGN 24-HOUR EMERGENCY PHONE NUMBERS FOR THE CITY AND THE CONTRACTOR. THE SIGN MUST BE POSTED AT THE PROJECT SITE IN FULL VIEW OF THE PUBLIC AND THE CONTRACTORS, AND IT MUST REMAIN POSTED UNTIL FINAL SIGN OFF BY THE CITY CLEARING AND GRADING INSPECTOR OR EQUIVALENT PARTY.
8. REMOVAL OF ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPS WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED. TRAPPED SEDIMENT SHALL BE REMOVED OR STABILIZED ON SITE. DISTURBED SOIL AREAS RESULTING FROM BMP REMOVAL SHALL BE PERMANENTLY STABILIZED.

MATERIALS & QUANTITIES

ITEM	QUANTITY	UNIT
SILT AND CONSTRUCTION FENCING	750	LF
EROSION CONTROL WATTLE	1000	LF
SEDIMENT CURTAIN - INSTALLATION, REMOVAL AND MAINTENANCE	0	LF
TEMPORARY BYPASS		
SANDBAG	20	EA
BYPASS PIPE	200	LF
DEWATERING PUMP	1	
FISH EXCLUSION/ CREEK RAMPING	1	LS
LOG INSTALLATION (INCLUDING HARDWARE)		
ROOTWAD	4	EA
BARB LOG	9	EA
FILL		
GRAVEL/ COBBLE/ BOULDER MIX	225	CY
TOPSOIL, TYPE A (IMPORTED COMPOST)	100	CY
MULCH	28	CY
ACCESS ROAD ASPHALT REPAIR		
ASPHALT	600	CF
SUBGRADE (CASE COURSE, UNTREATED, 3/4")	17	CY
BOX CULVERT AND SEDIMENT VAULT	1	EA

MATERIAL SPECIFICATIONS AND DEFINITIONS

ANCHORS: ANCHORS SHALL CONSIST OF MANTA RAY MR-3 EARTH ANCHORS OR EQUIVALENT. ANCHORS TO BE DRIVEN MINIMUM 6 FEET (72 INCHES) INTO GROUND (OR PER MANUFACTURER'S RECOMMENDATIONS) AT AN ANGLE APPROXIMATELY 15 TO 30 FROM VERTICAL AIMED AWAY FROM THE CENTER OF THE CHANNEL AND UPSTREAM. ALL ANCHORS SHALL BE SET AND LOAD TESTED TO APPROXIMATELY 5,000 LBS. IF MR-3 ANCHORS ARE UNABLE TO ACHIEVE SPECIFIED LOAD RATING, THEN A LARGER ANCHOR (MR-2 OR MR-1) SHALL BE SUBSTITUTED THAT MEETS SPECIFIED LOAD RATING. ALTERNATIVELY, IF MR-3 ANCHORS ARE UNABLE TO BE DRIVEN TO DESIRED LEVEL, A SMALLER ANCHOR (MR-4 OR MR-88) SHALL BE USED AND SET TO THE SAME LOAD RATING.

VEGETABLE COMPOST: COMPOST SHALL BE CEDAR GROVE OR EQUAL PRODUCT (TYPE A) CONTAINING 100% COMPOSED VEGETABLE MATTER AND NO VIABLE WEED SEEDS OR PARTS.

WOOD CHIP MULCH: CHIPPED WOODY MATERIAL APPROXIMATELY 1 TO 4 INCHES IN MAXIMUM DIMENSION (NOT SAWDUST OR HOG FUEL). ALSO KNOWN AS ARBORIST CHIPS.

FERTILIZER: THE SLOW RELEASE, GRANULAR FERTILIZER APPLICATIONS SHOULD BEGIN AFTER THE SHRUBS AND GROUNDCOVERS HAVE HAD A YEAR OF GROWTH. EARLY APPLICATION OF FERTILIZER BENEFITS INVASIVE WEEDS TO THE DISADVANTAGE OF THE NEWLY INSTALLED NATIVE PLANTS. FOLLOW MANUFACTURERS' INSTRUCTIONS FOR APPLICATION. KEEP ALL FERTILIZERS IN WEATHER-TIGHT CONTAINERS WHILE ON SITE.

CLEARING, GRADING & TEMPORARY EROSION CONTROL - GENERAL

1. ALL CLEARING AND GRADING WORK SHALL MEET THE REQUIREMENTS AS SET FORTH IN APPLICABLE CITY CODE SECTIONS.
2. A PRECONSTRUCTION MEETING SHALL BE HELD WITH CITY, CONTRACTOR, AND DESIGNER REPRESENTATIVES PRESENT, AND ALL REQUIRED PERMITS MUST BE APPROVED PRIOR TO START OF CONSTRUCTION. CONDUCT WEEKLY PROGRESS MEETINGS WITH CONTRACTOR AND DESIGNER REPRESENTATIVES PRESENT.
3. TEMPORARY EROSION/SEDIMENT CONTROLS SHALL BE INSTALLED AND OPERATING PRIOR TO ANY GRADING OR CONSTRUCTION-RELATED SOIL DISTURBANCE. THESE CONTROLS MUST BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION IS COMPLETE AND ALL EXPOSED SOILS ARE STABILIZED BY HYDROSEEDING OR MULCHING WITH STRAW.

NOTE: GRAVEL/COBBLE/BOULDER MIX SHALL CONSIST OF WELL-GRADED, ROUNDED GRAVEL COBBLES, AND SMALL BOULDERS, AND CONFORMING TO THE BELOW SIZE GRADATION BY WEIGHT.

MIX TO BE APPLIED TO SECTION OF STREAM UPSTREAM OF THE PROPOSED CULVERT:

<3/8" (MIN 5% FINES)	10%
3/8 TO 3 INCHES	10%
3 TO 6 INCHES	15%
6 TO 12 INCHES	15%
12 TO 18 INCHES	15%
18 TO 24 INCHES	15%
24 TO 36 INCHES	10%
36 INCHES AND LARGER	10%

MIX TO BE APPLIED TO SECTION OF STREAM DOWNSTREAM OF THE PROPOSED CULVERT:

FINES <0.004" (0.1 mm)	5%
0.004" to 1/4 INCH	10%
1/4 TO 3/4 INCH	15%
3/4 to 1-1/2 INCHES	30%
1-1/2 TO 3 INCHES	25%
3 TO 5 INCHES	15%

NOTES
1. REFER TO DETAILS ON SHEET 6.3.
2. FINAL LOG STRUCTURE PLACEMENT IN FIELD SHALL TAKE PLACE AFTER FOOTING REPAIRS AND SHALL BE DIRECTED BY A STREAM RESTORATION SPECIALIST.
3. ANCHOR LOGS USING EARTH ANCHORS AS FEASIBLE.
4. IF BOULDERS ARE USED MEET ANCHORING REQUIREMENTS AS PROVIDED IN THE DETAILS AND SPECIFICATIONS.

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GENERAL NOTES, TESC & QUANTITIES

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-2.0 GENERAL NOTES, TESC & QUANTITIES

DRAWING NO: D-18172
REV NO:
SHEET: 2 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

CONSTRUCTION SEQUENCE

GENERAL CONSTRUCTION WORK SEQUENCE:

1. INSTALL ALL TEMPORARY EROSION CONTROL MEASURES, GENERAL AND SITE-SPECIFIC, AS NOTED ON THE PLANS AND SUPPORTING DOCUMENTS OR AS REQUIRED BY VARIOUS PERMITS AND AUTHORIZATIONS. SEE NOTES AND PLANS ON SHEET W-4.1 AND W-4.2.
2. CLEAR AND GRUB WITHIN GRADING LIMITS.
3. CONSTRUCT A TEMPORARY GRAVEL BAG DIVERSION DAM (OR APPROVED ALTERNATE) ACROSS THE STREAM CHANNEL AT OR UPSTREAM OF THE LIMIT OF THE AFFECTED IN-STREAM WORK AREA, TO CREATE A POOL. PLACE FLEXIBLE DIVERSION PIPES TO CARRY FLOW AND ANY FISH IN THE UPSTREAM POOL TO THE INDICATED POINT DOWNSTREAM OF THE WORK AREA. THE DISCHARGE IS TO BE POSITIONED TO MINIMIZE EROSION OR TURBIDITY RESULTING FROM THE DISCHARGE VELOCITY OF THE WATER.
4. CONSTRUCT A SEDIMENT TRAP WITH A SUMP PUMP AT THE DOWNSTREAM LIMIT OF THE AFFECTED WORK AREA TO RETAIN ANY SILT-LADEN WATER THAT MAY COLLECT AS A RESULT OF IMPLEMENTATION ACTIVITIES. COLLECTED SILT-LADEN WATER IS TO BE PUMPED TO UPLAND AREAS FOR DISCHARGE/DISPERSAL BY PERFORATED PIPE AND BIOFILTRATION AND/OR INFILTRATION IN WETLAND AREAS.
5. THE CONTRACTOR SHALL NOTIFY THE STREAM RESTORATION SPECIALIST 3 WORKING DAYS IN ADVANCE OF DEWATERING TO ALLOW FOR FISH REMOVAL. ANY FISH ISOLATED IN THE LOCALIZED IN-STREAM WORK AREA WILL BE REMOVED BY THE STREAM RESTORATION SPECIALIST IN THE WORK AREA. GIVEN THE SIZE AND CHARACTERISTICS OF THE EXISTING STREAM, IT IS EXPECTED THAT STRANDED FISH CAN BE LOCATED AND CAPTURED USING DIPNETS OR SMALL SEINES, FOLLOWED BY ELECTROFISHING. EFFORTS TO CAPTURE AND RELOCATE FISH BY NETTING METHODS ARE TO PRECEDE ELECTROFISHING. CAPTURED FISH ARE TO BE RELEASED IN UNAFFECTED REACHES DOWNSTREAM OF THE PROJECT AREA.
6. EXCAVATE STREAM ACCORDING TO THE GRADING PLAN, PROFILE, AND CROSS-SECTIONS. EXCAVATE THE MAIN CHANNEL (DOWN TO THE ELEVATION OF THE BENCHES). UNDER SUPERVISION OF THE STREAM RESTORATION SPECIALIST, FLAG AND THEN EXCAVATE THE LOW FLOW CHANNEL.
7. REMOVE ACCESS ROAD ASPHALT WITHIN GRADING LIMITS AND EXCAVATE ACCORDING TO SHEETS W-4.0 AND W-4.1.
8. INSTALL CULVERT ACCORDING TO SHEETS W-5.0 AND W-5.1.
9. EXCAVATE DEPRESSIONS IN THE STREAM CHANNEL BOTTOM TO ACCOMMODATE THE PLACEMENT OF THE PROPOSED LOG STRUCTURES. MATERIAL EXCAVATED FROM THE CHANNEL MAY BE RE-USED AS DIRECTED. PLACE LOG STRUCTURES IN GROUPINGS AND ACCORDING TO TYPE AND POSITIONING AS LAID OUT IN DETAIL IN THE PROJECT PLANS.
10. PLACE LOG STRUCTURES ACCORDING TO SHEETS W-3.0, W-6.1, AND W-6.2. INSTALL EARTH ANCHOR SYSTEMS AND PLACE GRAVEL/ COBBLE/ BOULDER MIX.
11. BRING STREAM TO FINAL GRADE WITH GRAVEL/ COBBLE/ BOULDER MIX (SEE SHEETS W-2.0 AND W-6.2 FOR DETAILS).
12. FOLLOWING COMPLETION OF IN-STREAM WORK, ENSURE THAT MULCH, BLANKET AND OTHER EROSION CONTROLS ARE INSTALLED AND IN GOOD CONDITION ALONG STREAMBANKS BORDERING AREAS TO BE PLANTED, AND DOWNSLOPE OF ANY OTHER DISTURBED AREAS.
13. ANY SILT-LADEN WATER COLLECTING IN THE IN-STREAM WORK AREA FOLLOWING CESSATION OF IN-WATER WORK ACTIVITIES IS TO BE ALLOWED TO SETTLE OR DISSIPATE PRIOR TO RECONNECTING THE DE-WATERED WORK AREA TO THE FLOWING STREAM BY REMOVAL OF FIRST THE DOWNSTREAM THEN THE UPSTREAM TEMPORARY GRAVEL BAG DIVERSION DAM AND ASSOCIATED BYPASS PIPING.
14. INSTALL PLANTINGS ACCORDING TO SHEETS W-7.0 - W-7.3.
15. WATER PLANTS AS NEEDED DURING DRY CONDITIONS THROUGHOUT THE FIRST YEAR POST-PLANTING.
16. REMOVE ALL REFUSE, TESC MEASURES AND BMPS.

CONSTRUCTION SEQUENCE

SCALE 1"=20'

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-2.1 CONSTRUCTION SEQUENCE

DRAWING NO: D-18172 REV NO:

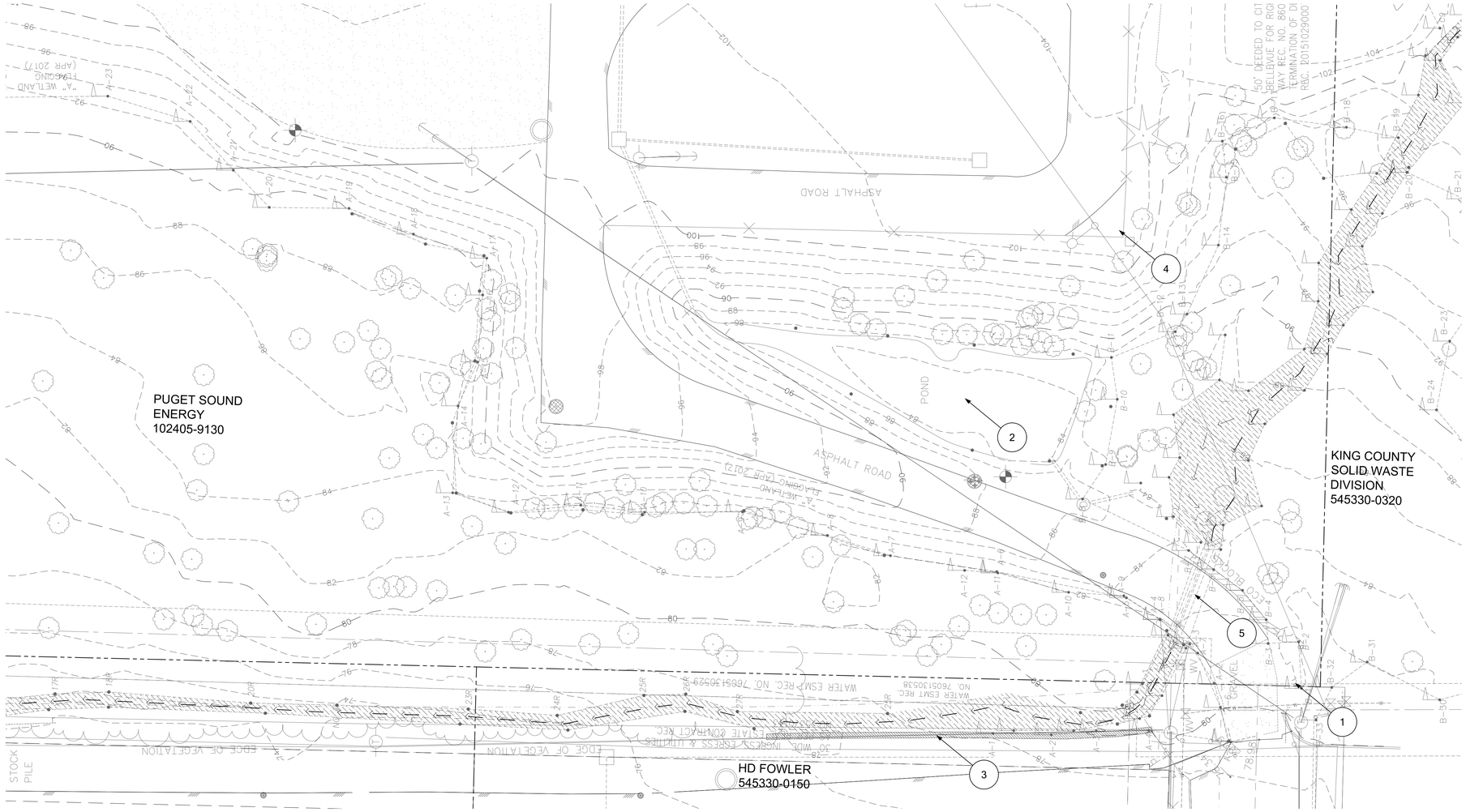
SHEET: 3 OF 22

CLASS: SITE

FILE NO: 111103

CODE: RIC

CADD NO:



LEGEND

- EXISTING TREE
- EXISTING SURVEYED STREAM CHANNEL (OHWM)
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PSE PROPERTY BOUNDARY

1. SECTION OF STREAM DAYLIGHTED FOR 15' LF BEFORE ENTERING INTO STORM DRAIN
2. STORMWATER POND
3. ECO BLOCK RETAINING WALL
4. GRAVEL EQUIPMENT STORAGE LOT
5. 2 - 18" CORRUGATED METAL PIPES

EXISTING CONDITIONS

SCALE 1"=20'

20 0 20 40 80

GRAPHIC SCALE
(IN FEET)

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W-2.2 EXISTING CONDITIONS

DRAWING NO: D-18172 REV NO:

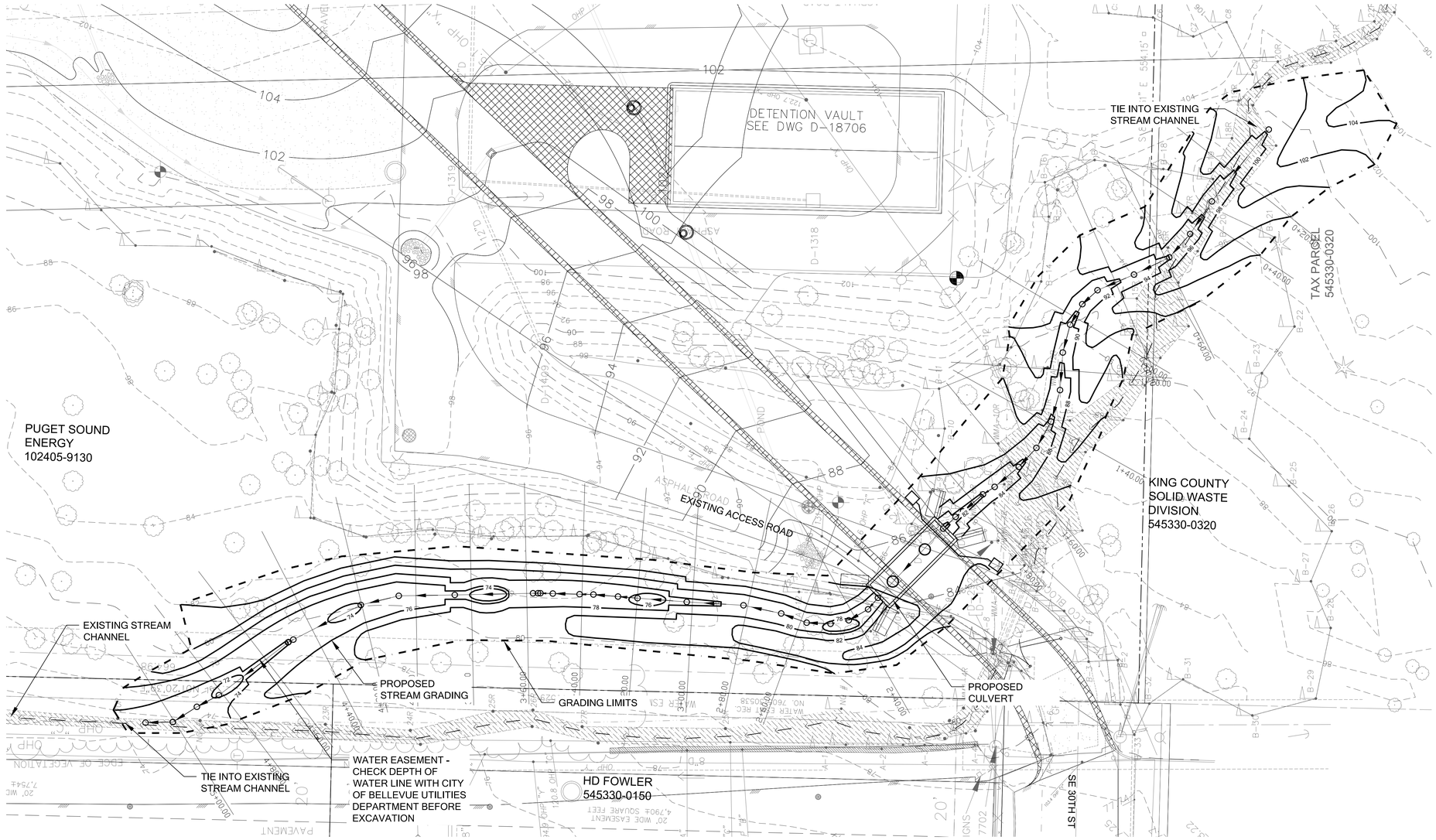
SHEET: 4 OF 22

CLASS: SITE

FILE NO: 111103

CODE: RIC

CADD NO:



LEGEND

- EXISTING CHANNEL
- EXISTING TREE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOURS
- PSE PROPERTY BOUNDARY
- GRADING LIMITS
- XS STATION (SEE 6.11 - 6.13)

GRADING PLAN

SCALE 1"=20'

GRAPHIC SCALE
(IN FEET)
20 0 20 40 80

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		DATE (M/D/Y)
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W-3.0 CHANNEL GRADING PLAN

DRAWING NO: D-18172 REV NO

SHEET: 5 OF 22

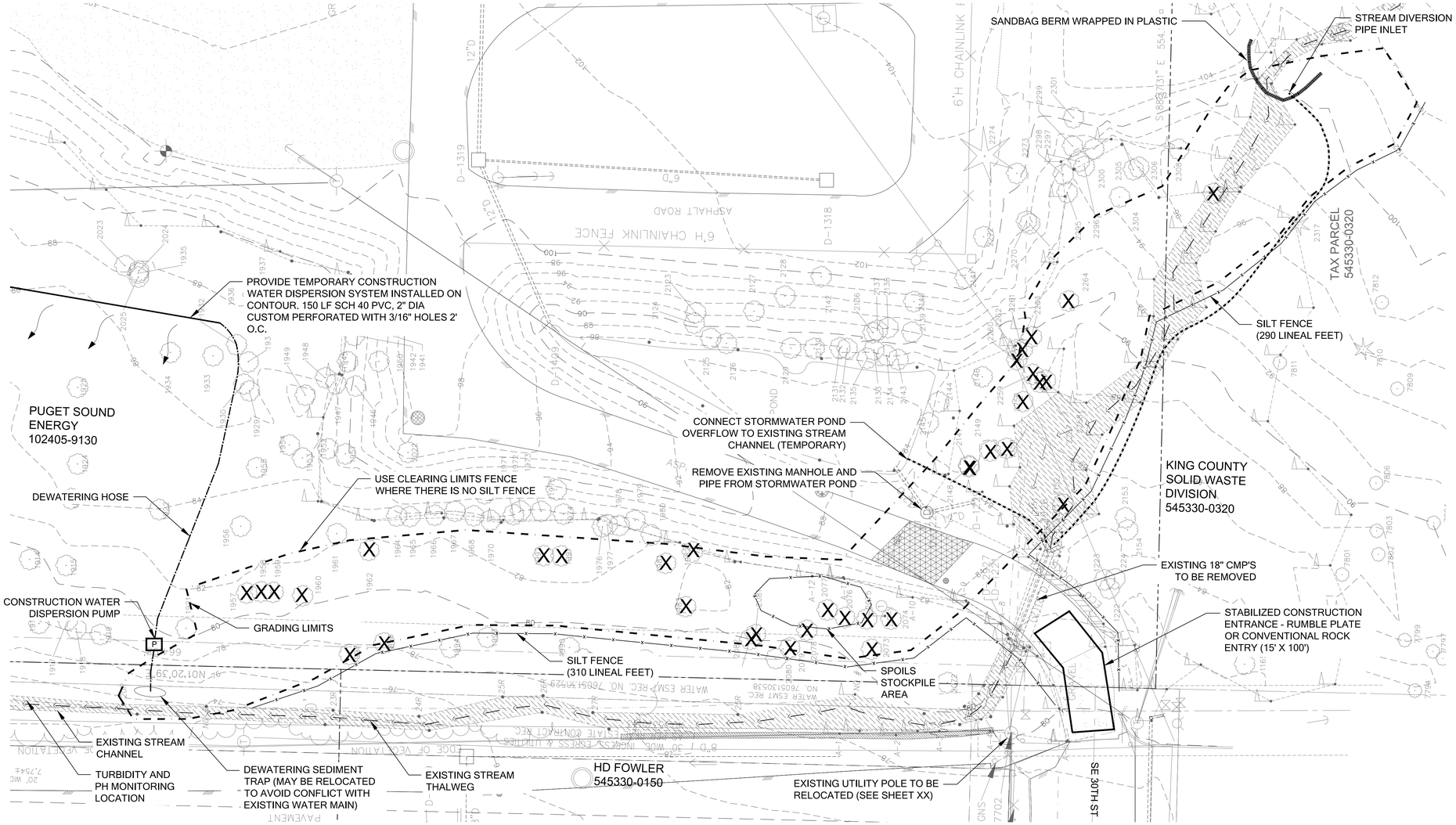
CLASS: SITE

FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002522



LEGEND

- EXISTING CHANNEL
- EXISTING TREE TO BE REMOVED
- GRADING LIMITS
- DIVERSION PIPE (210 LF)
- DEWATERING HOSE AND PUMP
- ASPHALT (TO BE REMOVED)
- SILT FENCE
- SANDBAG BERM

TREE REMOVAL TABLE

REFS.	TREE DESC.	DIA. (INCHES)	REFS.	TREE DESC.	DIA. (INCHES)	REFS.	TREE DESC.	DIA. (INCHES)	REFS.	TREE DESC.	DIA. (INCHES)
1957	ALDER	14									
1958	ALDER	14	1962	POPLAR	12 10	2077	ALDER	9 8	2258	ALDER	9
1959	ALDER	12	1981	ALDER	8	2078	ALDER	10 8 6 5	2260	ALDER	9
1960	ALDER	9 15	1982	ALDER	9 8 7	2079	ALDER	8 7	2261	ALDER	8
						2081	ALDER	10	2262	ALDER	9
			1983	ALDER	18	2082	ALDER	9	2263	ALDER	8
			1991	ALDER	12				2264	ALDER	10 5
			1992	ALDER	13	2147	ALDER	9			
			1996	ALDER	10	2148	ALDER	10	2317	ALDER	9
			1997	ALDER	8	2149	POPLAR	12 6			
						2150	POPLAR	14 12 10			
			2073	ALDER	8 5	2152	POPLAR	CLUSTER 15 TREES 3"-9" (15' DIA.)			
			2074	ALDER	12 11						
			2075	ALDER	(2)8	2256	ALDER	9			
			2076	ALDER	9	2257	ALDER	8			

NOTES

1. DIVERSION SHALL BE FLEXIBLE PIPE DESIGNED TO CONVEY THE 25-YR FLOW DURING THE CONSTRUCTION WINDOW. CONVEYANCE PIPE(S) SHALL BE INSTALLED AT THE STORMWATER POND OUTLET AND DISCHARGE AT THE EXISTING CMP PIPES BENEATH THE ACCESS DRIVE.
2. CONTRACTOR SHALL COMPLY WITH ESC NOTES AND SEQUENCES ON SHEETS 2.0 AND 4.2.

TESC & DEMOLITION PLAN

SCALE 1"=20'

20 0 20 40 80

GRAPHIC SCALE (IN FEET)

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REVISION DESCRIPTION:	WO NUMBER: 141003252
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RICHARDS CREEK SUBSTATION

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ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

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W-3.1 TESC & DEMOLITION PLAN

DRAWING NO: D-18172 REV NO:

SHEET: 6 OF 22

CLASS: SITE

FILE NO: 111103

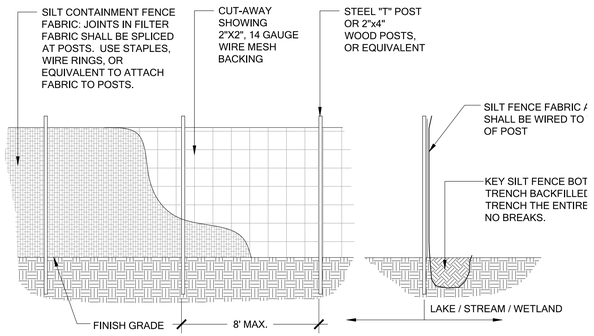
CODE: RIC

CADD NO:

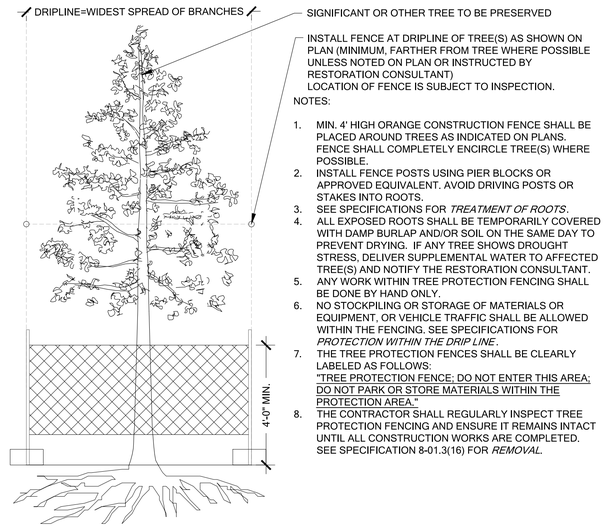
DSD 002523

1. TESC COORDINATION
   a. A Certified Erosion and Sediment Control Lead (CESCL) shall be designated by the contractor as the project's TESC supervisor and shall be responsible for the performance, maintenance, and review of TESC measures and for compliance with all permit conditions related to TESC. The TESC supervisor shall be certified by the Department of Ecology's training requirement.
   b. Contractor's Revised TESC Plans. The TESC measures shown on this plan, in the Stormwater Pollution Prevention Plan (Appendix D of the Specifications), and in Section 8.1 of the Specifications, are the minimum requirements for anticipated site conditions. The contractor may revise the TESC measures should they determine that there is a need to be modified to comply with the permit conditions or if there is a more effective and efficient way to meet the performance objectives for the duration of the project.
   c. Implementing Revised TESC Plans, The Contractor shall consult with the City prior to implementing any changes to ensure compliance with City permits, the contract, and that the changes do not negatively impact property or public safety.
   d. An onsite TESC preconstruction meeting shall be held before any work begins to review implementation of the TESC Plans and Report.
2. INITIAL TESC INSTALLATION
   a. All TESC facilities shown on the Plans shall be installed prior to or in conjunction with all clearing and grading so as to ensure that the sediment-laden water does not enter the City drainage system, surface waters, or wetlands. Adjacent properties shall be protected from sediment-laden runoff. If not specifically shown on the Plans or the TESC Report, installation shall be done in accordance with Appendix D of the King County Surface Water Design Manual, "Erosion and Sediment Control Standards", or as directed by the City.
   b. Clearing limits and tree protection boundaries shown on the Plans shall be clearly flagged by survey tape or fencing prior to construction. No disturbance beyond the clearing limits is allowed.
   c. Stabilized construction entrances shown on the Plans shall be installed at the beginning of construction and maintained for the duration of the project. Onsite roads and paved areas shall be kept clean to minimize turbidity in runoff. Additional measures, such as constructed wheel wash systems or wash pads, if shown on the Plans, are required to ensure sediment is not tracked out to city streets. Any dirt tracked onto city streets shall be swept as needed or as directed by the City of Issaquah. Street sweeping is not considered a TESC measure.
   d. Covering of exposed soils, including roadway embankments, that will not be disturbed for two consecutive days during the wet season (Oct 1 to April 30) or seven days during the dry season (May 1 to Sept 30) shall be done using approved TESC methods (e.g. seeding, mulching, plastic covering, etc.). These time limits may be modified by the City to address specific site and weather conditions.
   e. Collection and treatment of runoff using ditches, swales, or pipes is required to route stormwater to collection points where it is treated prior to infiltration or discharge offsite. When shown on the Plans, temporary storage facilities such as ponds and tanks shall be installed at the onset of construction, regardless of the time of year.
   f. Discharge to the sanitary sewer is allowed upon approval from the City or Sammamish Plateau Water and Sewer District and the King County Industrial Waste Program. Pretreatment prior to discharge is required to meet County or Sewer District standards.
   g. Working in Streams. All in-water work within waters of the state shall be conducted during the HPA-specified fish window (included in Appendix B). Any equipment working within regulated waters shall be equipped with vegetable-based (non-toxic) hydraulic fluids, and appropriate methods shall be employed to divert the stream around the working area or isolate the working area from the stream using barriers.
3. ROUTINE TESC MAINTENANCE
   a. Maintenance over duration of project. All TESC measures shall be maintained by the TESC supervisor for the duration of construction, until final landscaping or other permanent site stabilization is complete
   b. Routine inspections. The TESC facilities shall be inspected by the TESC supervisor daily or more often during rainfall, and maintained to ensure proper functioning. Written documentation is required for discharges above 25 NTUs and shall be readily available at the project site.
   c. Offsite Pumping. The TESC supervisor shall notify the City of Issaquah prior to pumping any discharge offsite or to critical areas.
   d. Inactive Sites. TESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within 24 hours following a storm event.
   b. Preparation for wet season. Prior to the beginning of the wet season (Oct 1), all disturbed areas shall be reviewed to identify which ones can be seeded or otherwise covered in preparation for the winter rains. If cover measures are not established by Oct 1, additional TESC measures shall be required.
5. TURBIDITY MONITORING
   a. Monitoring Responsibility. The City's Inspector will measure the turbidity of stormwater leaving the site at the designated monitoring point(s) to verify compliance with turbidity discharge limits for stormwater runoff per City permits, Appendix D of the Specifications, and Section 8.1 of the Specifications that are specified below. The Contractor shall monitor turbidity in Issaquah Creek upstream and downstream of the project site to verify compliance with turbidity in the stream per the Ecology Construction Stormwater General Permit and other State and Federal permits.
   b. Monitoring Location. The turbidity monitoring location, where the Inspector will measure turbidity for compliance, is shown on the TESC Plans. For project sites where designating a monitoring point is not feasible (e.g. flat sites or linear utility projects), the monitoring locations will be at the discretion of the Inspector.
   c. 25 NTU Action Level. The TESC Supervisor shall be notified of discharges above 25 NTUs. The TESC Supervisor shall review and modify the TESC measures as needed to keep discharges from the site below 25 NTUs.
   d. 100 NTU Discharge Limit. The contractor is responsible for installing and maintaining TESC measures so that discharge from the project site shall not exceed 100 NTUs at all times up to the 10 year/24 hour storm event. This event is defined as 3.5 inches of rainfall over a 24 hour period, as measured at the City's rain gage. Data from this rain gage is posted on the City's website.
   e. 5 NTU over background in Issaquah Creek. Refer to the Ecology Construction Stormwater General Permit and other State and Federal permits for compliance with State instream water quality standards.
6. OTHER POLLUTION CONTROL MEASURES
   a. Pollution Control. The contractor shall implement all requirements of the TESC Report and Stormwater Pollution Prevention Plan, including storage and handling of hazardous materials, concrete handling and wastewater disposal, spill kits and spill response, and other measures as needed.
   b. Control of Process Water. The contractor shall use the appropriate pollution control measures to ensure that no liquid products or contaminated water such as runoff from concrete slurry (known as process water) enters the storm drainage system, surface waters, or otherwise leaves the project site.
7. FINAL SITE STABILIZATION
   a. Final stabilization. The contractor shall install all TESC needed for final stabilization at completion of finish grading. This shall be done within two consecutive days during the wet season (Oct 1 to April 30), seven days during the dry season (May 1 to Sept 30) or as directed by the City.
   b. Removal of TESC Facilities. The contactor shall remove all TESC facilities, except those that will remain (such as seed and mulch) after final stabilization of the site.
8. ENFORCEMENT
   a. Non-compliance with contract requirements, performance objectives and permits. Failure to provide and maintain approved TESC facilities, discharges that exceed the 100 NTU turbidity limit, or other failures to comply with the contract or permits are considered violations of the contract and may be subject to suspension of work and monetary penalties.
   b. Maintenance of TESC during suspension. If work is ordered to be suspended, the contractor shall continue to control erosion, pollution, and runoff during the shutdown and working days will be continued to be counted.

SILT FENCE MAINTENANCE STANDARDS:
1. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY.
2. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION EXCEEDS 6" IN DEPTH.



1 SILT FENCE
Scale: NTS



NOTES:
1. MIN. 4' HIGH ORANGE CONSTRUCTION FENCE SHALL BE PLACED AROUND TREES AS INDICATED ON PLANS. FENCE SHALL COMPLETELY ENCIRCLE TREE(S) WHERE POSSIBLE.
2. INSTALL FENCE POSTS USING PIER BLOCKS OR APPROVED EQUIVALENT. AVOID DRIVING POSTS OR STAKES INTO ROOTS.
3. SEE SPECIFICATIONS FOR *TREATMENT OF ROOTS*.
4. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP AND/OR SOIL ON THE SAME DAY TO PREVENT DRYING. IF ANY TREE SHOWS DROUGHT STRESS, DELIVER SUPPLEMENTAL WATER TO AFFECTED TREE(S) AND NOTIFY THE RESTORATION CONSULTANT.
5. ANY WORK WITHIN TREE PROTECTION FENCING SHALL BE DONE BY HAND ONLY.
6. NO STOCKPILING OR STORAGE OF MATERIALS OR EQUIPMENT, OR VEHICLE TRAFFIC SHALL BE ALLOWED WITHIN THE FENCING. SEE SPECIFICATIONS FOR *PROTECTION WITHIN THE DRIP LINE*.
7. THE TREE PROTECTION FENCES SHALL BE CLEARLY LABELED AS FOLLOWS: "TREE PROTECTION FENCE; DO NOT ENTER THIS AREA; DO NOT PARK OR STORE MATERIALS WITHIN THE PROTECTION AREA."
8. THE CONTRACTOR SHALL REGULARLY INSPECT TREE PROTECTION FENCING AND ENSURE IT REMAINS INTACT UNTIL ALL CONSTRUCTION WORKS ARE COMPLETED. SEE SPECIFICATION 8-01.3(16) FOR *REMOVAL*.

2 TREE PROTECTION
Scale: NTS

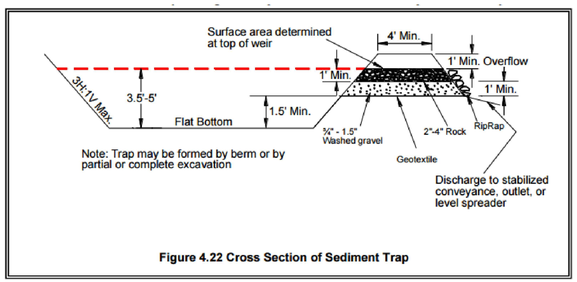


Figure 4.22 Cross Section of Sediment Trap

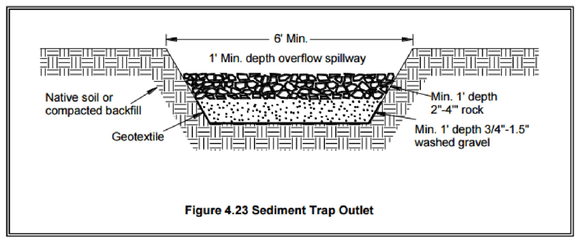


Figure 4.23 Sediment Trap Outlet

3 SEDIMENT TRAP (CITY OF BELLEVUE BMP C240)
Scale: NTS

TESC & DEMOLITION NOTES & DETAILS

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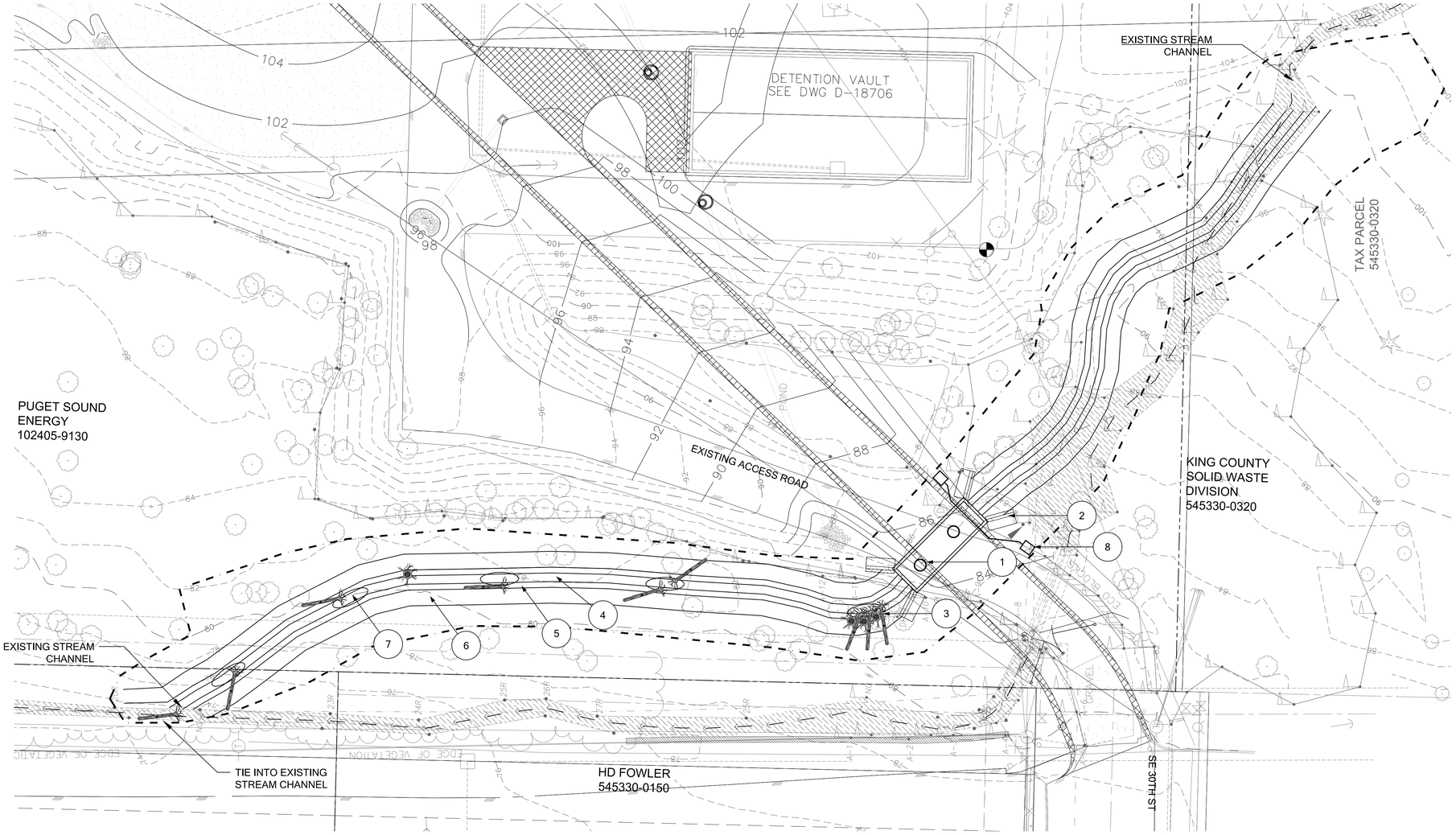
REVISION DESCRIPTION:	WO NUMBER: 141003252			
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL		RICHARDS CREEK SUBSTATION		
		DATE (M/D/Y)	W-3.2 TESC & DEMOLITION DETAILS	DRAWING NO D-18172 / REV NO
CAD	LM	06 / 13 / 17		
ENGINEER	EM	/ /		SHEET: 7 OF 22
REVIEWED	EM	/ /	CLASS: SITE	FILE NO: 111103
APPROVED		/ /	CADD NO:	CODE: RIC

PUGET SOUND ENERGY

DSD 002524



LEGEND

- EXISTING CHANNEL
- EXISTING TREE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PSE PROPERTY BOUNDARY
- GRADING LIMITS

1. BOX CULVERT WITH LID
2. WINGWALLS
3. WOODY DEBRIS
4. LOW-FLOW CHANNEL
5. 2' WIDE STREAM BENCHES
6. 3:1 STREAM BANK
7. POOL
8. UTILITY HANDHOLE BELOW CULVERT

LOG WITH ATTACHED ROOTS

KEY MEMBER LOG WITH ATTACHED ROOTS

UPRIGHT ROOT WAD

NOTES

1. NOT ALL SURVEYED OBJECTS ARE DISPLAYED IN THIS DRAWING
2. EXISTING CHANNEL OUTSIDE CONSTRUCTION LIMITS WILL NOT BE GRADED AND IS ANTICIPATED TO REMAIN OR BECOME WETLAND
3. FUTURE SUBSTATION NOT SHOWN

PROPOSED PLAN

SCALE 1"=20'

20 0 20 40 80

GRAPHIC SCALE
(IN FEET)

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-4.0 PROPOSED PLAN

CLASS: SITE

CADD NO:

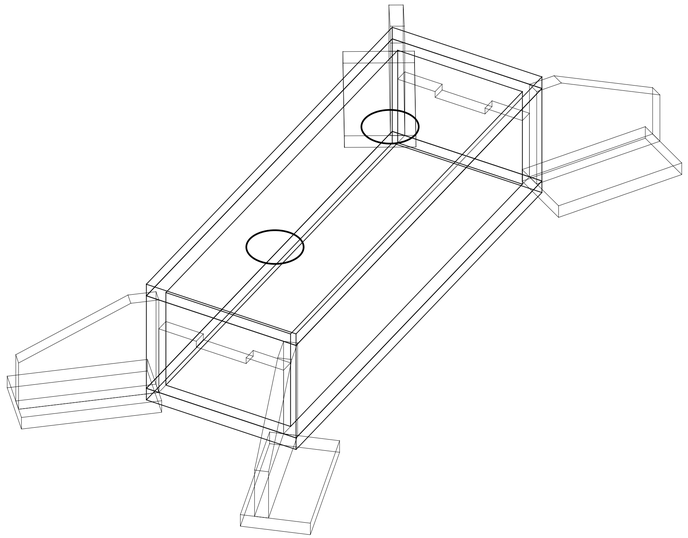
DRAWING NO D-18172 REV NO

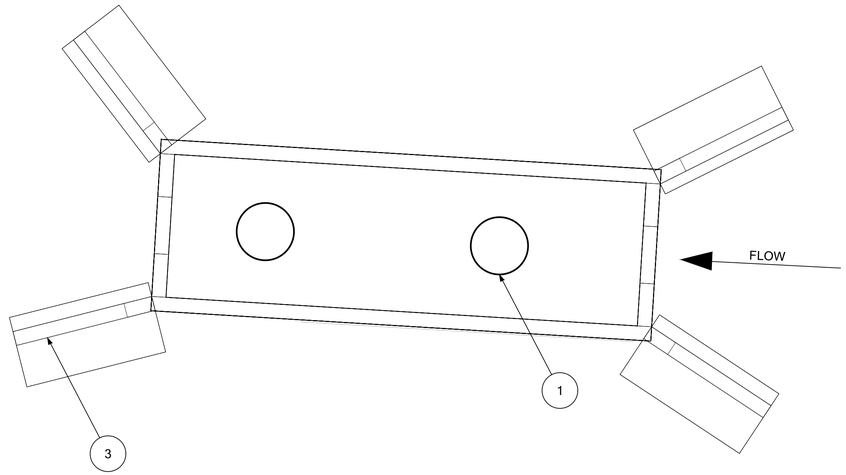
SHEET: 8 OF 22

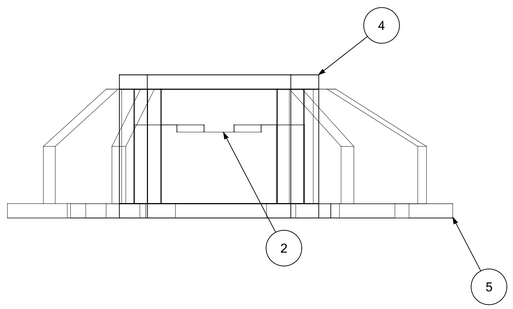
FILE NO: 111103

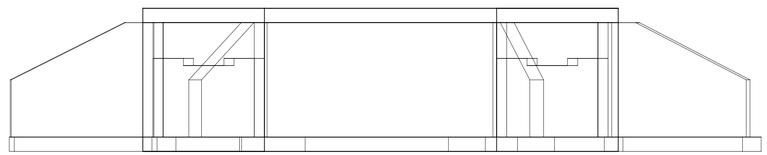
CODE: RIC

DSD 002525









REPLACEMENT CULVERT DIMENSIONS - CONCRETE BOX

UPSTREAM SILL INVERT ELEVATION:	80.2'
UPSTREAM NOTCH ELEVATION:	79.7'
DOWNSTREAM SILL INVERT ELEVATION:	79.7'
DOWNSTREAM NOTCH ELEVATION:	79.2'
INTERNAL BOTTOM ELEVATION:	74.7'
INTERNAL DIMENSIONS:	10'W x 35'L x 8'H
WALL THICKNESS:	1.0'
SEDIMENT STORAGE DEPTH:	5'
SEDIMENT STORAGE VOLUME:	56 CY

NOTES

1. CULVERT WILL BE PRECAST CONCRETE AND ASSEMBLED ONSITE DURING CONSTRUCTION.
2. FINAL CULVERT DESIGN TO INCLUDE INTERNAL FLOW AND FISH BYPASS FOR USE DURING SEDIMENT VAULT CLEANOUT.

(1) MANHOLE CLEANOUT ACCESS

(2) LOW-FLOW SILL CUTOUT

(3) WINGWALL

(4) LID

(5) BASE PAD

CULVERT DESIGN

SCALE 1"=5'

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-5.0 CULVERT DESIGN

DRAWING NO: D-18172

REV NO:

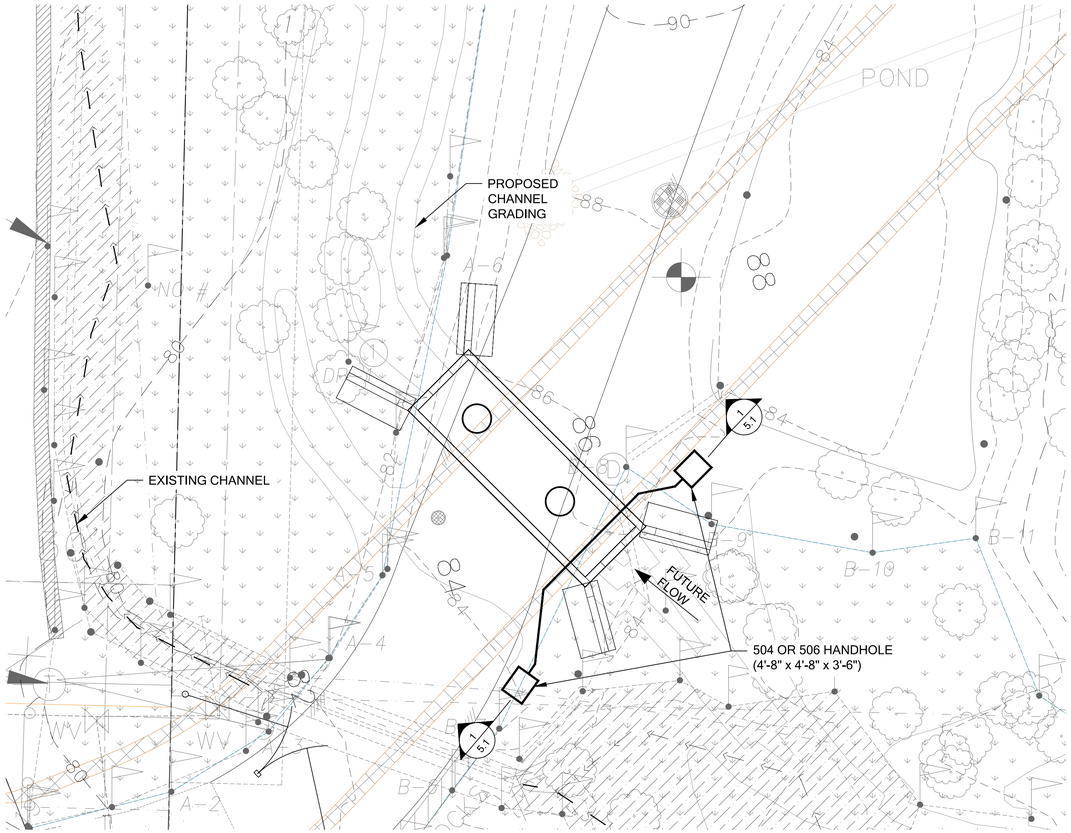
SHEET: 9 OF 22

CLASS: SITE

FILE NO: 111103

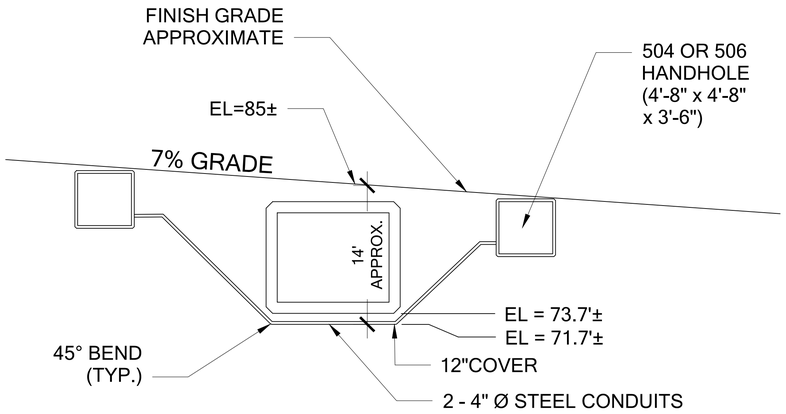
CODE: RIC

CADD NO:



NOTES
1. HANDHOLE AND CONDUIT LOCATIONS ARE APPROXIMATE

NOTE:
SEE PSE PLANS FOR DETAILS AND ELEVATIONS



1 SECTION A-A HANDHOLE DETAIL
Scale: NTS

CULVERT & UTILITY CROSS-SECTION

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

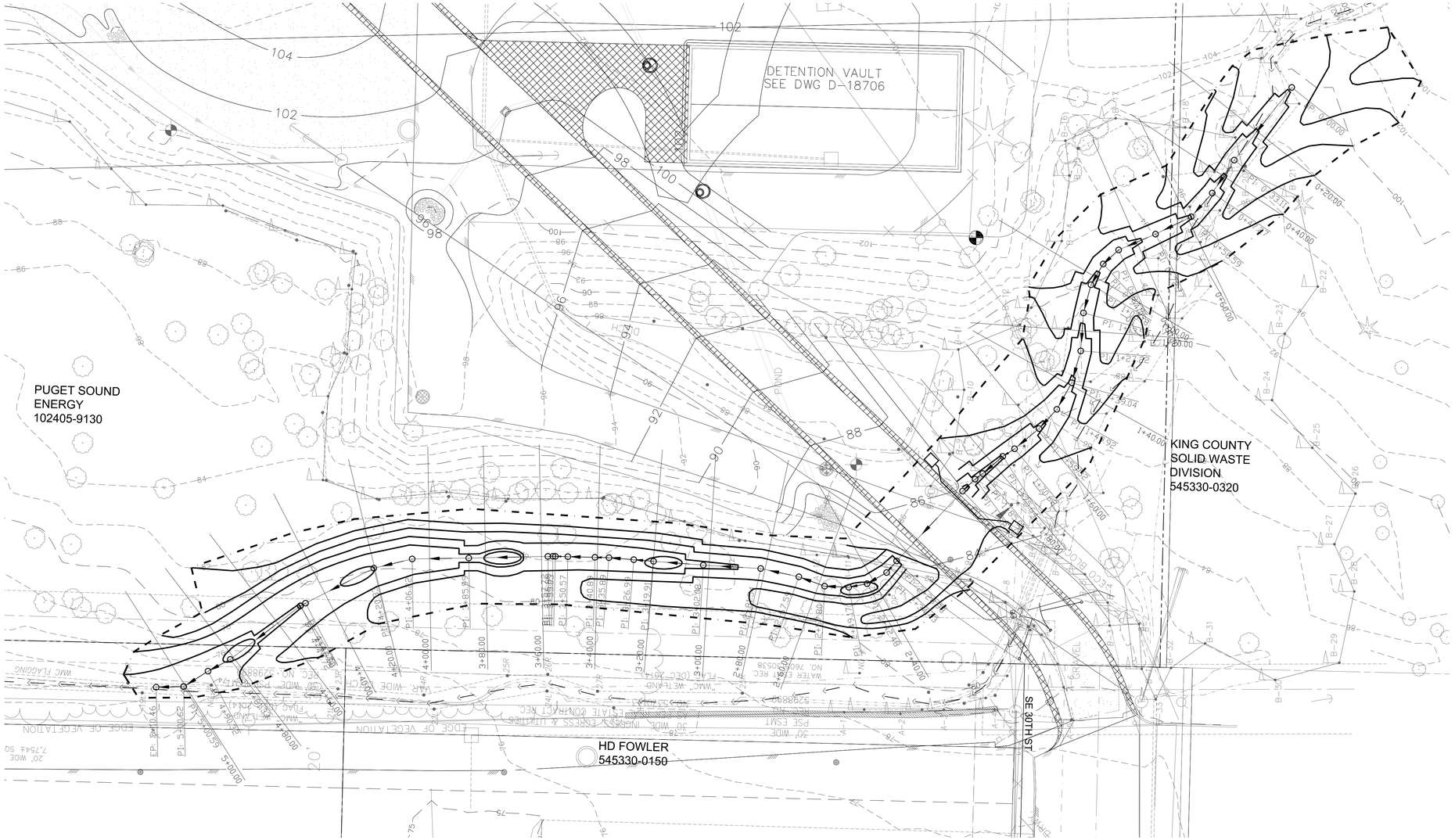
		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-5.1 CULVERT & UTILITY CROSS-SECTION

DRAWING NO: D-18172
REV NO:
SHEET: 10 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

DSD 002527



LEGEND

- EXISTING TREE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PSE PROPERTY BOUNDARY
- GRADING LIMITS
- STREAM CENTERLINE

STATIONING & CROSS-SECTIONS

SCALE 1"=20'

GRAPHIC SCALE
(IN FEET)
20 0 20 40 80

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

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W-6.0 STATIONING & CROSS-SECTIONS

DRAWING NO: D-18172
REV NO:
SHEET: 11 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

DSD 002528

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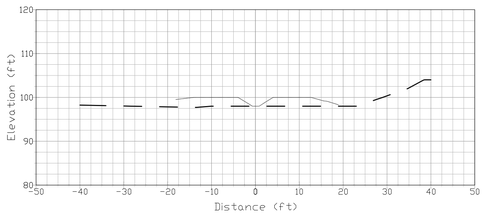

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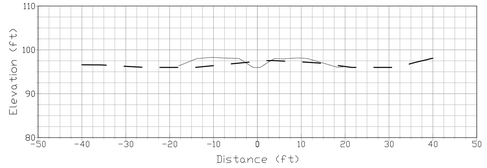

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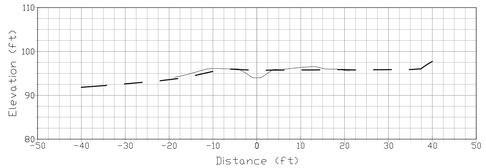

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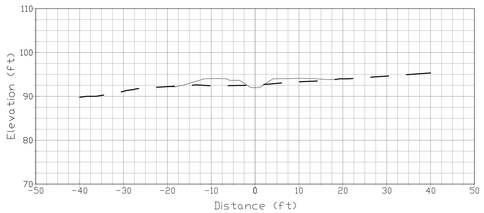

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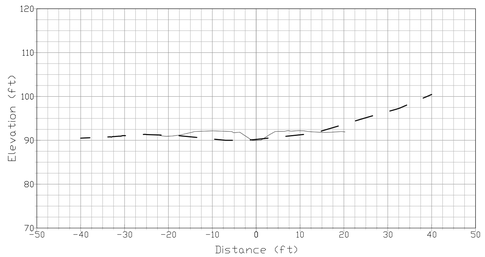

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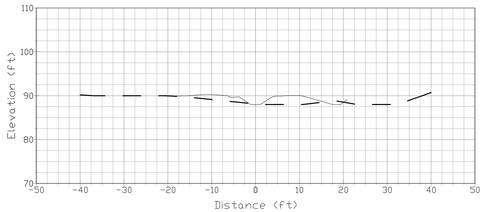

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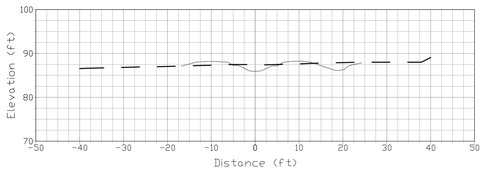

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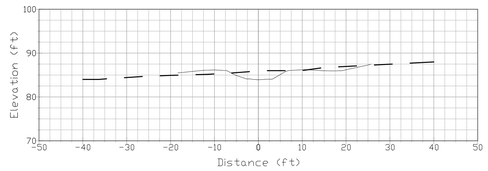

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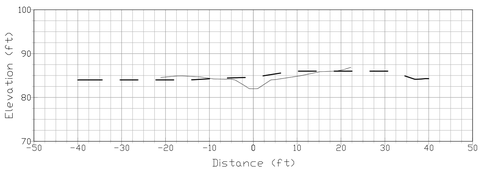

LEGEND

— — — EXISTING GRADE

——— PROPOSED GRADE

STREAM CROSS-SECTIONS (1 OF 3)

SCALE: AS SHOWN

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REVISION DESCRIPTION:	WO NUMBER: 141003252
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RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
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REVIEWED	EM	/ /
APPROVED		/ /

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W-6.11 STREAM CROSS-SECTIONS

DRAWING NO: D-18172

REV NO:

SHEET: 12 OF 22

CLASS: SITE

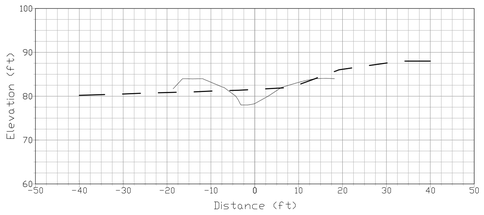
FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002529

2+40.00



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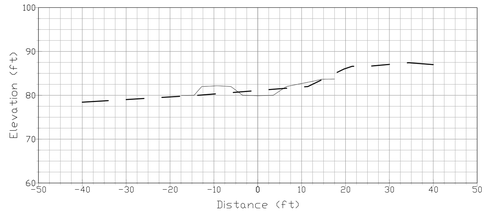

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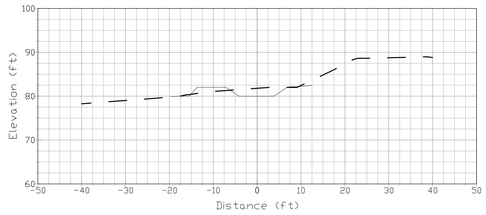

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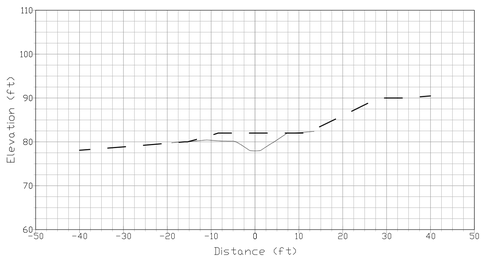

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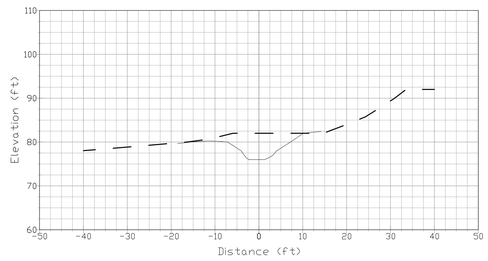

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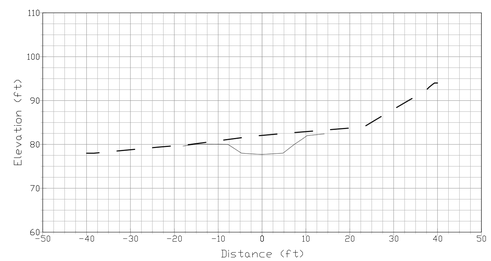

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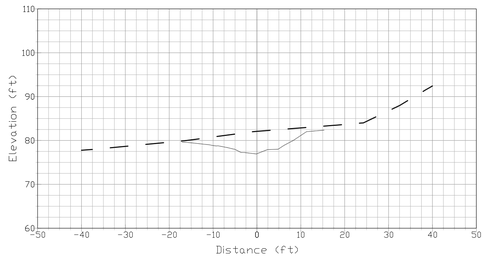

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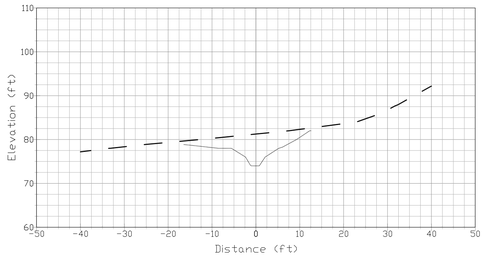

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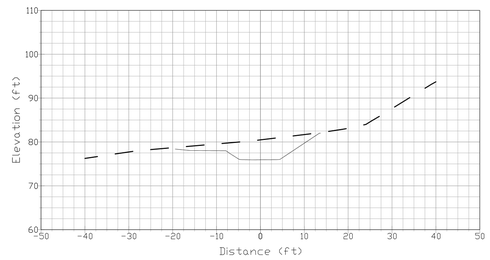

LEGEND

EXISTING GRADE

PROPOSED GRADE

STREAM CROSS-SECTIONS (2 OF 3)

SCALE: AS SHOWN

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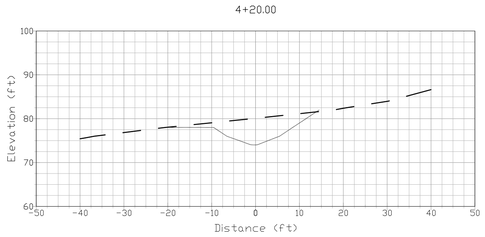
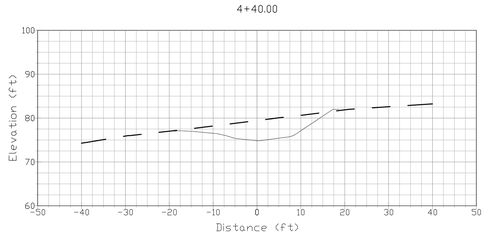
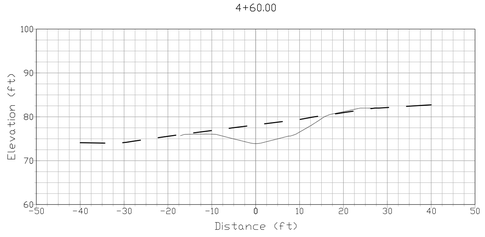
REVISION DESCRIPTION:	WO NUMBER: 141003252			
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL			RICHARDS CREEK SUBSTATION	
		DATE (M/D/Y)	W-6.12 STREAM CROSS-SECTIONS	DRAWING NO: D-18172
CAD	LM	06 / 13 / 17		REV NO
ENGINEER	EM	/ /		SHEET: 13 OF 22
REVIEWED	EM	/ /	CLASS: SITE	FILE NO: 111103
APPROVED		/ /	CADD NO:	CODE: RIC

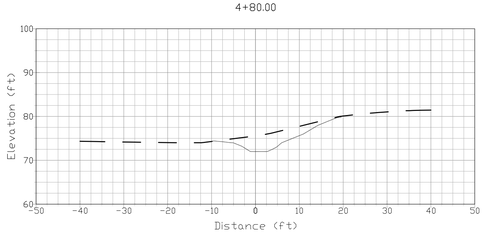
PUGET SOUND ENERGY

DSD 002530



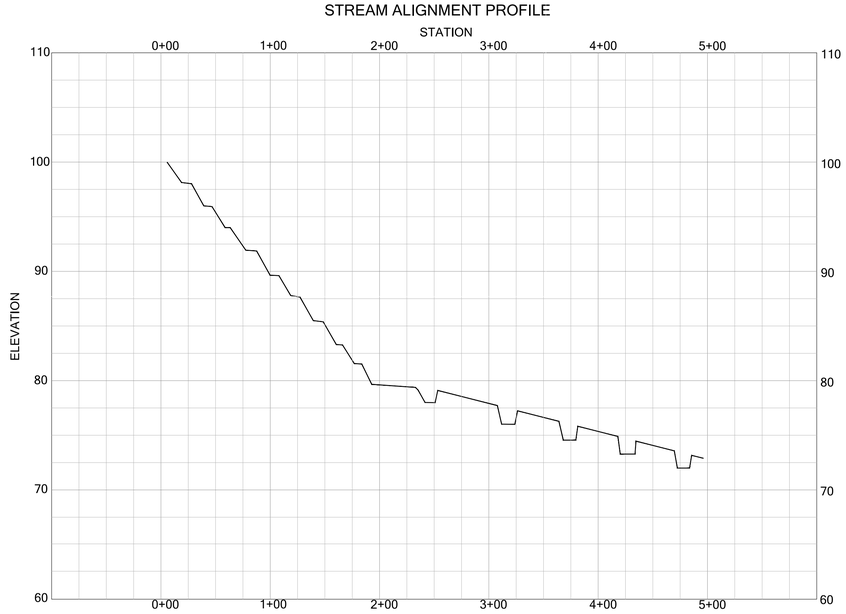






LEGEND

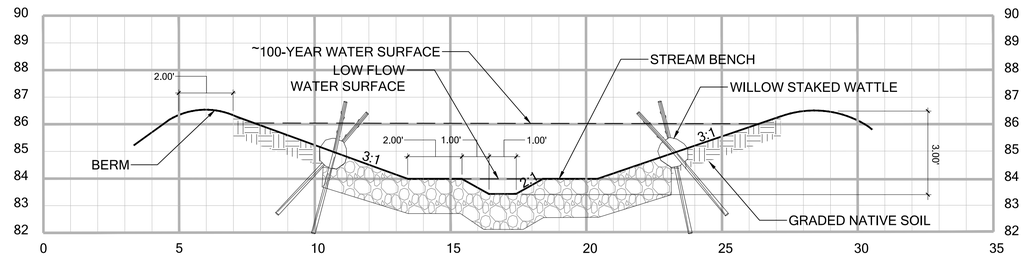
- EXISTING GRADE
- PROPOSED GRADE



3 STREAM ALIGNMENT PROFILE

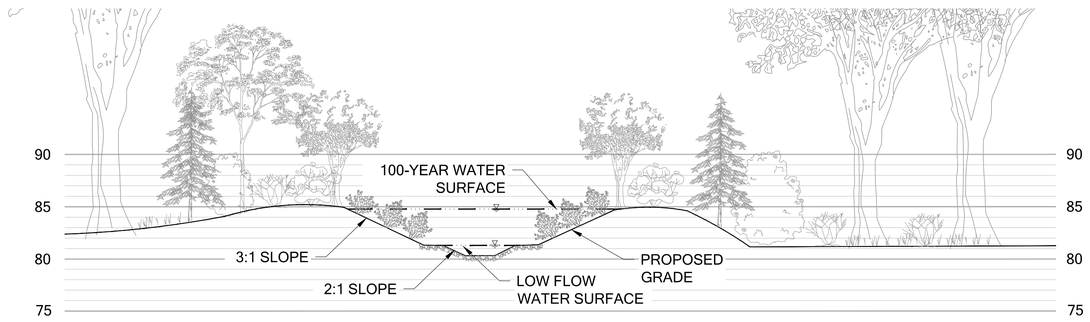
NOTE: REFER TO W-6.0 FOR CENTERLINE

Scale: NTS



1 STREAM TYPICAL CROSS-SECTION (STA 2+40 - 5+00)

Scale: NTS



2 STREAM TYPICAL CROSS-SECTION WITH PLANTINGS

Scale: NTS

STREAM CROSS-SECTIONS (3 OF 3) & PROFILE

SCALE NTS

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-6.13 STREAM CROSS-SECTIONS

DRAWING NO: D-18172

REV NO:

SHEET: 14 OF 22

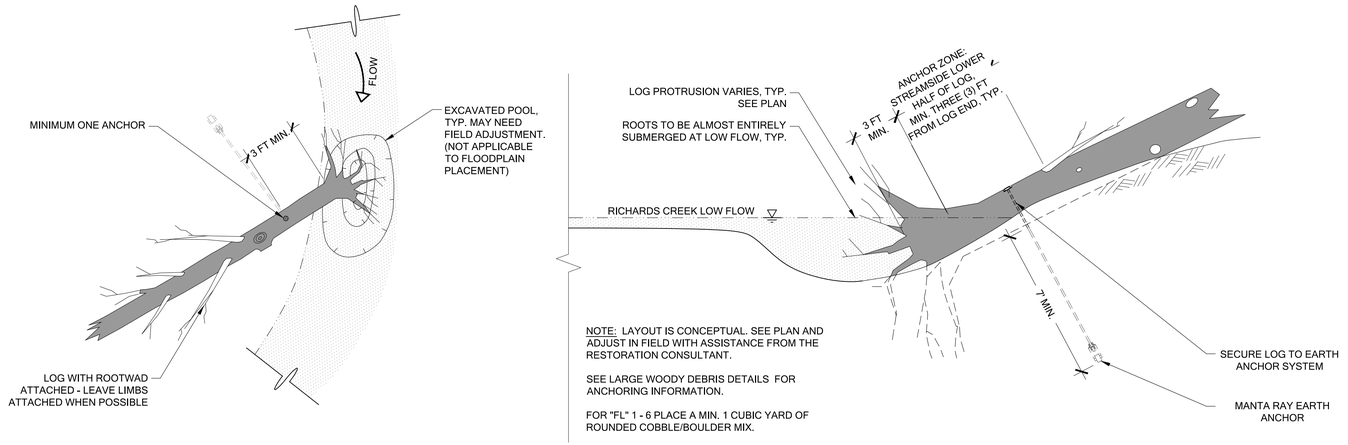
CLASS: SITE

FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002531



PLAN

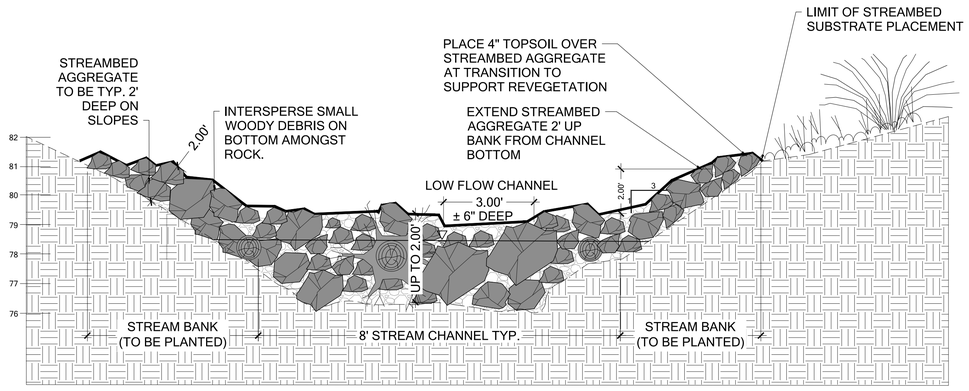
SECTION: ON-GRADE FALLEN LOG

1 FALLEN LOG (TYP.)

Scale: NTS

MATERIALS SPECIFICATIONS

1) ROOT WADS (QTY - 4): SHALL BE NATIVE WESTERN REDCEDAR OR DOUGLAS-FIR, FREE OF ROT, MINIMUM 50% CEDAR, SUPPLIED WITH ATTACHED TRUNKS 4 TO 7 FEET IN LENGTH ABOVE THE GROUND LINE AS THE TREE GREW AND A MINIMUM OF 12 INCHES IN DIAMETER 4 FEET ABOVE THE GROUND LINE. ROOT MASSES SHALL BE FULL AND DENSE TO A MINIMUM OF 4 FEET IN DIAMETER. HEMLOCK, SPRUCE AND DECIDUOUS TREE SPECIES WILL NOT BE ACCEPTED.
2) LOGS WITH ATTACHED ROOTS (QTY - 5): SHALL BE NATIVE WESTERN REDCEDAR OR DOUGLAS-FIR, MINIMUM 50% CEDAR, A MINIMUM OF 10 INCHES IN DIAMETER AT BREAST HEIGHT (DBH). ATTACHED ROOT WADS ARE TO BE FULL AND DENSE TO A MINIMUM OF 6 FEET IN DIAMETER.
3) KEY MEMBER LOGS (QTY - 3): SHALL BE NATIVE WESTERN REDCEDAR OR DOUGLAS-FIR, MINIMUM 50% CEDAR, A MINIMUM OF 18 INCHES IN DIAMETER AT BREAST HEIGHT (DBH). ATTACHED ROOT WADS ARE TO BE FULL AND DENSE TO A MINIMUM OF 4 FEET IN DIAMETER.
4) LOGS MAY BE TRIMMED TO FIT IN-PLACE, BUT ONLY AT THE DIRECTION OF THE STREAM RESTORATION CONSULTANT. HEMLOCK, SPRUCE AND DECIDUOUS TREE SPECIES WILL NOT BE ACCEPTED. ALL ROOT WADS, REGARDLESS OF LENGTH OF LOG ATTACHED, ARE TO BE THOROUGHLY POWER-WASHED FREE OF SOIL AND SEDIMENT AT AN UPLAND LOCATION WHERE ALL OF THE GENERATED RUNOFF CAN INFILTRATE PRIOR TO THE LOGS BEING PLACED WITHIN THE STREAM CHANNEL.



2 ROCK MIXED WITH WOOD CROSS-SECTION (TYP.) - UPSTREAM OF CULVERT (STA 0+00 - 1+80)

Scale: NTS

LARGE WOODY DEBRIS DETAILS

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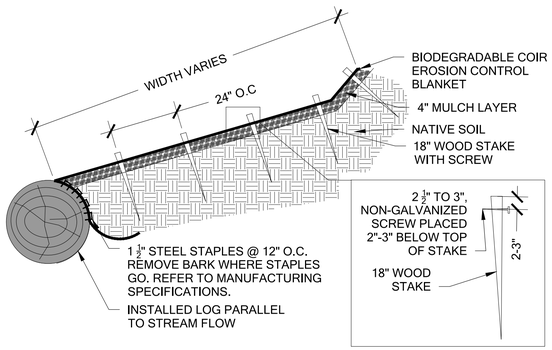
REVISION DESCRIPTION:	WO NUMBER: 141003252			
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL		RICHARDS CREEK SUBSTATION		
		DATE (M/D/Y)	PUGET SOUND ENERGY	W-6.21 LARGE WOODY DEBRIS DETAILS
CAD	LM	06 / 13 / 17		DRAWING NO: D-18172 REV NO
ENGINEER	EM	/ /		SHEET: 15 OF 22
REVIEWED	EM	/ /	CLASS: SITE	FILE NO: 111103
APPROVED		/ /	CADD NO:	CODE: RIC

DSD 002532

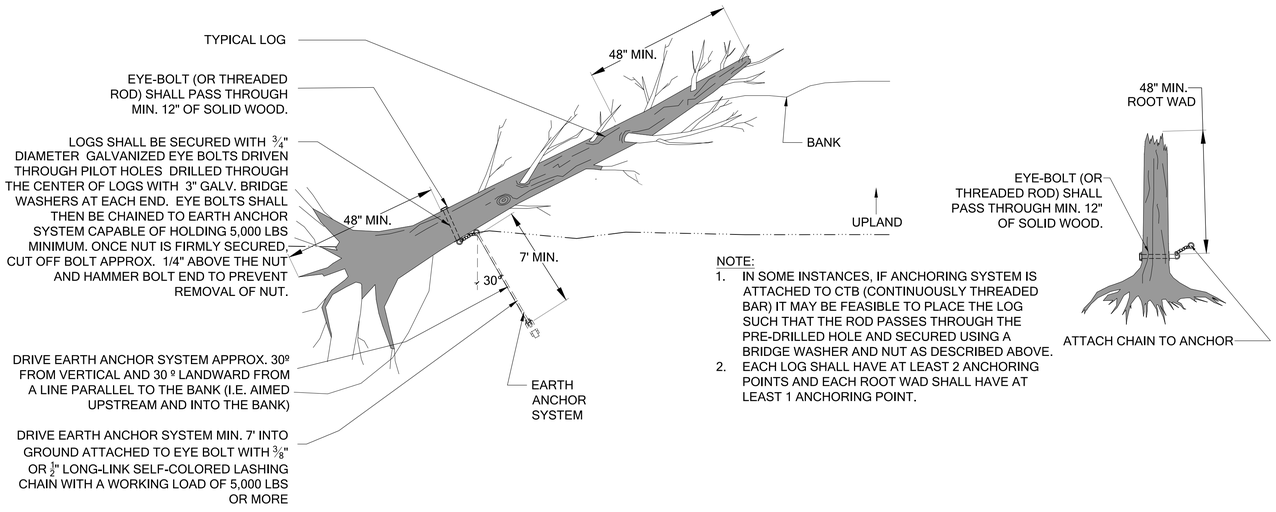


NOTES:

STAKES ARE TO BE WOODEN, 1" BY 2" BY 18" WESTERN RED CEDAR OR FIR (NO HARDWOOD OR HEMLOCK).

1 BIODEGRADABLE EROSION CONTROL BLANKET

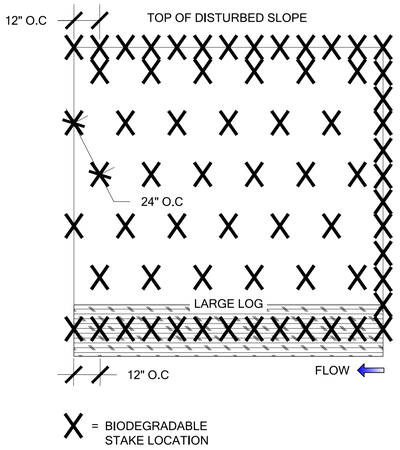
Scale: NTS



NOTE:
1. IN SOME INSTANCES, IF ANCHORING SYSTEM IS ATTACHED TO CTB (CONTINUOUSLY THREADED BAR) IT MAY BE FEASIBLE TO PLACE THE LOG SUCH THAT THE ROD PASSES THROUGH THE PRE-DRILLED HOLE AND SECURED USING A BRIDGE WASHER AND NUT AS DESCRIBED ABOVE.
2. EACH LOG SHALL HAVE AT LEAST 2 ANCHORING POINTS AND EACH ROOT WAD SHALL HAVE AT LEAST 1 ANCHORING POINT.

3 LOG ANCHORING OPTIONS

Scale: NTS



NOTES:
1. BIODEGRADABLE COIR EROSION CONTROL BLANKET SHALL PROVIDE EROSION PROTECTION FOR 24-36 MONTHS
2. BLANKET SHALL BE CUT LARGER THAN THE INSTALLATION AREA SHOWN ON THE CONTRACT DRAWINGS IN ORDER TO EXTEND BEYOND THE EDGES AND STAKE INTO THE SUBGRADE AS SHOWN.
3. CLEAR ANY WEEDS OR DEBRIS FROM THE INSTALLATION AREA BEFORE INSTALLING THE BLANKET.
4. SECURE THE BLANKET AT THE TOP WITH A ROW OF STAKES PLACED 12" APART ACROSS THE WIDTH OF THE BLANKET.
5. ROLL THE BLANKET ACROSS SLOPE AS DIRECTED BY RESTORATION SPECIALIST
6. THE EDGES OF ALL HORIZONTAL AND VERTICAL SEAMS MUST BE SECURED WITH A MIN. 12" OF OVERLAP, SHINGLE STYLE IN THE DIRECTION OF WATER FLOW. PLACE STAKES MIN. 6" APART ALONG THE OVERLAPPING SEAMS.
7. STAPLE BOTTOM OF COIR TO LARGE LOG OR ROOT WAD WITH STAPLES AT 12" O.C. IN ROWS OF 4 STAPLES.
8. ENDS OF COIR ON UPSTREAM SIDE SHALL BE INSTALLED WITH A VERTICAL ROW OF STAKES 12" O.C.
9. STAKING PATTERN: YIELDS ROUGHLY 8.25 STAKES PER SQUARE YARD.

2 BIODEGRADABLE EROSION CONTROL BLANKET

Scale: NTS

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LARGE WOODY DEBRIS DETAILS

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

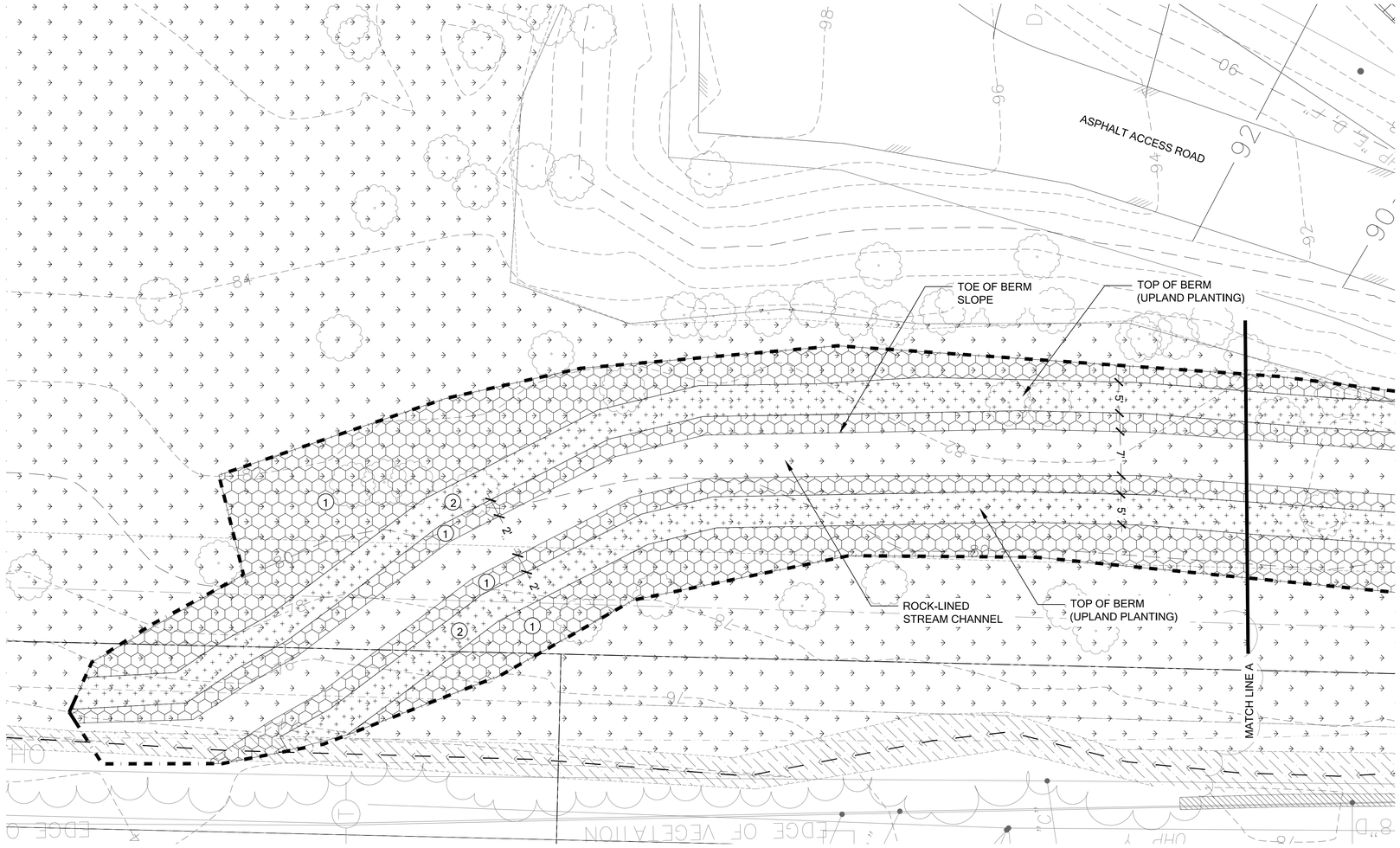
		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-6.22 LARGE WOODY DEBRIS ANCHOR DETAILS

DRAWING NO: D-18172
REV NO:
SHEET: 16 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

DSD 002533



LEGEND

(1) WETLAND/RIPARIAN PLANTINGS (SEE W-7.3)

(2) UPLAND PLANTINGS (SEE W-7.3)

PLANTING PLAN (1 OF 3)

SCALE 1"=10'

10 0 10 40 80

GRAPHIC SCALE
(IN FEET)

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-7.0 PLANTING PLAN (1 OF 3)

DRAWING NO: D-18172

REV NO:

SHEET: 17 OF 22

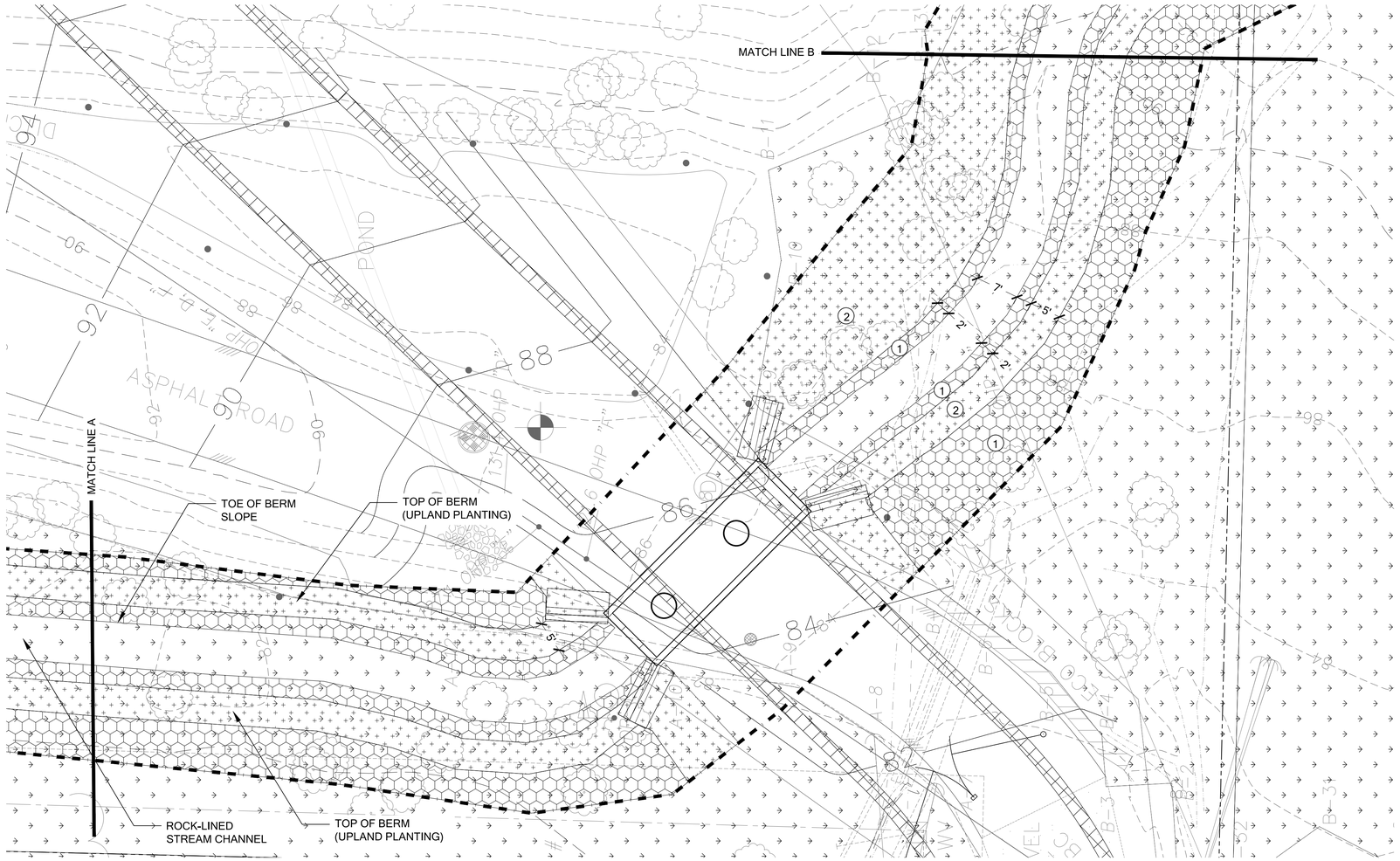
CLASS: SITE

FILE NO: 111103

CODE: RIC

CADD NO:

DSD 002534



LEGEND

(1) WETLAND/RIPARIAN PLANTINGS (SEE W-7.3)

(2) UPLAND PLANTINGS (SEE W-7.3)

PLANTING PLAN (2 OF 3)

SCALE 1"=10'

10 0 10 40 80

GRAPHIC SCALE
(IN FEET)

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REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-7.1 PLANTING PLAN (2 OF 3)

DRAWING NO: D-18172

REV NO

SHEET: 18 OF 22

FILE NO: 111103

CLASS: SITE

CODE: RIC

CADD NO:

DSD 002535

LEGEND

1. WETLAND/RIPARIAN PLANTINGS (SEE W-7.3)
2. UPLAND PLANTINGS (SEE W-7.3)

CALL BEFORE YOU DIG
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PLANTING PLAN (3 OF 3)

SCALE 1"=10'

GRAPHIC SCALE (IN FEET): 10 0 10 40 80

REVISION DESCRIPTION:	WO NUMBER: 141003252	
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL		
		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

RICHARDS CREEK SUBSTATION

PSE PUGET SOUND ENERGY

W-7.2 PLANTING PLAN (3 OF 3)

CLASS: SITE

CADD NO:

DRAWING NO D-18172

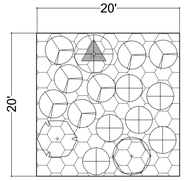
REV NO

SHEET: 19 OF 22

FILE NO: 111103

CODE: RIC

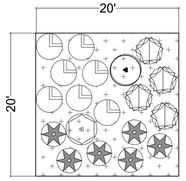
DSD 002536



1 WETLAND/RIPARIAN PLANTINGS

Scale: NTS

		QTY	SPACING	SIZE
TREES (66)				
	ALNUS RUBRA / RED ALDER	12	ALL TREES TO BE SPACED PER PLAN	2 GAL.
	FRAXINUS LATIFOLIA / OREGON ASH	10		2 GAL.
	THUJA PLICATA / WESTERN RED CEDAR	12		2 GAL.
	SALIX LUCIDA / PACIFIC WILLOW	12		2 GAL.
	PICEA SITCHENSIS / SITKA SPRUCE	10		2 GAL.
	SALIX SITCHENSIS / SITKA WILLOW	10		2 GAL.
SHRUBS (600)				
	CORNUS SERICEA / RED-OSIER DOGWOOD	150	4' O.C.	1 GAL.
	ROSA NUTKANA / NOOTKA ROSE	150		1 GAL.
	RUBUS SPECTABILIS / SALMONBERRY	150		1 GAL.
	PHYSOCARPUS CAPITATUS/ PACIFIC NINEBARK	150		1 GAL.
GROUNDCOVER (3600)				
	**ALL SPECIES TO BE SPACED TRIANGULARLY*		18" O.C.	
	ATHYRIUM FILIX-FEMINA/ LADY FERN (NO INUNDATION)	900		1 GAL
	TOLMIEA MENZIESII /PIGGYBACK PLANT (NO INUNDATION)	900		1 GAL
	SCIRPUS MICROCARPUS / SMALL FRUITED BULRUSH	900		1 GAL.
	CAREX OBNUPTA/ SLOUGH SEDGE (BACKWATER AREAS)	900		1 GAL.
	(PLANT BY SPECIES IN ODD GROUPS OF 9-15)			



2 UPLAND/BUFFER PLANTS

Scale: NTS

		QTY	SPACING	SIZE
TREES (48)				
	PSEUDOTSUGA MENZIESII / DOUGLAS-FIR	8	ALL TREES TO BE SPACED PER PLAN	2 GAL
	THUJA PLUCATA / WESTERN RED CEDAR	8		2 GAL
	ARBUTUS MENZIESII / PACIFIC MADRONE (PLANT NEXT TO DOUGLAS-FIR)	8		2 GAL
	PRUNUS EMARGINATA / BITTER CHEERY	8		2 GAL
	SALIX SCOULERIANA / SCOULER'S WILLOW	8		2 GAL
	ACER MACROPHYLLUM / BIG LEAF MAPLE (AWAY FROM ACCESS DRIVE)	8		2 GAL
SHRUBS (240)			4' O.C.	
	RUBUS SPECTABILIS / SALMONBERRY	40		1 GAL
	SYMPHORICARPUS ALBUS / SNOWBERRY	40		1 GAL
	OEMLERIA CERASIFORMIS / OSOBERRY	40		1 GAL
	MAHONIA NERVOSA / LOW OREGON GRAPE	40		1 GAL
	MAHONIA AQUIFOLIUM / TALL OREGON GRAPE	40		1 GAL
	ACER CIRCINATUM / VINE MAPLE	40		1 GAL
GROUNDCOVER (3290)				
	**ALL SPECIES TO BE SPACED TRIANGULARLY*		18" O.C.	
	POLYSTICHUM MUNITUM / SWORD FERN	1645		1 GAL
	BLECHNUM SPICANT / DEER FERN	1645		1 GAL
	(PLANT BY SPECIES IN ODD GROUPS OF 9-15)			

PLANTING TYPICALS & SCHEDULE

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		DATE (M/D/Y)
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PUGET SOUND ENERGY

W-7.3 PLANTING TYPICALS & SCHEDULE

DRAWING NO: D-18172
REV NO:
SHEET: 20 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

DSD 002537

PLANT INSTALLATION SPECIFICATIONS

QUALITY ASSURANCE

1. PLANTS SHALL MEET OR EXCEED THE SPECIFICATIONS OF FEDERAL, STATE, AND LOCAL LAWS REQUIRING INSPECTION FOR PLANT DISEASE AND INSECT CONTROL.
2. PLANTS SHALL BE HEALTHY, VIGOROUS, AND WELL-FORMED, WITH WELL DEVELOPED, FIBROUS ROOT SYSTEMS, FREE FROM DEAD BRANCHES OR ROOTS. PLANTS SHALL BE FREE FROM DAMAGE CAUSED BY TEMPERATURE EXTREMES, LACK OR EXCESS OF MOISTURE, INSECTS, DISEASE, AND MECHANICAL INJURY. PLANTS IN LEAF SHALL BE WELL FOLIATED AND OF GOOD COLOR. PLANTS SHALL BE HABITUATED TO THE OUTDOOR ENVIRONMENTAL CONDITIONS INTO WHICH THEY WILL BE PLANTED (HARDENED-OFF).
3. TREES WITH DAMAGED, CROOKED, MULTIPLE OR BROKEN LEADERS WILL BE REJECTED. WOODY PLANTS WITH ABRASIONS OF THE BARK OR SUN SCALD WILL BE REJECTED.
4. NOMENCLATURE: PLANT NAMES SHALL CONFORM TO *FLORA OF THE PACIFIC NORTHWEST* BY HITCHCOCK AND CRONQUIST, UNIVERSITY OF WASHINGTON PRESS, 1973 AND/OR TO *A FIELD GUIDE TO THE COMMON WETLAND PLANTS OF WESTERN WASHINGTON & NORTHWESTERN OREGON*, ED. SARAH SPEAR COOKE, SEATTLE AUDUBON SOCIETY, 1997.

DEFINITIONS

1. PLANTS/PLANT MATERIALS. PLANTS AND PLANT MATERIALS SHALL INCLUDE ANY LIVE PLANT MATERIAL USED ON THE PROJECT. THIS INCLUDES BUT IS NOT LIMITED TO CONTAINER GROWN, B&B OR BAREROOT PLANTS; LIVE STAKES AND FASCINES (WATTLES); TUBERS, CORMS, BULBS, ETC..; SPRIGS, PLUGS, AND LINERS.
2. CONTAINER GROWN. CONTAINER GROWN PLANTS ARE THOSE WHOSE ROOT BALLS ARE ENCLOSED IN A POT OR BAG IN WHICH THAT PLANT GREW.

SUBSTITUTIONS

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN SPECIFIED MATERIALS IN ADVANCE IF SPECIAL GROWING, MARKETING OR OTHER ARRANGEMENTS MUST BE MADE IN ORDER TO SUPPLY SPECIFIED MATERIALS.
2. SUBSTITUTION OF PLANT MATERIALS NOT ON THE PROJECT LIST WILL NOT BE PERMITTED UNLESS AUTHORIZED IN WRITING BY THE PROJECT LANDSCAPE ARCHITECT.
3. IF PROOF IS SUBMITTED THAT ANY PLANT MATERIAL SPECIFIED IS NOT OBTAINABLE, A PROPOSAL WILL BE CONSIDERED FOR USE OF THE NEAREST EQUIVALENT SIZE OR ALTERNATIVE SPECIES, WITH CORRESPONDING ADJUSTMENT OF CONTRACT PRICE.
4. SUCH PROOF WILL BE SUBSTANTIATED AND SUBMITTED IN WRITING TO THE CONSULTANT AT LEAST 30 DAYS PRIOR TO START OF WORK UNDER THIS SECTION.

INSPECTION

1. PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE PROJECT LANDSCAPE ARCHITECT FOR CONFORMANCE TO SPECIFICATIONS, EITHER AT TIME OF DELIVERY ON-SITE OR AT THE GROWER'S NURSERY. APPROVAL OF PLANT MATERIALS AT ANY TIME SHALL NOT IMPAIR THE SUBSEQUENT RIGHT OF INSPECTION AND REJECTION DURING PROGRESS OF THE WORK.
2. PLANTS INSPECTED ON SITE AND REJECTED FOR NOT MEETING SPECIFICATIONS MUST BE REMOVED IMMEDIATELY FROM SITE OR RED-TAGGED AND REMOVED AS SOON AS POSSIBLE.
3. THE PROJECT LANDSCAPE ARCHITECT MAY ELECT TO INSPECT PLANT MATERIALS AT THE PLACE OF GROWTH. AFTER INSPECTION AND ACCEPTANCE, THE PROJECT LANDSCAPE ARCHITECT MAY REQUIRE THE INSPECTED PLANTS BE LABELED AND RESERVED FOR PROJECT. SUBSTITUTION OF THESE PLANTS WITH OTHER INDIVIDUALS, EVEN OF THE SAME SPECIES AND SIZE, IS UNACCEPTABLE.

MEASUREMENT OF PLANTS

1. PLANTS SHALL CONFORM TO SIZES SPECIFIED UNLESS SUBSTITUTIONS ARE MADE AS OUTLINED IN THIS CONTRACT.
2. HEIGHT AND SPREAD DIMENSIONS SPECIFIED REFER TO MAIN BODY OF PLANT AND NOT BRANCH OR ROOT TIP TO TIP. PLANT DIMENSIONS SHALL BE MEASURED WHEN THEIR BRANCHES OR ROOTS ARE IN THEIR NORMAL POSITION.
3. WHERE A RANGE OF SIZE IS GIVEN, NO PLANT SHALL BE LESS THAN THE MINIMUM SIZE AND AT LEAST 50% OF THE PLANTS SHALL BE AS LARGE AS THE MEDIAN OF THE SIZE RANGE. (EXAMPLE: IF THE SIZE RANGE IS 12" TO 18", AT LEAST 50% OF PLANTS MUST BE 15" TALL.).

SUBMITTALS

PROPOSED PLANT SOURCES

1. WITHIN 45 DAYS AFTER AWARD OF THE CONTRACT, SUBMIT A COMPLETE LIST OF PLANT MATERIALS PROPOSED TO BE PROVIDED DEMONSTRATING CONFORMANCE WITH THE REQUIREMENTS SPECIFIED. INCLUDE THE NAMES AND ADDRESSES OF ALL GROWERS AND NURSERIES.

PRODUCT CERTIFICATES

4. PLANT MATERIALS LIST - SUBMIT DOCUMENTATION TO CONSULTANT AT LEAST 30 DAYS PRIOR TO START OF WORK UNDER THIS SECTION THAT PLANT MATERIALS HAVE BEEN ORDERED. ARRANGE PROCEDURE FOR INSPECTION OF PLANT MATERIAL WITH CONSULTANT AT TIME OF SUBMISSION.
5. HAVE COPIES OF VENDOR'S OR GROWERS' INVOICES OR PACKING SLIPS FOR ALL PLANTS ON SITE DURING INSTALLATION. INVOICE OR PACKING SLIP SHOULD LIST SPECIES BY SCIENTIFIC NAME, QUANTITY, AND DATE DELIVERED (AND GENETIC ORIGIN IF THAT INFORMATION WAS PREVIOUSLY REQUESTED).

DELIVERY, HANDLING, & STORAGE

NOTIFICATION

CONTRACTOR MUST NOTIFY CONSULTANT 48 HOURS OR MORE IN ADVANCE OF DELIVERIES SO THAT CONSULTANT MAY ARRANGE FOR INSPECTION.

PLANT MATERIALS

1. TRANSPORTATION - DURING SHIPPING, PLANTS SHALL BE PACKED TO PROVIDE PROTECTION AGAINST CLIMATE EXTREMES, BREAKAGE AND DRYING. PROPER VENTILATION AND PREVENTION OF DAMAGE TO BARK, BRANCHES, AND ROOT SYSTEMS MUST BE ENSURED.
2. SCHEDULING AND STORAGE - PLANTS SHALL BE DELIVERED AS CLOSE TO PLANTING AS POSSIBLE. PLANTS IN STORAGE MUST BE PROTECTED AGAINST ANY CONDITION THAT IS DETRIMENTAL TO THEIR CONTINUED HEALTH AND VIGOR.
3. HANDLING - PLANT MATERIALS SHALL NOT BE HANDLED BY THE TRUNK, LIMBS, OR FOLIAGE BUT ONLY BY THE CONTAINER, BALL, BOX, OR OTHER PROTECTIVE STRUCTURE, EXCEPT BAREROOT PLANTS SHALL BE KEPT IN BUNDLES UNTIL PLANTING AND THEN HANDLED CAREFULLY BY THE TRUNK OR STEM.
4. LABELS - PLANTS SHALL HAVE DURABLE, LEGIBLE LABELS STATING CORRECT SCIENTIFIC NAME AND SIZE. TEN PERCENT OF CONTAINER GROWN PLANTS IN INDIVIDUAL POTS SHALL BE LABELED. PLANTS SUPPLIED IN FLATS, RACKS, BOXES, BAGS, OR BUNDLES SHALL HAVE ONE LABEL PER GROUP.

WARRANTY

PLANT WARRANTY

PLANTS MUST BE GUARANTEED TO BE TRUE TO SCIENTIFIC NAME AND SPECIFIED SIZE, AND TO BE HEALTHY AND CAPABLE OF VIGOROUS GROWTH.

REPLACEMENT

1. PLANTS NOT FOUND MEETING ALL OF THE REQUIRED CONDITIONS MUST BE REMOVED FROM SITE AND REPLACED IMMEDIATELY AT THE CONSULTANT'S DISCRETION.
2. PLANTS NOT SURVIVING AFTER ONE YEAR TO BE REPLACED.

PLANT MATERIAL

GENERAL

1. PLANTS SHALL BE NURSERY GROWN IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICES UNDER CLIMATIC CONDITIONS SIMILAR TO OR MORE SEVERE THAN THOSE OF THE PROJECT SITE.
2. PLANTS SHALL BE TRUE TO SPECIES AND VARIETY OR SUBSPECIES. NO CULTIVARS OR NAMED VARIETIES SHALL BE USED UNLESS SPECIFIED AS SUCH.

QUANTITIES

SEE PLANT LIST ON ACCOMPANYING PLANS AND PLANT SCHEDULES.

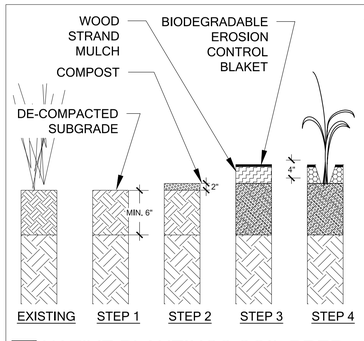
ROOT TREATMENT

1. CONTAINER GROWN PLANTS (INCLUDES PLUGS): PLANT ROOT BALLS MUST HOLD TOGETHER WHEN THE PLANT IS REMOVED FROM THE POT, EXCEPT THAT A SMALL AMOUNT OF LOOSE SOIL MAY BE ON THE TOP OF THE ROOT BALL.
2. PLANTS MUST NOT BE ROOT-BOUND; THERE MUST BE NO CIRCLING ROOTS PRESENT IN ANY PLANT INSPECTED.
3. ROOT BALLS THAT HAVE CRACKED OR BROKEN WHEN REMOVED FROM THE CONTAINER SHALL BE REJECTED.

GENERAL PLANTING SEQUENCE:

1. NATIVE PLANT INSTALLATION SHALL OCCUR DURING FROST-FREE PERIODS ONLY. PREFERRED MONTHS FOR INSTALLATION ARE BETWEEN SEPTEMBER 15TH AND APRIL 15, PRIOR TO HOT, DRY WEATHER. PLANTS MAY ONLY BE INSTALLED DURING HOT WEATHER IF THE APPLICANT AGREES TO IRRIGATION OF THE ENTIRE PLANTING AREA, DELIVERING AT LEAST 2" OF WATER PER WEEK FROM JUNE 1 THROUGH SEPTEMBER 15TH.
2. PROCURE PLANTS IN LEGEND AND ENSURE THAT MATERIAL MEETS THE MINIMUM REQUIREMENTS OUTLINED IN THE PLANT LEGEND AND PLANTING DETAILS.
3. LOCATE ALL EXISTING UTILITIES WITHIN THE LIMIT OF WORK.
4. REMOVE ALL INVASIVE WEEDS WITHIN THE PROJECT AREA, PARTICULARLY ENGLISH IVY. AMEND SOILS WITH COMPOST IF NEEDED.
5. ENSURE THAT NO ADVERSE DRAINAGE CONDITIONS EXIST THAT MAY AFFECT PROPER PLANT GROWTH AND ESTABLISHMENT.
6. LAYOUT PLANT MATERIAL PER PLAN FOR INSPECTION BY THE LANDSCAPE ARCHITECT. PLANT SUBSTITUTIONS WILL NOT BE ALLOWED WITHOUT AGENCY APPROVAL.
7. INSTALL PLANTS PER PLANTING DETAILS.
8. WATER EACH PLANT THOROUGHLY TO REMOVE AIR POCKETS.
9. INSTALL A 4" DEEP, COARSE WOOD-CHIP MULCH RING THROUGHOUT ENTIRE PROJECT AREA.
10. INSTALL A TEMPORARY OR PERMANENT IRRIGATION SYSTEM CAPABLE OF DELIVERING 2" OF WATER PER WEEK TO THE ENTIRE PLANTED AREA. MAINTAIN IRRIGATION SYSTEM IN WORKING CONDITION FOR TWO (2) SUMMERS AFTER INITIAL PLANT INSTALLATION.

THE APPLICANT SHALL MAINTAIN ALL PLANT MATERIAL UNTIL FINAL INSPECTION AND APPROVAL AS SET FORTH IN THE PERMIT CONDITIONS. IF THE OWNER OR APPLICANT CHOOSES TO HIRE A LANDSCAPE CONTRACTOR, THEN ALL PLANTINGS AND WORKMANSHIP SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING FINAL OWNER ACCEPTANCE.



NATIVE PLANTINGS SOIL PREP
SEQUENCE OF WORK - NOT TO SCALE

PLANTING AREA PREPARATION

STEP 1
REMOVE INVASIVE SPECIES. COMPACTED SOILS OUTSIDE OF FORESTED AREAS SHALL BE DE-COMPACTED TO A DEPTH OF 6". CLEARING AND GRUBBING WITHIN ANY NATIVE PLANT ROOT ZONE SHALL BE DONE BY HAND.

STEP 2
PLACE TWO (2) INCHES COMPOST AND AMEND WITH DE-COMPACTED TOPSOIL

STEP 3
INSTALL WOOD STRAND MULCH 4" DEEP. THEN PLACE BIODEGRAABLE EROSION CONTROL BLANKET OVER THE TOP.

STEP 4
CUT "X" SLITS IN BIODEGRADABLE EROSION CONTROL BLAKET AND INSTALL PLANTS. SEE PLANTING PLAN SHEET W-08.

PLANTING NOTES & DETAILS (1 OF 2)

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

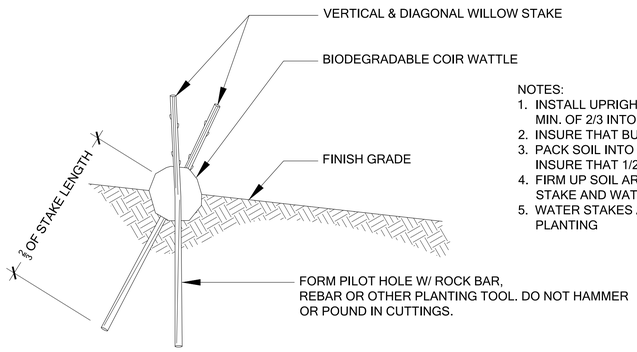
		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-7.4 PLANTING NOTES & DETAILS (1 OF 2)

DRAWING NO: D-18172
REV NO:
SHEET: 21 OF 22
CLASS: SITE
FILE NO: 111103
CODE: RIC
CADD NO:

DSD 002538



NOTES:
1. INSTALL UPRIGHT & DIAGONAL STAKE A MIN. OF 2/3 INTO SOIL
2. INSURE THAT BUDS ARE POINTING UP
3. PACK SOIL INTO WATTLE SPACES, INSURE THAT 1/2 OF WATTLE IS BURIED
4. FIRM UP SOIL AROUND INSTALLED STAKE AND WATTLE
5. WATER STAKES AND WATTLE AFTER PLANTING

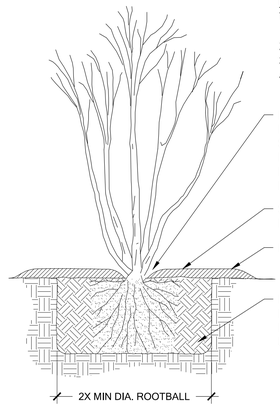
1 WILLOW WATTLE PLANTING

Scale: NTS

NOTES:
1. PLANT GROUNDCOVER AT SPECIFIED DISTANCE ON-CENTER (O.C.) USING TRIANGULAR SPACING, TYP.
2. LOOSEN SIDES AND BOTTOM OF PLANTING PIT AND REMOVE DEBRIS
3. LOOSEN ROOTBOUND PLANTS BEFORE INSTALLING
4. SOAK PIT BEFORE AND AFTER INSTALLING PLANT

2 GROUNDCOVER PLANTING

Scale: NTS



NOTES:
1. PLANTING PIT SHALL NOT BE LESS THAN (2) TIMES THE WIDTH OF THE ROOT BALL DIA.
2. LOOSEN SIDES AND BOTTOMS OF PLANTING PIT
3. SOAK PLANTING PIT AFTER PLANTING
4. PLANT AT SPECIFIED DISTANCE ON-CENTER (O.C.) PER PLAN USING TRIANGULAR SPACING, TYP.

REMOVE FROM POT OR BURLAP & ROUGH-UP ROOT BALL BEFORE INSTALLING. UNTANGLE AND STRAIGHTEN CIRCLING ROOTS - PRUNE IF NECESSARY. IF PLANT IS EXCEPTIONALLY ROOT-BOUND, DO NOT PLANT AND RETURN TO NURSERY FOR AN ACCEPTABLE ALTERNATIVE

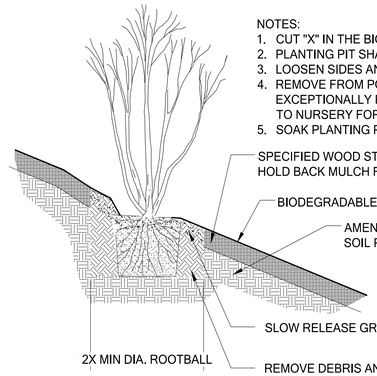
SPECIFIED MULCH LAYER. HOLD BACK MULCH FROM TRUNK/STEMS

FINISH GRADE

REMOVE DEBRIS AND LARGE ROCKS FROM PLANTING PIT AND SCARIFY SIDES AND BASE. BACKFILL WITH SPECIFIED SOIL. FIRM UP SOIL AROUND PLANT.

3 TREE/SHRUB CONTAINER PLANTING

Scale: NTS



NOTES:
1. CUT "X" IN THE BIODEGRADABLE EROSION CONTROL FABRIC TO MAKE WAY FOR PLANTING.
2. PLANTING PIT SHALL NOT BE LESS THAN (2) TIMES THE WIDTH OF THE ROOT BALL DIA.
3. LOOSEN SIDES AND BOTTOM OF PLANT PIT
4. REMOVE FROM POT & ROUGH-UP ROOT BALL BEFORE INSTALLING. IF PLANT IS EXCEPTIONALLY ROOT-BOUND OR CONTAINS CIRCLING ROOTS, DO NOT PLANT AND RETURN TO NURSERY FOR AN ACCEPTABLE ALTERNATIVE.
5. SOAK PLANTING PIT AFTER PLANTING

SPECIFIED WOOD STRAND MULCH IN ALL PLANTING BEDS. HOLD BACK MULCH FROM TRUNK/STEMS

BIODEGRADABLE EROSION CONTROL FABRIC

AMENDED SOIL SEE NATIVE PLANTING SOIL PREPARATION ON SHEET W-08

SLOW RELEASE GRANULAR FERTILIZER. APPLIED ONE YEAR AFTER INITIAL PLANTING

REMOVE DEBRIS AND LARGE ROCKS AND BACKFILL WITH NATIVE SOIL. FIRM UP SOIL AROUND PLANT

4 SLOPE CONTAINER PLANTING

Scale: NTS

PLANTING NOTES & DETAILS (2 of 2)

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Call: TOLL FREE
1-800-424-5555

REVISION DESCRIPTION:	WO NUMBER: 141003252
6/30/2017: 60% CITY OF BELLEVUE SUBMITTAL	

RICHARDS CREEK SUBSTATION

		DATE (M/D/Y)
CAD	LM	06 / 13 / 17
ENGINEER	EM	/ /
REVIEWED	EM	/ /
APPROVED		/ /

PUGET SOUND ENERGY

W-7.5 PLANTING NOTES & DETAILS (2 OF 2)

CLASS: SITE

CADD NO:

DRAWING NO: D-18172

REV NO:

SHEET: 22 OF 22

FILE NO: 111103

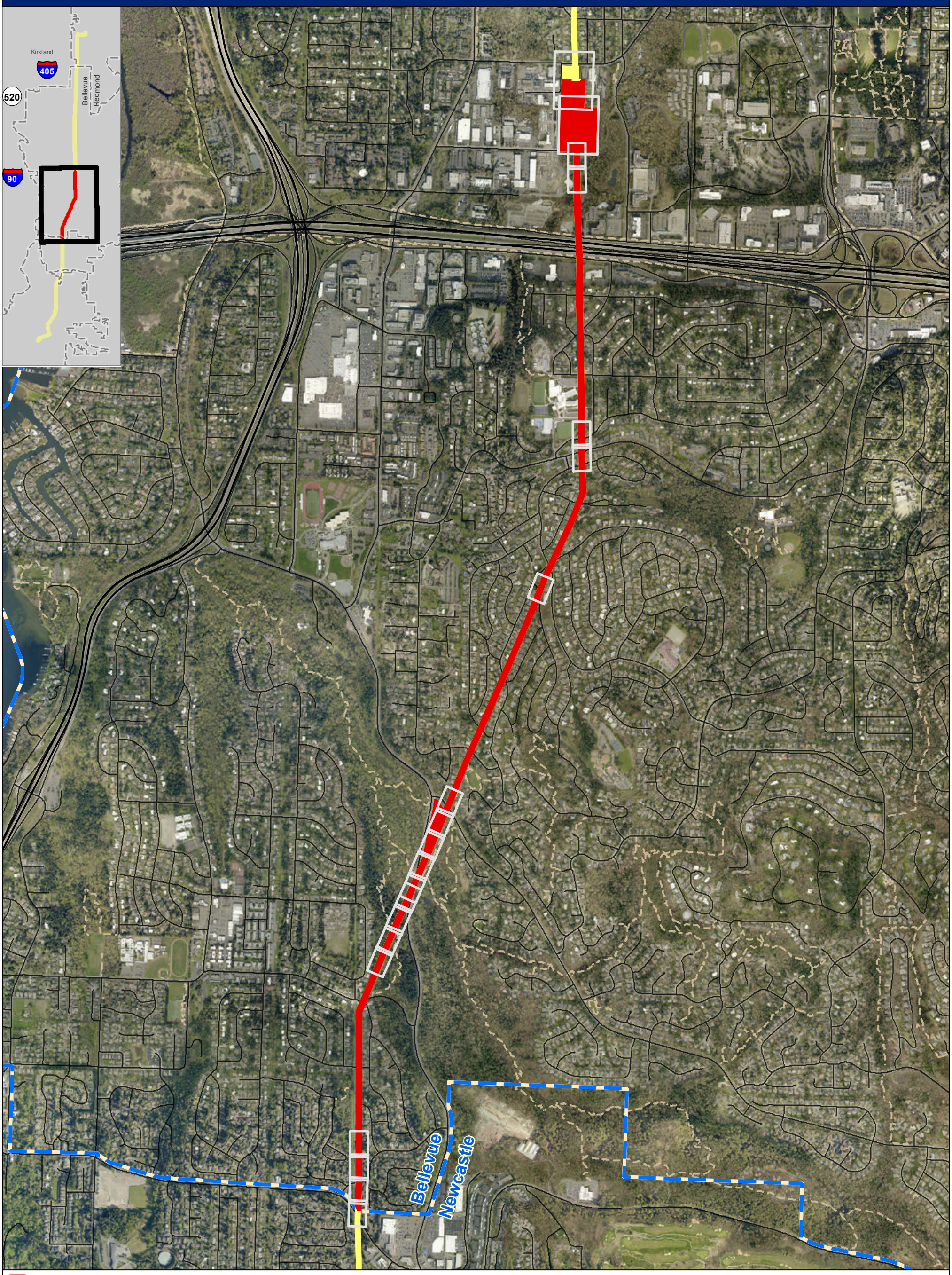
CODE: RIC

DSD 002539

APPENDIX B

Critical Area Assessment Maps

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP - COVER PAGE



South Bellevue Segment of PSE Route and Critical Area Study Limits[1 PSE, TWC]

PSE Route and Critical Area Study Limits outside of South Bellevue Segment[PSE]

Report Map Page Extents[2 TWC]

Road Centerlines[COB]

Trails[COB]

City Limit[KC]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Map pages highlighted are where critical areas, as designated in Bellevue Municipal Code, are mapped within the South Bellevue portion of the corridor. All other map pages were omitted.
3. Only those steep slopes designated as priority through geotechnical field investigation are mapped within the corridor. Please refer to discussion in Critical Areas Report.

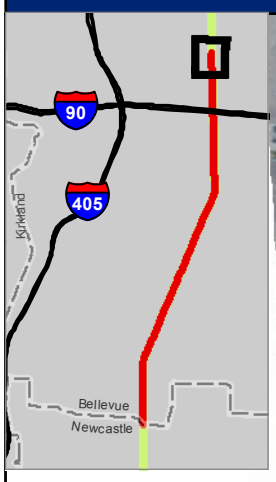
DSD 002541

N

0 720 1,440

Feet

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



SE 26TH ST

137TH AVE SE

WETLAND I
(Lakeside)
(Category III)

Northern extent of South Bellevue project area

136TH AVE SE

WETLAND EE
(Lakeside)
(Category III)

7/5

7/5

LAKESIDE
SUBSTATION

SE 27TH PL

115-X

7/6

7/6

115-5

STREAM D
(Lakeside)
(Type F)

WETLAND A
(Richards)
(Category III)

STREAM B
(Lakeside)
(Type F)

WETLAND D (Lakeside)
(Category III)

STREAM C (Richards) -
Richards Creek
(Type F)

115-2

115-X

STREAM F
(Lakeside)
(Type F)

STREAM A
(Richards)
(Type N)

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

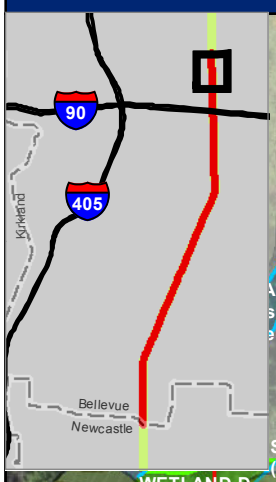
DSD 002542

1

0 25 50
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



115-X
115-5
7/6
7/6
115-2
115-X
115-X
7/7
115-1
115-X
7/7
115-X
7/8
115-X
7/9
115-X
9/1
9/2
115-X
9/1
9/2
WETLAND D (Lakeside) (Category III)
STREAM B (Lakeside) (Type F)
STREAM F (Lakeside) (Type F)
STREAM A (Richards) (Type N)
WETLAND C (Richards) (Category III)
WETLAND A (Richards) (Category III)
WETLAND B (Richards) (Category III)
STREAM C (Richards) - Richards Creek (Type F)
RICHARDS CREEK SUBSTATION
SE 30TH ST
WETLAND D (Richards) (Category II)
WETLAND H (Richards) (Category III)

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

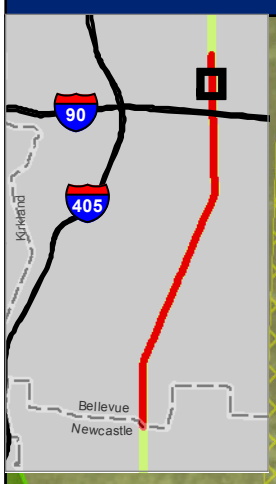
DSD 002543

2

0 25 50
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



7/8
115-X
7/9
115-X
9/2
9/1
115-X
9/1
WETLAND D
(Richards)
(Category II)
STREAM C (Richards)
- Richards Creek
(Type F)
STREAM JB02
(Type F)
WETLAND H
(Richards)
(Category III)
King County
Mitigation Area

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

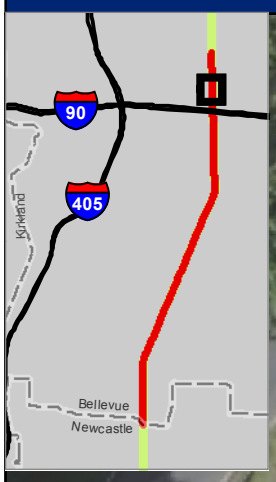
Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002544
3

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



King County Mitigation Area

STREAM C (Richards) - Richards Creek (Type F)

WETLAND H (Richards) (Category III)

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002545

4

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP

SUNSET CREEK FLOODPLAIN

SE ALLEN RD

8/3

8/3

Critical Area Study Limits[1] TWC
City Limit
Maintained Legal ROW[PSE] - *pale yellow shading*
Managed Right-of-Way
Wires
Wire Zone

Proposed Stringing Sites HDR
Existing Pole to Remain PSE
Existing Pole to be Removed[PSE]
Proposed Pole Footprints PSE
Proposed Access Routes[3] PSE

Richards Creek Work Limits[PSE]
Substation Improvement Area[PSE]
Trees to Remove[6]
Canopy to be Removed[6] TWC
Canopy to Remain[6]

Delineated Stream Boundary[TWC]
Delineated Wetland Boundary[TWC]
Limit of Combined Functioning Wetland/Stream Buffer[2] TWC

Stream
Wetland
Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*

Priority Steep Slopes[4 COB]
Limit of Priority Steep Slope Buffer[5 TWC]
Landslide Hazard Areas
Landslide Hazard Area Buffer[TWC]
Flood Hazard (100-yr Floodplain)[COB]

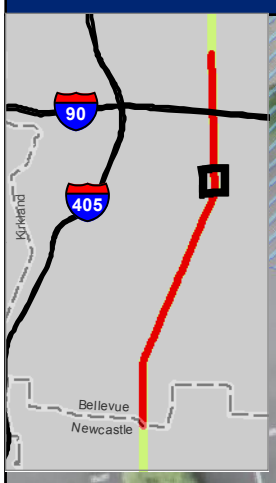
Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002546
5

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



SUNSET CREEK FLOODPLAIN

SE NEWPORT WAY

SE 42ND ST

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR[1]
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002547

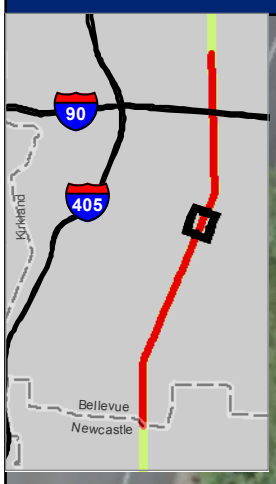
6

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



SOMERSET BLVD SE

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WETLAND JB03
(Category IV)

SOMERSET PL SE

WETLAND JB02
(Category IV)

- Critical Area Study Limits[1] (TWC)
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites (HDR)
- Existing Pole to Remain (PSE)
- Existing Pole to be Removed (PSE)
- Proposed Pole Footprints (PSE)
- Proposed Access Routes[3] (PSE)
- Richards Creek Work Limits (PSE)
- Substation Improvement Area (PSE)
- Trees to Remove[6]
- Canopy to be Removed[6] (TWC)
- Canopy to Remain[6]
- Delineated Stream Boundary (TWC)
- Delineated Wetland Boundary (TWC)
- Limit of Combined Functioning Wetland/Stream Buffer[2] (TWC)
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2] (TWC) - *white shading*
- Priority Steep Slopes[4] (COB)
- Limit of Priority Steep Slope Buffer[5] (TWC)
- Landslide Hazard Areas
- Landslide Hazard Area Buffer (TWC)
- Flood Hazard (100-yr Floodplain) (COB)

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002548

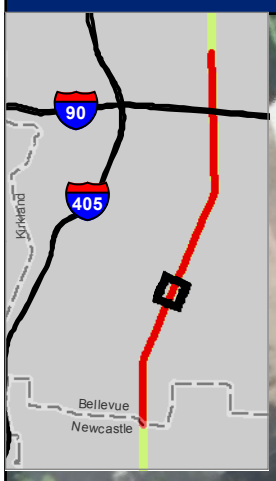
7

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



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Foresthill Neighborhood Trail

WETLAND JB04
(Category IV)

FOREST DR SE

Critical Area Study Limits[1] TWC
City Limit
Maintained Legal ROW[PSE] - *pale yellow shading*
Managed Right-of-Way
Wires
Wire Zone

Proposed Stringing Sites HDR
Existing Pole to Remain PSE
Existing Pole to be Removed[PSE]
Proposed Pole Footprints PSE
Proposed Access Routes[3] PSE

Richards Creek Work Limits[PSE]
Substation Improvement Area[PSE]
Trees to Remove[6]
Canopy to be Removed[6] TWC
Canopy to Remain[6]

Delineated Stream Boundary[TWC]
Delineated Wetland Boundary[TWC]
Limit of Combined Functioning Wetland/Stream Buffer[2] TWC

Stream
Wetland
Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*

Priority Steep Slopes[4 COB]
Limit of Priority Steep Slope Buffer[5 TWC]
Landslide Hazard Areas
Landslide Hazard Area Buffer[TWC]
Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

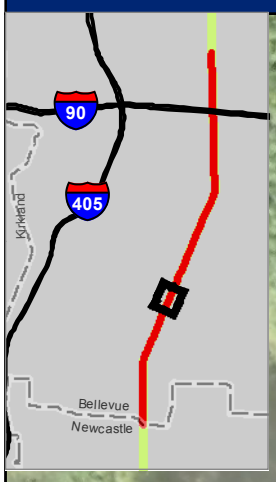
DSD 002549

8

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



FOREST DR SE

WETLAND C
(Somerset)
(Category IV)

WETLAND A
(Somerset)
(Category IV)

WETLAND D
(Somerset)
(Category IV)

Foresthill Neighborhood Trail

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6/7

SOMERSET
SUBSTATION

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

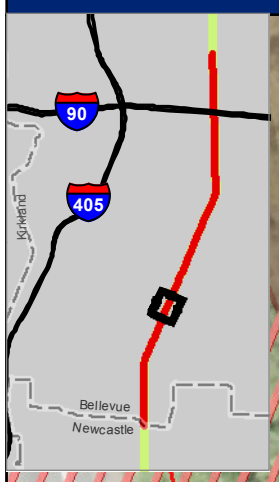
DSD 002550

9

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



SOMERSET SUBSTATION

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WETLAND A (Somerset) (Category IV)

WETLAND D (Somerset) (Category IV)

Foresthill Neighborhood Trail

COAL CREEK PKWY SE

WETLAND E (Somerset) (Category IV)

WETLAND JB05 (Category IV)

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002551

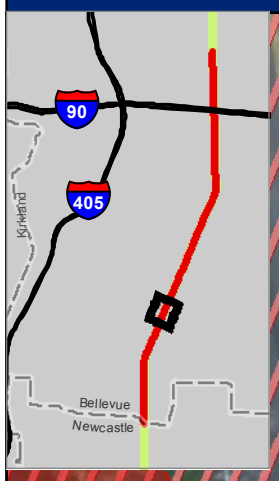
10

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



WETLAND JB05
(Category IV)

Foresthill
Neighborhood
Trail

COAL CREEK PKWY SE

WETLAND JB08
(Category III)

STREAM JB04
(Type N)

STREAM JB05
(Coal Creek)
(Type F)

COAL CREEK
FLOODPLAIN

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

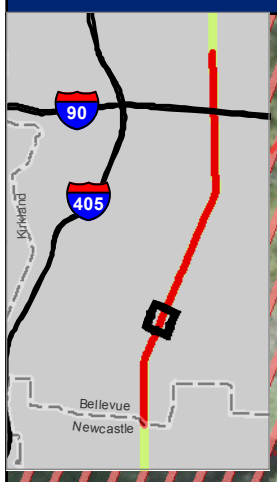
DSD 002552

11

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



COAL CREEK FLOODPLAIN

COAL CREEK PKWY SE

STREAM MB02
(Type F)

WETLAND MB04
(Category IV)

STREAM MB01
(Type N)

STREAM JB05
(Coal Creek)
(Type F)

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

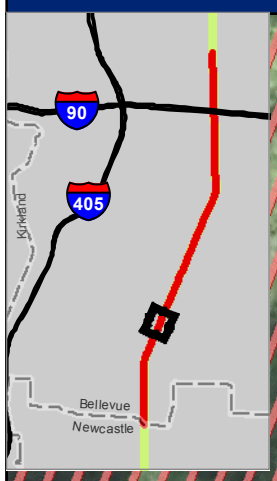
DSD 002553

12

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



STREAM MB02
(Type F)

COAL CREEK
FLOODPLAIN

STREAM
MB01
(Type N)

WETLAND MB04
(Category IV)

COAL CREEK PKWY SE

STREAM JB05
(Coal Creek)
(Type F)

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002554
13

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP

COAL CREEK PKWY SE

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Lower Coal Creek Trail

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002555

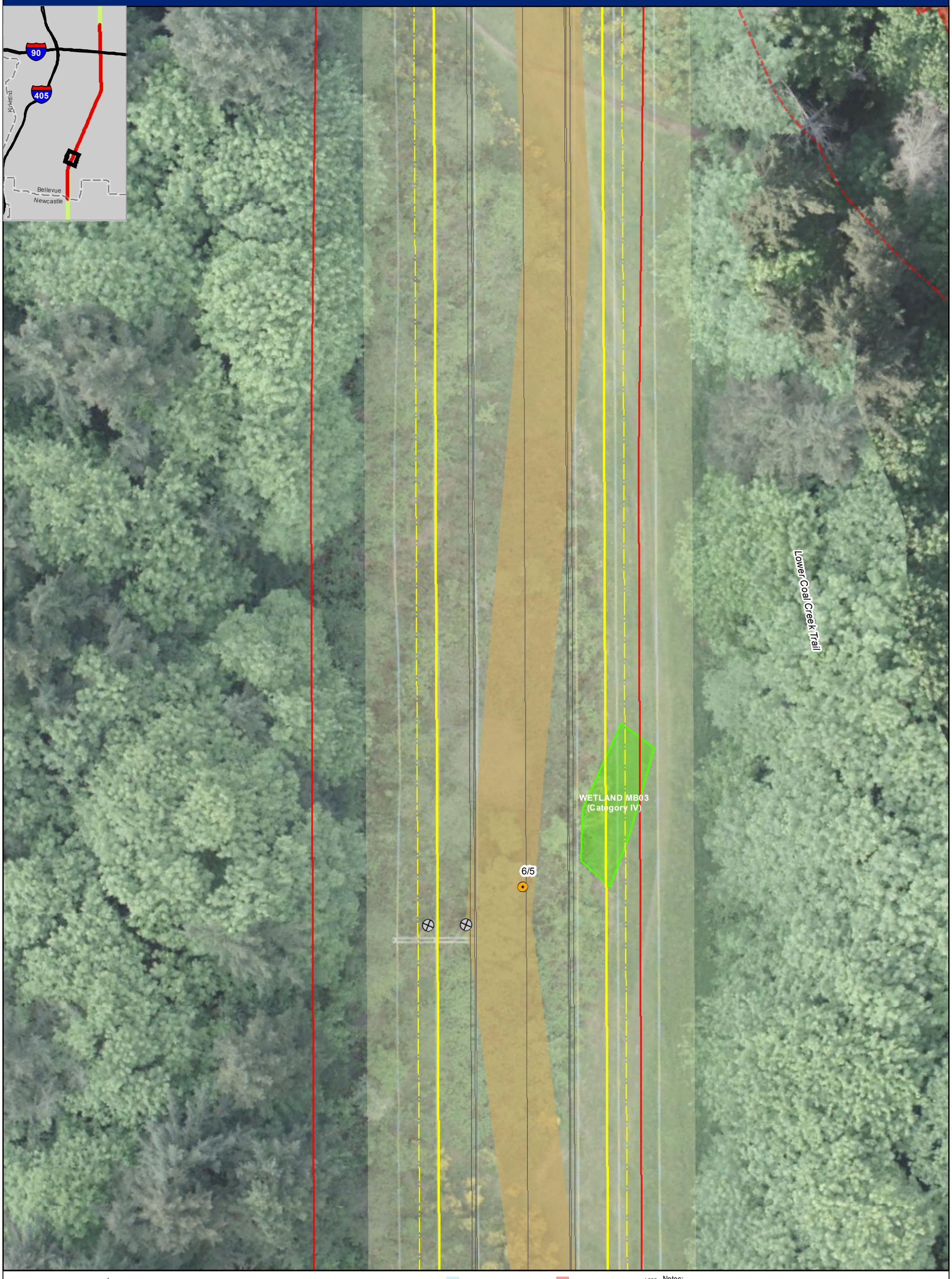
14

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002556

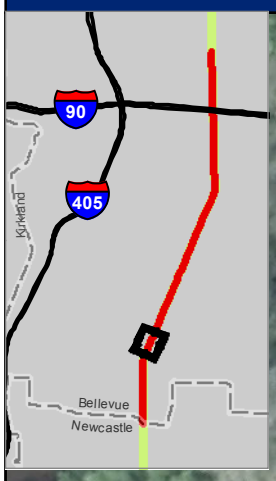
15

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



WETLAND MB02
(Category IV)

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

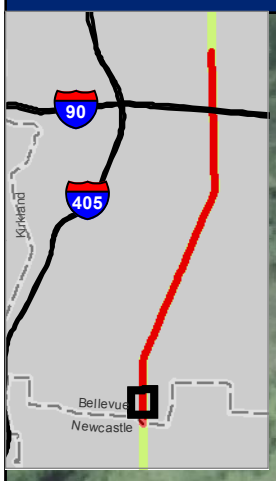
DSD 002557

16

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



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Regional Trail

WETLAND MB01 (Category III)

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002558

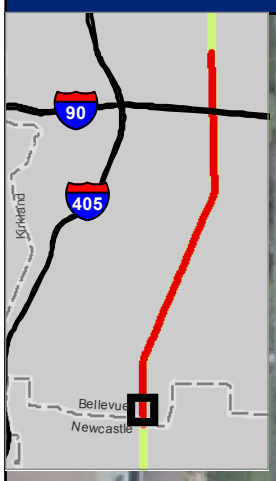
17

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



WETLAND
MB01
(Category III)

Regional Trail

5/8

5/8

128TH AVE SE

- Critical Area Study Limits[1] TWC
- City Limit
- Maintained Legal ROW[PSE] - *pale yellow shading*
- Managed Right-of-Way
- Wires
- Wire Zone
- Proposed Stringing Sites HDR
- Existing Pole to Remain PSE
- Existing Pole to be Removed[PSE]
- Proposed Pole Footprints PSE
- Proposed Access Routes[3] PSE
- Richards Creek Work Limits[PSE]
- Substation Improvement Area[PSE]
- Trees to Remove[6]
- Canopy to be Removed[6] TWC
- Canopy to Remain[6]
- Delineated Stream Boundary[TWC]
- Delineated Wetland Boundary[TWC]
- Limit of Combined Functioning Wetland/Stream Buffer[2] TWC
- Stream
- Wetland
- Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*
- Priority Steep Slopes[4 COB]
- Limit of Priority Steep Slope Buffer[5 TWC]
- Landslide Hazard Areas
- Landslide Hazard Area Buffer[TWC]
- Flood Hazard (100-yr Floodplain)[COB]

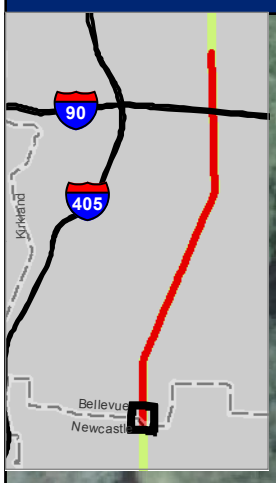
Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002559
18

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



5/8

5/8

128TH AVE SE

128TH PL SE

Regional Trail

STREAM MB01
(Type N)

NEWCASTLE WAY

Critical Area Study Limits[1] TWC
City Limit
Maintained Legal ROW[PSE] - *pale yellow shading*
Managed Right-of-Way
Wires
Wire Zone

Proposed Stringing Sites HDR
Existing Pole to Remain PSE
Existing Pole to be Removed PSE
Proposed Pole Footprints PSE
Proposed Access Routes[3] PSE

Richards Creek Work Limits PSE
Substation Improvement Area PSE
Trees to Remove[6]
Canopy to be Removed[6] TWC
Canopy to Remain[6]

Delineated Stream Boundary TWC
Delineated Wetland Boundary TWC
Limit of Combined Functioning Wetland/Stream Buffer[2] TWC

Stream
Wetland
Combined Functioning Wetland/Stream Buffer Area[2] TWC - *white shading*

Priority Steep Slopes[4] COB
Limit of Priority Steep Slope Buffer[5] TWC
Landslide Hazard Areas
Landslide Hazard Area Buffer TWC
Flood Hazard (100-yr Floodplain) COB

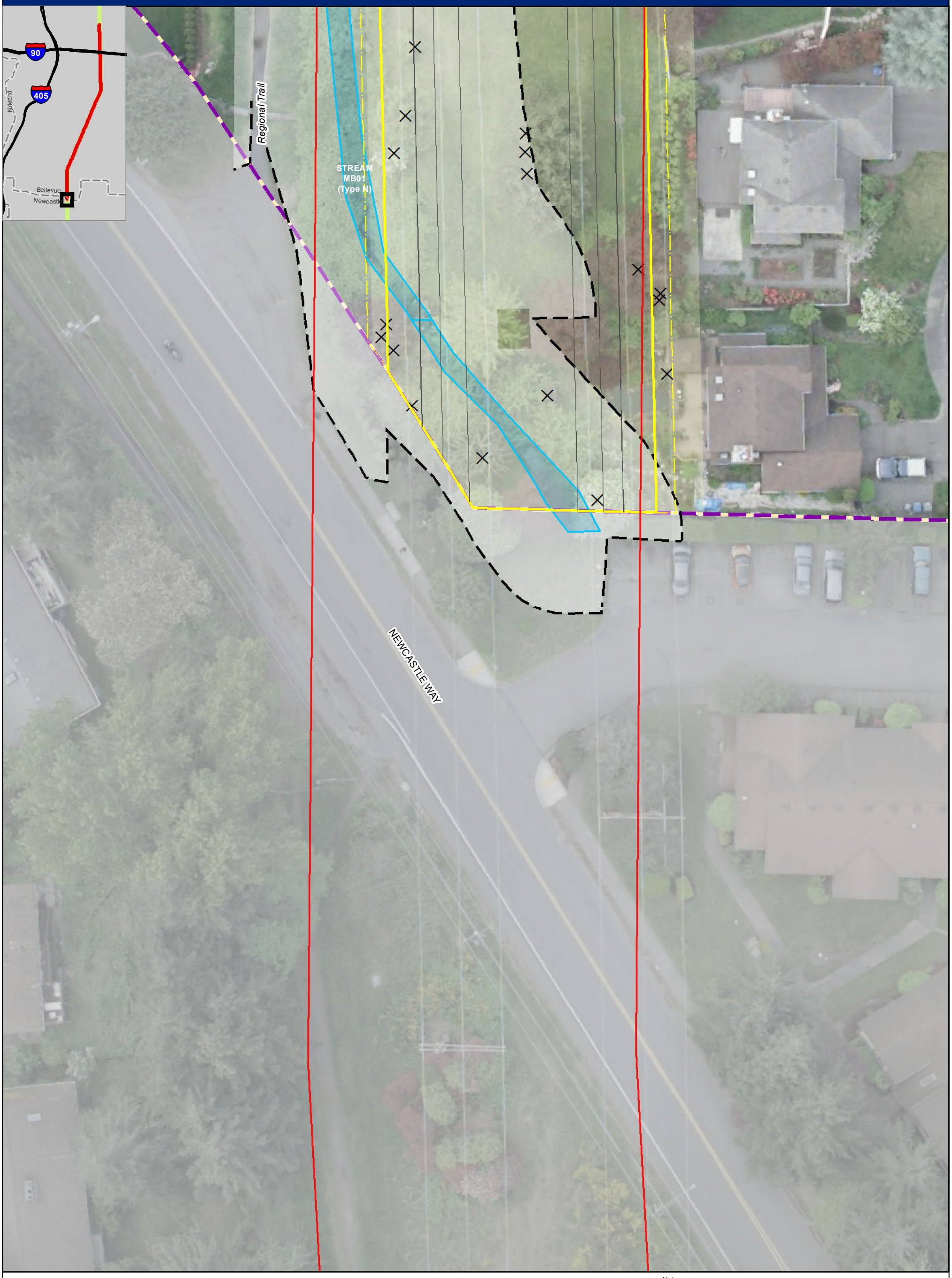
Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002560
19

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

PSE EE230 - SOUTH BELLEVUE CRITICAL AREA ASSESSMENT MAP



Critical Area Study Limits[1] TWC
City Limit
Maintained Legal ROW[PSE] - *pale yellow shading*
Managed Right-of-Way
Wires
Wire Zone

Proposed Stringing Sites HDR
Existing Pole to Remain PSE
Existing Pole to be Removed[PSE]
Proposed Pole Footprints PSE
Proposed Access Routes[3] PSE

Richards Creek Work Limits[PSE]
Substation Improvement Area[PSE]
Trees to Remove[6]
Canopy to be Removed[6] TWC
Canopy to Remain[6]

Delineated Stream Boundary[TWC]
Delineated Wetland Boundary[TWC]
Limit of Combined Functioning Wetland/Stream Buffer[2] TWC

Stream
Wetland
Combined Functioning Wetland/Stream Buffer Area[2 TWC] - *white shading*

Priority Steep Slopes[4 COB]
Limit of Priority Steep Slope Buffer[5 TWC]
Landslide Hazard Areas
Landslide Hazard Area Buffer[TWC]
Flood Hazard (100-yr Floodplain)[COB]

Notes:
1. Critical areas were defined within a 100' corridor along the existing powerline corridor and the entirety of the Lakeside and Richards Creek substation parcels.
2. Shapes representing functioning buffers are truncated 25 feet outside of the study limits.
3. Access roads shown at typical width of 20 feet.
4. Determined in the field by geotechnical consultant. See discussion in Critical Areas Report.
5. Required from top of slope only, per BMC 20.25H.035(A).
6. Canopy shown only in Richards Creek and Lakeside substation parcels. Canopy not shown for dead/dying trees.

DSD 002561

20

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and HDR. Aerial imagery from PSE, 2011.

APPENDIX C

Geotechnical Report and Memo

Revised Targeted Critical Areas Geologic Hazard Evaluation

Energize Eastside Project
Bellevue, Washington

for
Puget Sound Energy

July 11, 2017

GeoEngineers
Earth Science + Technology

DSD 002563

Revised Targeted Critical Areas Geologic Hazard Evaluation

Energize Eastside Project
Bellevue, Washington

for
Puget Sound Energy

July 11, 2017

GeoEngineers

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Redmond, Washington 98052
425.861.6000

Revised Targeted Critical Areas Geologic Hazard Evaluation

Energize Eastside Project
Bellevue, Washington

File No. 0186-871-06

July 11, 2017

Prepared for:

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P.O. Box 97034, EST-04W
Bellevue, Washington 98009-9734

Attention: Kelly Purnell

Prepared by:

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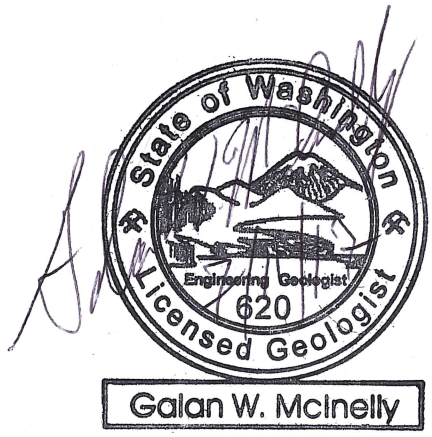

RMH:ETB:GWM:cam

Disclaimer: Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

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INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) is pleased to present the revised results for targeted critical areas evaluation of specific geologic hazards identified by Puget Sound Energy (PSE) for the Energize Eastside Project. Our services have been provided in general accordance with the proposal between GeoEngineers and PSE dated June 21, 2017. These services were authorized by Kelly Purnell with PSE on June 15, 2017, and formal authorization was received on June 26, 2017.

The project area is located along existing PSE rights-of-way and includes areas within the city of Bellevue. We previously provided a geologic hazard evaluation for various routes under consideration, including the route evaluated within this document, in a separate report submitted to PSE on December 19, 2014. The geologic hazards evaluation included in this report focuses on a desktop review for steep slope and landslide hazard areas (geologic hazard areas), as assigned by PSE, relative to proposed vegetation management activities, including tree-removal required for construction access and pole replacement. PSE has provided specific locations for evaluation and also provided a map developed by others which shows proposed pole replacement activities including proposed tree removal, vegetation management zones and access roads.

LOCAL REGULATIONS

GeoEngineers assessed local regulations in the Bellevue Land Use Code, Critical Areas Overlay District for Geologic Hazard Areas (20.25H.120) for the project areas identified by PSE that coincide with regulated geologic hazard areas.

General Geologic Hazard Area Buffers

The City of Bellevue Land Use Code, 20.25H.120, criteria for defining geologic hazards and geologic hazard buffers is described below.

- *Landslide Hazards: Areas of slopes of 15 percent of more with more than 10 feet of rise, which also displace areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides, areas that have shown movement during the past 13,500 years or that are underlain by landslide deposits, slopes that are parallel or subparallel to planes of weakness in subsurface materials, slopes exhibiting geomorphological features indicative of past failures such as hummocky ground and back-rotated benches on slopes, areas with seeps indicating a shallow ground water table on or adjacent to the slope face, or areas of potentially instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.*

  According to the Bellevue Land Use Code, the established critical area buffer in geologic hazard critical areas for landslide hazards is 50 feet from the top of the slope.

- *Steep Slopes: Slope of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.*

  According to the Bellevue Land Use Code, the established critical area buffer in general geologic hazard critical areas for steep slopes is 50 feet from the top of the slope.

EXISTING CONDITIONS

GeoEngineers reviewed a previous report, titled Geologic Hazards Evaluation and Preliminary Geotechnical Engineering Services report, submitted to PSE on December 2014, to assess existing conditions in the project area within City of Bellevue (GeoEngineers 2014). Existing geology in the identified areas mainly consists of glacial drift, recessional outwash, glacially consolidated till and advance outwash deposits, with the exception of a small areas of peat, fill, alluvium and Eocene age sedimentary rocks. Soil types anticipated in the project area include mainly silty gravel, silty sand and silt.

Steep slopes with slopes 40 percent or greater are observed locally within the project area, however the steep slope areas where selected tree removal is proposed are generally developed and include rockeries, landscaped residential slopes and managed right-of-way areas that are unlikely to be adversely impacted. Some undeveloped/natural areas of steep slopes along the project area include the Coal Creek drainage east and west locally along Coal Creek Parkway. These Coal Creek drainage areas also include localized mapped landslide hazards. We observed no active areas of slope movement or instability for project areas that include mapped steep slope areas or steep slope and landslide areas within the Coal Creek drainage area.

IMPACT ASSESSMENT

Tree Removal

There are two primary ways in which tree removal activities may impact slope stability on steep slopes or landslide hazard areas. After tree removal, root decay causes both the numbers of roots and the tensile strength of the remaining individual roots to decrease with time (Burroughs and Thomas 1977). Studies show that the period of minimum root strength is typically from 3 to 5 years after harvest (Ziemer 1981a; 1981b), but can extend up to 10 to 20 years depending on the tree species. For example, minimum root strength in evergreens is typically 10 years after harvest, alders have a minimum root strength of 5 to 10 years after harvest, and maples typically maintain full root strength after harvest (because they regrow from the existing stump). The reductions in root strength result in a net decrease in the cohesive strength of the near-surface soil mass.

Tree removal likely will modify surface and subsurface hydrology. Tree removal may increase soil moisture by reducing canopy interception and evapotranspiration. Ground-based yarding equipment can compact soil, which may alter hydrologic processes in certain soil types.

Elevated groundwater levels decreases the stability of slopes by reducing the shear strength of the soil and by adding additional weight. The probability of landsliding from increased groundwater levels depends on the magnitude of the increase and the existing stability of the slope. The magnitude of potential changes in groundwater levels from tree removal is highly variable and depends on several factors, including the tree size, silviculture, subsurface conditions and topography.

In general, tree removal will increase the impact on slope stability for steep slopes or landslide hazard areas. However, fewer impacts are expected in areas where tree removal is isolated to one or two trees and the steep slope or landslide hazard area is otherwise stable and well vegetated. Additionally, fewer impacts are expected at the toe of the slope, compared to tree removal within the body or at the top of the slope.

Much of the tree removal near/on steep slope areas north of I-90 are situated in the PSE parcel that will be developed for the Richards Creek Substation. GeoEngineers completed a geotechnical engineering report for this substation in a report dated September 23, 2016 and an addendum report dated April 4, 2017. The new substation will require some retaining walls along the south side of the parcel where existing steep slopes are mapped, and a soldier pile wall on the east side of the site. The soldier pile wall (and eastern limits of the new substation) will be located east of the existing eastern steep slope area. Thus, construction of the substation and soldier wall will result in removal of this small steep slope area and the hillside will be stabilized by the wall. As such, the proposed tree removal located within the steep slopes of the substation limits will not affect the stability of the hillside.

Access Construction

Temporary access routes will generally follow previously established access trails and routes, and in some cases, will cross existing developed landscape. Therefore, little cutting or filling will be required. Small amounts of quarry spalls might be necessary to stabilize portions of existing routes. Many of the existing routes are overgrown with vegetation and, thus, will need to be cleared. Standard erosion control best management practices (BMPs) should be followed during clearing and use of the temporary access routes. Following completion of construction activities, restoration BMPs such as mulching and/or placing jute matting, should be implemented.

Pole Installation

Where new poles are located in steep slope or landslide hazard areas, a temporary working bench might be necessary to install the pole. We anticipate that these benches might vary from about 10 feet by 10 feet to 30 feet by 30 feet in dimension. The same considerations discussed above for access routes also apply to benches needed for pole installation. We recommend that clearing activities be restricted to that necessary to auger the hole for the pole.

Recommendations for the design and construction of poles are presented in our Geotechnical Engineering Services report dated June 8, 2016. In general, most of the site soils along the proposed route consist of recessional deposits or glacially consolidated deposits, and in some limited locations, bedrock. These soils should provide adequate support for the new poles, and it is our opinion that once the pole is installed, the pole will not adversely impact slope stability since the pole should actually provide additional resisting force against slope failure, provided the pole is embedded to a sufficient depth.

Conclusions

Mapped steep slopes in Bellevue that include slopes 40 percent or greater are observed locally within the project area, however many of these areas are developed and include rockeries, landscaped residential or commercial development slopes and cut slopes associated with paved roadways and include the following:

- Two trees removed from just north of 132nd Avenue SE.
- Multiple trees removed and access just east of the intersection of Somerset Drive SE and 134th Place SE, north to Somerset Place SE.
- Multiple trees removed just east of the intersection of Somerset Drive SE and Somerset Boulevard SE.

- Multiple trees removed just east of 136th Place SE between SE 43rd Place and SE 43rd Street; and two trees between this area and the intersection of Somerset Drive SE and Somerset Boulevard SE.
- Two trees removed and access north of the intersection of SE 43rd St. and the PSE right-of-way.
- Multiple trees removed south of SE 42nd Street.
- Multiple trees removed between SE 37th Street and SE 36th Street.
- Access east of SE 32nd Street.
- Multiple trees removed in the Richards Creek Substation and Lakeside Substation area.
- Multiple trees removed and access south of SE 26th Street.

A localized natural area of steep slopes in the project area includes the Coal Creek drainage east and west locally along Coal Creek Parkway; this area also has localized mapped landslide hazards. The project area is within an existing right-of-way that is maintained for vegetation by PSE and includes a narrower right-of-way managed by a private petroleum pipeline company. The right-of-way for the buried petroleum pipeline includes areas with no trees and grass that is mowed regularly for vegetation management. We observed no indication of slope movement in the pipeline right-of-way that is included within the PSE right-of-way. The proposed removal of 11 selected trees in this area is consistent with the management activities of the existing pipeline right-of-way and is not anticipated to impact the mapped geologic hazard areas within the Coal Creek drainage, in our opinion, provided that no tracked or rubber-tired equipment is used to remove the trees.

Conceptual Impact Mitigation Strategy

Vegetation Management and Tree Removal

For vegetation management and tree removal in the City of Bellevue within the mapped geohazard areas outlined in the proposed PSE project segment, GeoEngineers suggests the following options for mitigating impacts after tree removal.

In general, to limit impacts on slope stability from vegetation management and tree removal within steep slope and landslide hazard areas, the sites should be accessed by foot to reduce equipment impacts. Hand cutting with chainsaws should be implemented to trim branches and remove trees. Stumps should remain in place, but can be cut to ground level. Branches, limbs, trunks and other tree debris should be chipped and scattered around the removal site within the right-of-way. Where chipping is not feasible, unchipped tree debris can be scattered.

In areas where tree removal is widely spaced within steep slope and landslide buffer areas, the trees should be cut, stumps left in place, and trimmed branches and trunks can be scattered within the right-of-way.

In areas where tree removal is clustered, erosion control BMPs, such as grass seeding, leaving stumps, scattering straw and/or replacement planting of native shrubs or small trees, should be implemented to reduce concentrated flows and minimize disturbance.

In areas where houses are located within 25 to 50 feet of vegetation management and tree removal, all tree debris should be removed from the owner's property and communication with the property owner is

suggested to identify possible reseeding, replacement tree or shrub, or landscaping options. If agreeable to the property owner, it is possible that the tree trunk can be cut and left below ground surface to maintain root strength (up to 5 to 10 years, depending on tree type), and a replacement tree or shrub may be planted near the trimmed trunk.

Reestablish Access Routes

Where vegetation clearing is required to reestablish the access on existing trails and access routes, BMPs should be implemented; these BMPs can include, but are not limited to: outsloping road surfaces, crowning road surfaces (where appropriate, such as at ridge tops and where roads climb gently inclined surfaces) and installing water bars or rolling dips at regularly spaced intervals to avoid concentrating surface water flow along the road surface. The spacing depends on the grade of the route, the soil type present, proximity to streams and the intended use of the road (e.g., temporary or permanent).

Most, if not all, access routes will be temporary and will be abandoned following construction of the transmission line. In the transmission corridor, no temporary access roads will cross any drainages situated in geologic hazard areas (i.e. Coal Creek).

It is the contractor's responsibility to complete construction work safely and in accordance with applicable local, state and federal laws. After access use is complete, where it is deemed necessary, limited regrading of the access route is recommended to avoid concentrating surface runoff along tracks, ruts or other potential flowpaths. Following completion of construction activities, the construction access routes will be graded to a stable free-draining configuration, treated with appropriate erosion control measures, such as mulching and/or placing jute matting and installation of water bars as needed to control runoff, and seeded. If jute mat is determined a necessary BMP, the jute mat should be anchored at the upslope and downslope ends and secured with staples per the manufacturer's recommendations.

Pole Installation

Where a bench is required to install a pole on a steep slope or landslide hazard area, the recommendations presented above for temporary access routes also apply for pole installation. Appropriate erosion control BMPs should be implemented during construction, and the disturbed area should be restored after pole installation by seeding or revegetating and covering the disturbed area with appropriate BMPs. Soil removed from the new pole excavations should be scattered into vegetation away from the any landscaped areas. Any areas of exposed soil must be seeded and mulched (or covered with hog fuel) to prevent transport of sediment down the steep slopes or into the seepage area during rain events. If the work area is wet or has standing water, driving mats should be used under all equipment and all soils should be removed from the site for off-site disposal.

For poles located in geologic hazards areas, the old poles should be cut off approximately 1 to 2 feet below the ground surface and the remaining portion of each pole left in place. If poles are installed on slopes steeper than 2H:1V (horizontal:vertical), they should be embedded at least 3 feet deeper than the typical design embedment.

CODE COMPLIANCE

20.25H.125 Performance standards – Landslide hazards and steep slopes

In addition to generally applicable performance standards set forth in LUC 20.25H.055 and 20.25H.065, development within a landslide hazard or steep slope critical area or the critical area buffers of such hazards shall incorporate the following additional performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.

A. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography.

Response to Code Requirement: No structures will be constructed as part of the proposed project. Site improvements (pole removal, pole replacement, access roads, and vegetation management) are not anticipated to adversely impact the natural contour of the slope. The proposed site activities that include vegetation management, tree removal, and temporary access roads (associated with the proposed pole replacement activities) will maintain overall existing site topography.

B. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation.

Response to Code Requirement: No structures will be constructed as part of the proposed project. Site improvements include localized vegetation management, including tree removal, and use of existing access routes (associated with the proposed pole replacement activities). The proposed tree removal and surface disturbance will be limited to reduce potential impacts to natural landforms and vegetation.

C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties.

Response to Code Requirement: The proposed development includes vegetation management, including tree removal and use of existing access routes (associated with the proposed pole replacement activities) that will be followed by mitigation measures to reduce potential impacts to geologic hazards that include landslide and steep slope hazards. Mitigation measures include a variety of BMPs to reduce potential impacts to geologic hazards in the vicinity of neighboring properties. BMPs include plant replacement, scattering trimmed or removed tree debris, and chipping wood to reduce potential impacts to work areas as appropriate. Removal of vegetation by hand and/or using limited access machinery will reduce potential impacts to landslide and steep slope hazard areas. It is our opinion that the proposed project will not require additional buffers.

D. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall.

Response to Code Requirement: In the transmission corridor, no retaining walls or grading activities are proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities). The development of soldier pile walls and retaining walls for the Richards Creek Substation is discussed in detail in the substation-specific geotechnical engineering report dated September 23, 2016, and in an addendum report dated April 4, 2017. The use of retaining walls for the new substation will reduce disturbance

and grading of the existing natural slopes, which would be otherwise necessary without construction of the walls.

E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer.

Response to Code Requirement: No new impervious surfaces are proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities) within mapped critical area and mapped critical area buffers of the transmission corridor. Five narrow, and relatively small (low square footage), steep slopes are located on the future Richards Creek Substation property (comprising 8.46 acres), which is partially developed with an existing pole yard (existing hard surface/impervious surface of 1.58 acres). Only two mapped steep slopes are located within the limits of the new substation (one of which is mapped in the graded/compacted gravel pole yard). Based on the design of the future Richards Creek Substation, site development will be limited to that area necessary for the substation, leaving the surrounding vegetation and grade intact. As such, only one of the mapped steep slopes in the future Richards Creek Substation property will experience an increase in impervious surface.

F. Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with these criteria.

Response to Code Requirement: No change in grade is proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities) within the transmission corridor. Within the new substation, grade transitions along the east side (up to 24 feet in height) will be supported with a soldier pile wall (cantilever and with tiebacks). Grade transitions along the west side (up to 6 feet in height) will be supported by fill slopes and a cast-in-place retaining wall.

G. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation.

Response to Code Requirement: No building foundations are proposed relative to the proposed vegetation management and tree removal activities associated with the proposed pole replacement activities within the transmission corridor. However, for stability purposes, drilled pier foundations will be utilized on select poles in the corridor where appropriate. The new substation is not a building and, thus, does not have typical foundation walls; as such, soldier pile and retaining walls will be necessary to retain the required grade changes.

H. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification.

Response to Code Requirement: No pole-type structures are proposed relative to the proposed vegetation management and tree removal activities. The new poles will meet the preferred construction type (which is pole-type construction). The new substation cannot be tiered and was situated east of the existing Olympic pipeline. This requires construction of a soldier pile wall east of

the existing steep slope area. While this results in grading in the steep slope area, the area of disturbance is minimized by construction of a vertical wall.

I. On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types.

Response to Code Requirement: No structures requiring pile deck support are proposed relative to the proposed vegetation management and tree removal activities. The new poles will meet the preferred construction type (which is pole-type construction).

No parking or garage structures are planned for the new substation. Pile-supported deck structures are not feasible for a substation. The substation grades will require cutting into the steep slope on the east side, which will then be retained with a soldier pile wall.

J. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210. (Ord. 5680, 6-26-06, § 3).

Response to Code Requirement: Temporary disturbance for the proposed vegetation management and tree removal activities and access routes (associated with the proposed pole replacement activities) within the existing transmission corridor will be mitigated by scattering and/or chipping trimmed limbs and logs, replanting vegetation, and using limited access equipment or accessing only by foot as appropriate. For steep slope areas in the vicinity of the new substation that will be disturbed during construction, the disturbed areas should be restored by seeding/revegetating and covering the planted area with mulch or other appropriate BMPs.

LIMITATIONS

We have prepared this report for the exclusive use of PSE and their authorized agents for the Energize Eastside project located in Bellevue, Washington.

The purpose of our services was to review slope stability and landslide hazard impacts in relation to vegetation management and tree removal and temporary access routes (associated with the proposed pole replacement activities) in steep slope and landslide critical hazard areas along the transmission line corridor within the City of Bellevue. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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Memorandum

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To: Kelly Purnell, Puget Sound Energy

From: Elson T. "Chip" Barnett, LG, LEG;
Galan W. McInelly, LG, LHG, LEG

Date: August 21, 2017

File: 0186-871-06

Subject: Critical Area Supplement for Energize Eastside Bellevue
Geologic Hazard Report dated July 11, 2017

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GeoEngineers, Inc. (GeoEngineers) is providing this memorandum as a supplement to our City of Bellevue (City) Critical Areas report for the Energize Eastside Project dated July 11, 2017. Puget Sound Energy (PSE) requested this memorandum to address additional permitting related services during a phone conversation with Chip Barnett and Kelly Purnell of PSE on August 10, 2017. PSE has proposed modification of the number of trees for removal associated with the project.

A follow up conversation on August 15, 2017 with Chip Barnett and Galan McInelly of GeoEngineers and Kerry Kriner, Toni Hartje, and Kelly Purnell of PSE included an additional request to provide some details regarding the methodology for evaluating geologic hazards and to further clarify the City code as it related to geologic hazard area buffers, their value and need for mitigation relative to the Eastside Energize project.

We provide discussion below related to our geologic hazard evaluation methodology, the modification of the number of trees for removal and City code relative to geologic hazard buffers.

Methodology

Our methodology to evaluate geologic hazards primarily relied on the following:

- Review of published geologic maps and geologic hazard maps
- Review of digital imagery (King County and Google Earth)
- Previous site visits for the Geotechnical and Geologic Hazard Evaluation (December 19, 2014).
- Evaluate the potential for impacts to the following geologic hazards:
  - Landslide Areas and buffers
  - Steep Slopes (Greater than 40 percent) and buffers
- Develop a response to specific critical area code requirements

Review of published geologic maps and geologic hazard maps

We reviewed geologic and geologic hazard maps from published King County 1:100,000 scale maps as well as digital geologic hazard data from City of Bellevue as provided by Watershed Associates. The goal of this task was to better understand mapped geologic conditions and geologic hazards at the site relative to planned poles

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and areas for proposed tree removal. We also reviewed previous geologic and geotechnical reports completed in the vicinity of the project area.

Review of digital area photographs

Aerial photographs were reviewed using both King County iMap (http://kingcounty.gov/services/gis/Maps/imap.aspx) as well as Google Earth images. King County data available for review of surface conditions includes Light Detection and Ranging (LiDAR) bare earth hillshade surface relief and aerial photograph images from 1936, 1998, 2000, 2002, 2005, 2007, 2009, 2012, 2013 and 2015. Google Earth aerial photograph images include 1990, 2002, 2005, 2006, 2007, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016 and 2017. Google Earth data includes multiple images for the same year to observe more subtle changes over the course of a shorter period of time. This task was focused on observing changes in development and vegetation and if geologic hazard areas show some activity during the aerial photograph record. Also, LiDAR bare earth hillshade data provides a tool to observe surface relief without a vegetated canopy that is key to evaluating geologic hazards physical characteristics (scarps, flanks, toe of slide, hummocky topography) of the hazard area, if any.

Previous site visits for the Geotechnical and Geologic Hazard Evaluation

We also verified with GeoEngineers staff that had already completed surface reconnaissance for the proposed site relative to our December 19, 2014 report. The goal of this task was to compare our site-specific reconnaissance information relative to mapped geologic hazards in the project vicinity.

Evaluate the potential for impacts to geologic hazards

GeoEngineers compiled the information to evaluate the potential impacts to the geologic hazard areas relative to the proposed construction of poles and removal of trees. Per City code (20.25H.120). We considered whether mapped landslide areas have:

- Areas that have shown movement during the Holocene Epoch (past 13,500 years) or that are underlain by landslide deposits.
- Slopes that are parallel or subparallel to planes of weakness in subsurface materials.
- Slopes exhibiting geomorphological features indicative of past failures, such as hummocky ground and back-rotated benches on slopes.
- Areas with seeps indicating a shallow ground water table on or adjacent to the slope face.
- Areas of potential instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.

We also consider steep slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.

We reviewed the performance of these steep slopes and mapped landslide areas relative to decades of residential development as well as engineered City streets.

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Develop a response to specific critical area code requirements

GeoEngineers lastly addressed each of the following code performance standards (20.25H.125) for landslide hazards and steep slopes relative to the proposed development for the proposed project.

A. *Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography.*

B. *Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation.*

C. *The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties.*

D. *The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall.*

E. *Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer.*

F. *Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with these criteria.*

G. *Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation.*

H. *On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification.*

I. *On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types.*

J. *Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210. (Ord. 5680, 6-26-06, § 3).*

Modified Tree Removal

PSE has increased areas of proposed tree removal and in some cases, has reduced the number of trees previously proposed for removal. GeoEngineers reviewed the locations of the trees that PSE has reduced or added to those previously identified. We reviewed the online mapping provided by Watershed Associates on August 14, 2017 for updated proposed retained and removed trees within the project area.

In general, we noted that a proportion of the added trees proposed for removal are located on areas that include cut- and fill slopes that are locally greater than 40 percent. These slopes have been engineered in many cases associated with roadways that include Coal Creek Parkway SE, Somerset Place SE, Somerset Boulevard SE, SE Newport Way, SE 37th Street, and SE 26th Street. Elsewhere proposed tree removal is located within residential

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areas of the right-of-way that include landscaped slopes and rockeries. Also, we reviewed the area that include south of the Richards Creek Substation near previous earthwork activities within the PSE right-of-way observed from the May 2005 aerial photographs that did not destabilize the right of way. It is our opinion that the limited additional few dozen trees proposed for removal will not adversely impact existing mapped geologic hazard areas or their buffers.

Geologic Hazard Buffers and Value

PSE requested additional discussion and comment relative to geologic hazard buffers (landslide and steep slopes), their value and protection. Several areas within the project include buffers (50 feet from mapped hazard) that extend across residential areas and existing roadways where cut and fill areas are steeper than 40 percent.

The City code (20.25H.120) sections provides context:

- Existing Development. Where a primary structure legally established on a site prior to August 1, 2006, encroaches into the critical area buffer established in subsection B.1 of this section, the critical area buffer and structure setback shall be modified to exclude the footprint of the existing structure. Expansion of an existing structure into the critical area buffer shall be allowed only pursuant to the provisions of LUC 20.25H.065.
- Buffer Modification. Modifications to the geologic hazard critical area buffer may be considered through a critical areas report, LUC 20.25H.230.

The value these natural buffers provide is likely some measure of reduced concentration of runoff onto steep slopes and landslide hazards. However, it is important to consider that some areas of existing roadways that have a mapped “steep slope” downslope include a fill slope or rockery that is not a natural slope, rather it is a constructed and likely an engineered slope that does not represent a geologic hazard and therefore it should have no buffer. In that regard modification of buffers is entirely appropriate as is the case in most of the project area.

It is our opinion that buffers that need protection or mitigation are those where the geologic hazard downslope shows some indication of activity in the form of slope movement or active erosion. We observed no buffer areas associated with active or historically active landslides or steep slopes as related to the proposed development. The proposed replanting and other BMP measures as previously discussed in our July 11, 2017 report for buffer and mapped geologic hazards are intended to address the potential risk for instability and maintain value of the critical area.

We appreciate the opportunity to provide services to you. Please contact us if you have any questions concerning this memorandum or our services.

ETB:GWM:cam

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APPENDIX D

Detailed CAIA Methodology

This detailed Critical Area Impact Analysis (CAIA) is intended to further describe the methods used to generate critical area features and existing land cover classes used in conjunction with PSE site plans in order to quantify impacts resulting from implementation of the Energize Eastside Project. This Appendix is meant to complement and expand upon the methods described in the body of the report.

Methodology Outline:

- Critical Area Delineation and Mapping Methods
  - Wetlands
  - Streams
  - Functioning Wetland and Stream Buffers
  - Geologic Hazard Area Buffers
- Existing Land Cover Mapping
  - Vegetation Assessment Methods
- Impact Characterization
- Critical Areas Impact Assessment
- Quality Assurance Review of Analysis Steps and Results
- Limitations
- Data Sources Table

Critical Area Delineation and Mapping Methods

Wetland and stream critical areas were delineated and classified by The Watershed Company between March and October 2015 coincident with the field work for vegetation inventory analysis. These delineated features were GPS-located.

Supplemental studies were conducted at specific locations along the Project corridor as indicated in the body of the report (Section 3.2). Wetland and stream boundaries delineated during supplemental studies were typically survey-located.

Critical area features not delineated in the field were mapped using publicly-available GIS data. Priority was given to data produced and/or provided by the City of Bellevue. Where such data were not available for a designated critical area, data were obtained from other agency sources. A table provided at the end of this document lists data sources for each mapped critical area.

WETLAND DELINEATION

The study area was evaluated for wetlands using methodology from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (Regional Supplement) (US Army Corps of Engineers [Corps] May 2010). Wetland boundaries were determined on the basis of an examination of vegetation, soils, and hydrology. Areas meeting the criteria set forth in the Regional Supplement were determined to be wetland. Soil, vegetation, and hydrologic parameters were sampled at several locations along the wetland boundary to make the determination.

Identified wetlands have been classified using the *Washington State Wetland Rating System for Western Washington, Version 2* (Ecology publication #04-06-025), per Bellevue's current Critical Areas Ordinance.

STREAM DELINEATION

The study area was also evaluated for streams based on the presence or absence of an ordinary high water mark (OHWM) as defined by the Revised Code of Washington (RCW) 90.58.030 and the Washington Administrative Code (WAC) 220-660-030. The OHWM edge was located by examining the bed and bank physical characteristics and vegetation.

The centerlines of streams in the study area were recorded in the field, with stream widths either visually approximated in the field or later approximated based on aerial photometry and elevation contours. Streams were classified according to the City of Bellevue Land Use Code.

Stream OHWM edges were delineated on the Richards Creek and Lakeside Substation parcels.

Functioning Wetland and Stream Buffers Mapping

Standard buffers were applied to delineated wetland and stream edges in GIS according to regulatory buffer widths in Bellevue Land Use Code. It was observed that in many cases, developed areas intruded into these mapped standard buffers. To remove these non-functioning buffer areas from the assessment of Project impacts, developed areas (see land cover mapping section) were manually removed from the standard buffer polygons in GIS (based on observed field conditions and recent aerial photography). Where development, such as a roadway, intruded into the buffer, impeding hydrologic connection, the disconnected outer portion of the buffer was removed. The resulting functioning buffers were used to determine buffer impacts and mitigation needs.

Geologic Hazard Areas and Buffers Mapping

According to Bellevue Land Use Code, landslide hazard areas and steep slopes require 50-foot buffers from the top-of-slope. In order to map top-of-slope buffers, steep slopes and landslide hazard areas were visually evaluated relative to 10-foot contour data provided by the City of Bellevue, and buffers were clipped to top-of-slope.

Steep slope and steep slope buffer data were further refined to include only priority features, as described by GeoEngineers in their July 2017 report and subsequent memo. GeoEngineers evaluated proposed tree removal associated with the Energize Eastside Project on Bellevue's mapped steep slopes for impact risks, including review against a current aerial photograph and field conditions following a site visit. According to communication with PSE, based on the observed developed conditions of the majority of the corridor (residential rockeries, landscaped residential or commercial development slopes, and engineered cut slopes associated with paved roadways) and the proposed work at those locations, the GeoEngineers Report considered these mapped areas as having a low impact risk, offering generalized impact minimization measures. As such, steep slope areas depicted on the Critical Areas Assessment Maps (Appendix B) were limited to show priority areas, while features with low impact risk, including residential rockeries and other marginal mapped slopes, were omitted.

Existing Land Cover Mapping

In order to quantify land cover changes from Project-related activities, a layer showing existing land use was created to describe the current land cover conditions. The land cover base map was developed from the following existing data sources:

- 2009 Impervious and Impacted Surface raster data set, King County GIS
- Energize Eastside Corridor digital survey, APS Surveying
- Energize Eastside Corridor Tree Inventory data, The Watershed Company
- Energize Eastside Corridor Vegetation Polygon data, The Watershed Company
- Energize Eastside Corridor Wetland and Stream Inventory, The Watershed Company
- High-resolution aerial photography, PSE, captured in 2011
- 2015-2016 aerial photography, King County GIS

Using the King County impervious surface raster, GIS analysts supplemented the mapped features using digital survey data. These data were further refined by manually reviewing mapped features against high-resolution aerial photography and field-verified conditions. After developed and non-developed areas were mapped, vegetation and tree canopy coverage information were integrated (described in following subsection), as well as mapped open water areas (streams). This effort yielded a base map with six general land cover types:

- Forested with understory vegetation
- Forested without understory vegetation
- Understory vegetation, unforested
- Other (generally lawn)
- Developed
- Water

VEGETATION ASSESSMENT METHODS

A full description of the vegetation analysis methods, the results of which have been incorporated into the CAIA, is presented in the *City of Bellevue Tree Inventory Report: Puget Sound Energy – Energize Eastside Project* (The Watershed Company 2016b). The ways in which the results were used to generate the mapped features presented in the CAIA are summarized below.

The Watershed Company certified arborists conducted a field-based vegetation inventory from March 23, 2015, to November 9, 2015 associated with potential routes for the Energize Eastside Project. The methodology utilized during the inventory was developed to comprehensively identify, describe, and mark all vegetation greater than 15 feet tall, or that had the potential to reach a mature height of 15 feet or taller.

Inventoried vegetation was mapped as points and/or polygons. Any tree with a diameter of six inches at four-and-a-half feet above the ground surface (DBH) was mapped as a point and tagged with a unique number and its attributes were recorded. Landscaped vegetation with the potential to reach 15 feet or greater

was also inventoried in this manner regardless of size. Finally, weedy vegetation (i.e. from seed [not planted] and not maintained) with a DBH of three to six inches was also inventoried in this way. This type of inventoried vegetation was typically survey-located.

Hedges and small weedy vegetation (less than three inches DBH) were mapped as polygons, not points. Polygons were sketched in the field based on observations then digitized in GIS using high-resolution imagery. Vegetation attributes within polygons were averaged. No significant (regulated) trees were inventoried using this method.

Resulting mapped features included in land cover mapping of the CAIA are vegetation points with the recorded canopy (or radius) applied creating circular "tree footprints" and polygons representing varying densities of smaller weedy vegetation with the potential to reach a height of 15 feet or more.

Using inventoried tree point data and incorporation of 3D design data depicting proposed pole heights and vertical wire alignment, tree impacts related to the construction of the Energize Eastside Project were quantified. Canopy cover for the anticipated trees to remain and trees to be removed or maintained was then mapped and overlayed, resulting in a coverage layer depicting the extent of anticipated canopy preservation and canopy loss. This data was incorporated into the land cover data, further refining existing land cover into eight general land cover types:

- Forested to be removed (canopy loss) with understory
- Forested to be removed, no understory
- Forested to remain (canopy preservation) with understory
- Forested to remain, no understory
- Understory vegetation, unforested
- Other (generally lawn)
- Developed
- Water

Impact Characterization

Proposed development areas associated with the Energize Eastside Project were mapped using geometry from design files and data provided by PSE. As described by PSE, work proposed could be classified into ten types and maintained in the long term as described in the following table.

Proposed Work	Long term Condition
Pole footprint	Developed
Permanent development of the Richards Creek Substation, including structures and impervious areas	Developed
Clearing limits for the Richards Creek Substation construction, includes temporary disturbance related to construction activities	Mixed Vegetation (Height may be maintained depending upon location relative to wire alignment)
Pole buffer, describes an approximate 6-foot buffer around the proposed poles that will be disturbed during construction and tree growth will be managed long-term	Mixed Vegetation (Height maintained at 15 feet or where 20 feet of vertical clearance is provided beneath the vertical curvature of the lowest wire)
Access route, describes approximate path used during construction activities	Mixed Vegetation (Height may be maintained depending upon location relative to wire alignment)
Stringing sites*	Mixed Vegetation (Height may be maintained depending upon location relative to wire alignment)
Wire zone (WZ)	Mixed Vegetation (Height maintained at 15 feet or where 20 feet of vertical clearance is provided beneath the vertical curvature of the lowest wire)
Managed right-of-way (MROW)	Mixed Vegetation (Height maintained at 15 feet or where 20 feet of vertical clearance is provided beneath the vertical curvature of the lowest wire)
Pole work area, approximate temporary disturbance related to pole construction	Mixed Vegetation (Height may be maintained depending upon location relative to wire alignment)
Limit of other vegetation management associated with construction and operations at the Richards Creek Substation	Mixed Vegetation (Height may be maintained depending upon location relative to wire alignment)
Maintained legal right-of-way (LROW), encompasses the areas of LROW where PSE intends to exercise long-term vegetation management	**Mixed Vegetation (Height maintained at 70 feet)**
* Note: Impacts from stringing sites are captured within the footprints of other proposed work activities. During construction work associated with stringing sites, adjustments may be made in the field to avoid, minimize, or mitigate impacts should they occur.	

These proposed work areas were then intersected with the land cover data set described above. The result was a set of polygons defining pre-Project conditions (land cover data set values) and post-Project conditions (proposed work and long-term condition values). Differences between post-Project conditions and pre-Project conditions, or impacts, were then characterized as one of four types – permanent, conversion, temporary, or no change – based on the nature of the change on the ground. These characterization types are defined in the matrix below.

			Existing Land Cover Types							
	Impact Description	**Long-term Condition[1]**	Forested to be removed with understory	Forested to be removed, no understory	Forested to remain with understory	Forested to remain, no understory	Understory	Other (mostly lawn)	Developed	Water
Proposed Activities	Pole footprint	Developed	P	P	P	P	P	P	NC	N/A
	Permanent development of Richards Creek Substation	Developed	P	P	P	P	P	P	NC	N/A
	Clearing limits for the Richards Creek Substation construction	Mixed vegetation[2]	C	C	T	T	T	T	NC	N/A
	Pole buffer	Mixed vegetation[2]	C	C	T	T	T	T	NC	N/A
	Access route	Mixed vegetation[2]	C	C	T	T	T	T	NC	N/A
	Wire zone (WZ)	Mixed vegetation[2]	C	C	NC	NC	NC	NC	NC	N/A
	Managed right-of-way (MROW)	Mixed vegetation[2]	C	C	NC	NC	NC	NC	NC	N/A
	Pole work area	Mixed vegetation[2]	C	C	T	T	T	T	NC	N/A
	Limit of other vegetation management at Richards Creek Substation	Mixed vegetation[2]	C	C	NC	NC	NC	NC	NC	N/A

Type of Impact based on proposed activity, long term condition, and existing land cover type:

P = Permanent to developed C = Vegetation conversion (not developed)

T = Temporary impact, can be restored to existing land cover

NC = No Change N/A = Not applicable/does not occur

[1] Long term condition determined in coordination with PSE.

[2] Subject to varying height restrictions described in Section 2.3.5.

Critical Areas Impact Assessment

Application of the matrix, yielded a map showing a full characterization of permanent, conversion, and temporary impacts associated with the Energize Eastside Project. This impact characterization layer was then intersected with each individual mapped critical area in order to locate, characterize, and quantify impacts to that critical area. The results were summarized by critical area and drainage sub-basin.

The ending table summarizes the data sources used for the critical areas analysis.

Quality Assurance Review of Analysis Steps and Results

Internal review of CAIA steps and results has occurred throughout the process described above and will be ongoing as the analysis is refined.

Ecologists, arborists, GIS analysts, and planners worked collaboratively to ensure all appropriate critical areas were incorporated into the maps and where appropriate, classified and buffered according the local jurisdiction regulations.

GIS analysts created the land cover base map, compiled from a variety of sources. Land cover classifications were reviewed for quality assurance first through the GIS department by comparing mapped data to high resolution aerial imagery. Following review by the GIS analysts, the land cover map was reviewed by an ecologist against delineation field notes and recollections from field work activities.

Project elements and site plans have been provided by, and reviewed with, PSE Project staff. The mapped location and long term condition of Project elements is based upon discussions with PSE regarding BMPs and standard PSE programs and policies.

All components of the CAIA have been generated/authored by reputable sources and have been cross-checked internally for consistency. Quantified and depicted impacts resulting from the CAIA have been reviewed by ecologists for quality assurance to the extent feasible. Impact results will continue to be reviewed for accuracy as the Project plans and impact areas are refined and finalized.

Limitations

This analysis relies on a series of data products produced using different scales and methods; therefore, mapped features may not align with the planned real-world layout of proposed corridor facilities. Ground-truthing of these results may reveal inaccuracies. Furthermore, as some features and design geometries were translated from AutoCAD into ArcGIS, some geometric refinements were necessary to address gaps and other issues, which could affect the accuracy of the analysis results.

Data Inventory Elements and Information Sources:

Inventory Element	Information Gathered	Data Source(s)	Assumptions/Limitations
Proposed Development			
Topographic surface data	• Point map of surface elevations	Puget Sound Energy (PSE) tabular data (via email R. Weider); date received 4/19/2017 The Watershed Company (TWC)	• Point elevations generated from lidar flight by consultant to PSE; flight date unknown • Data was post-processed to generate a 3D surface map using ArcGIS software
Proposed Energize Eastside Project Improvements	• Pole structures • Wire alignments • Pole construction work areas • Proposed temporary construction access routes • Stringing sites • Richards Creek substation improvements	PSE (via email R. Weider, K. Purnell), design drawings in AutoCAD; date received: 7/20/2017-8/2/2017 HDR (via email K. Purnell), geospatial data; date received 8/2/2017 TWC	• Reflects pole and wire design configuration from June 30, 2017, with updates through Aug 18, 2017 • Design may be subject to revision or update based on regulatory comments, field conditions, or other factors
Cadastral Datasets & Features			
Land Cover	• Development and impervious areas • Other • Tree canopy • Understory vegetation	King County 2009 impervious dataset and 2015-2016 aerial data PSE high-resolution aerial photography; flight date 2011 APS Surveying, digital survey TWC	• Impervious dataset from King County, last updated 2009 • Vegetation survey by TWC between 2015 and 2017 • "Developed" category includes roads, structures, and heavily disturbed areas, such as compacted unimproved roadways • "Other" category observed to be mostly lawn based on visual observation of aerial photographs, but could include other conditions • Survey data was post-processed to isolate and generate geospatial feature classes using ArcGIS software

Inventory Element	Information Gathered	Data Source(s)	Assumptions/Limitations
Parks	• Park locations	City of Bellevue (downloaded 4/6/2017) King County	• Bellevue last updated on 02-06-2017 • King Co last updated 07-19-2016
City limits	• Incorporated city limit boundary	City of Bellevue (downloaded 4/14/2017)	• Bellevue updated 02-06-2017
Parcels	• Parcel lines	City of Bellevue (downloaded 4/14/2017)	• Bellevue updated 02-06-2017
Regulated Critical Areas			
Streams and Riparian Areas (LUC 20.25H.075)	• Streams with study corridor • Stream buffers	TWC	• Streams delineated by TWC between 2015 and 2017 • Feature buffers assigned according to City of Bellevue 2006 Critical Areas Ordinance (CAO)
	• Floodplains	*See Flood Hazard Areas*	
Wetlands (LUC 20.25H.095)	• Delineated wetlands within study corridor • Wetland buffers • Approximate wetlands	TWC	• Wetlands delineated by TWC between 2015 and 2017 • Wetland feature ratings based on 2004 rating system • Feature buffers assigned according to City of Bellevue 2006 Critical Areas Ordinance (CAO)
Habitats for Species of Local Importance (LUC 20.25H.150)	• Priority habitat and species data (PHS)	WDFW (received 6/27/2017)	• Scale may not be sufficient to capture individual occurrences or observations along the corridor. • Accuracy does not supersede observation by PSE staff.
Geological Hazard Areas (LUC 20.25H.120)	• Landslide hazard areas • Landslide hazard buffers	King County (downloaded 6/15/2017) TWC	• Data describes landslide hazards defined by King County SAO • Feature buffers assigned according to City of Bellevue 2006 Critical Areas Ordinance (CAO); mapped buffers extend around full feature area; however, only top-of-slope buffers are prescribed by code.
	• Priority steep slopes • Priority steep slope buffers	City of Bellevue Mapping Services (downloaded 4/6/2017) TWC GeoEngineers	• Bellevue data last updated 04-06-2016 • Feature buffers assigned according to City of Bellevue 2006 Critical Areas Ordinance (CAO); mapped buffers extend around full feature area;

Inventory Element	Information Gathered	Data Source(s)	Assumptions/Limitations
			however, only top-of-slope buffers are prescribed by code. • Based on site-specific geotechnical analysis by GeoEngineers, datasets were refined to show only priority geohazard features
	• Coal mine hazard areas	City of Bellevue Mapping Services (downloaded 4/6/2017)	• COALZONE – last updated 04-05-2016; no features occur within Project area
Flood Hazard Areas (LUC 20.25H.175)	• Flood hazard areas	City of Bellevue Mapping Services (downloaded 4/6/2017) FEMA	• Bellevue FLOODPLAIN last updated 04-05-2016
Shorelines (LUC 20.25E.017)	• Shoreline jurisdiction areas	City of Bellevue Mapping Services (downloaded 4/6/2017)	• SHORELINES not provided on Bellevue site; no features occur within Project area

Vegetation Management

The Federal Energy Regulatory Commission (FERC) has certified the National Energy Regulatory Corporation (NERC) as the electric reliability organization who establishes legally enforceable mandatory standards for the U.S. bulk power system. PSE is required by NERC standards to maintain safe clearances between vegetation and utility lines. Specifically, NERC FAC-003-4 (*Transmission Vegetation Management*) sets forth the vegetation management requirements for transmission lines operated above 200 kV. Under the standard, PSE must manage vegetation to prevent encroachments into the Minimum Vegetation Clearance Distance (MVCD) of its applicable line(s). Since the Energize Eastside Project entails replacing the existing 115 kV lines with 230 KV lines, the upgraded transmission lines must comply with the NERC standard and PSE's 230 kV vegetation management standard, which generally require the removal of trees with an expected mature height of more than 15 feet from the wire zone. Management of trees within the transmission right of way may also be required depending on tree species, tree health, distance from the wires, and topography.

The following maps and table illustrate the location, tree tag number, species, diameter, and general condition of the regulated trees in the area between the Richards Creek/Lakeside substations and the Newcastle City limits (South Bellevue Segment). Generally, vegetation impacts were calculated according to the following criteria:

- Remove all trees within the proposed wire zone (WZ) and managed right-of-way (MROW) with a maximum potential height[1] (MPH) that exceeds 15 feet or where 20 feet of vertical clearance is provided beneath the vertical curvature of the lowest wire.
- Remove all trees within the legal ROW and outside of the MROW, but within the Maintained legal right of way, with a maximum potential height exceeding 70 feet.
- Remove all dead and dying trees[2].

Based on the above parameters, it is estimated that there are approximately 550 trees that do not meet the NERC and PSE vegetation management standards. It is important to note that these trees are located within an existing and managed transmission line corridor and that more than 80 percent of those trees are in poor to fair condition. Additionally, the tree inventory field work was completed on October 13, 2016, and includes trees that may have been removed by others since that time.

PSE has been meeting with property owners along the existing corridor to discuss tree replacement and will continue to work together to develop property-specific landscaping and tree replacement plans. There are anticipated to be a number of trees that cannot be replaced onsite due to property owners' preferences. In those cases, replacement trees will need to be outside the corridor. One benefit of offsite planting is that larger trees may be planted and, potentially, clustered. Larger, clustered trees contribute to higher habitat quality and area aesthetics. Offsite options to pursue include city parks, neighborhood groups/HOAs, and developments within the Spring District. PSE will work with the City to identify other offsite areas that would benefit from these trees.

[1] Maximum potential height assigned by species. When feasible during field assessment, arborists identified cultivars and varietals through observation and nursery tag information, if found.
[2] Trees rated as dead or dying based on visual field assessment by arborist field crews.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002594

1

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

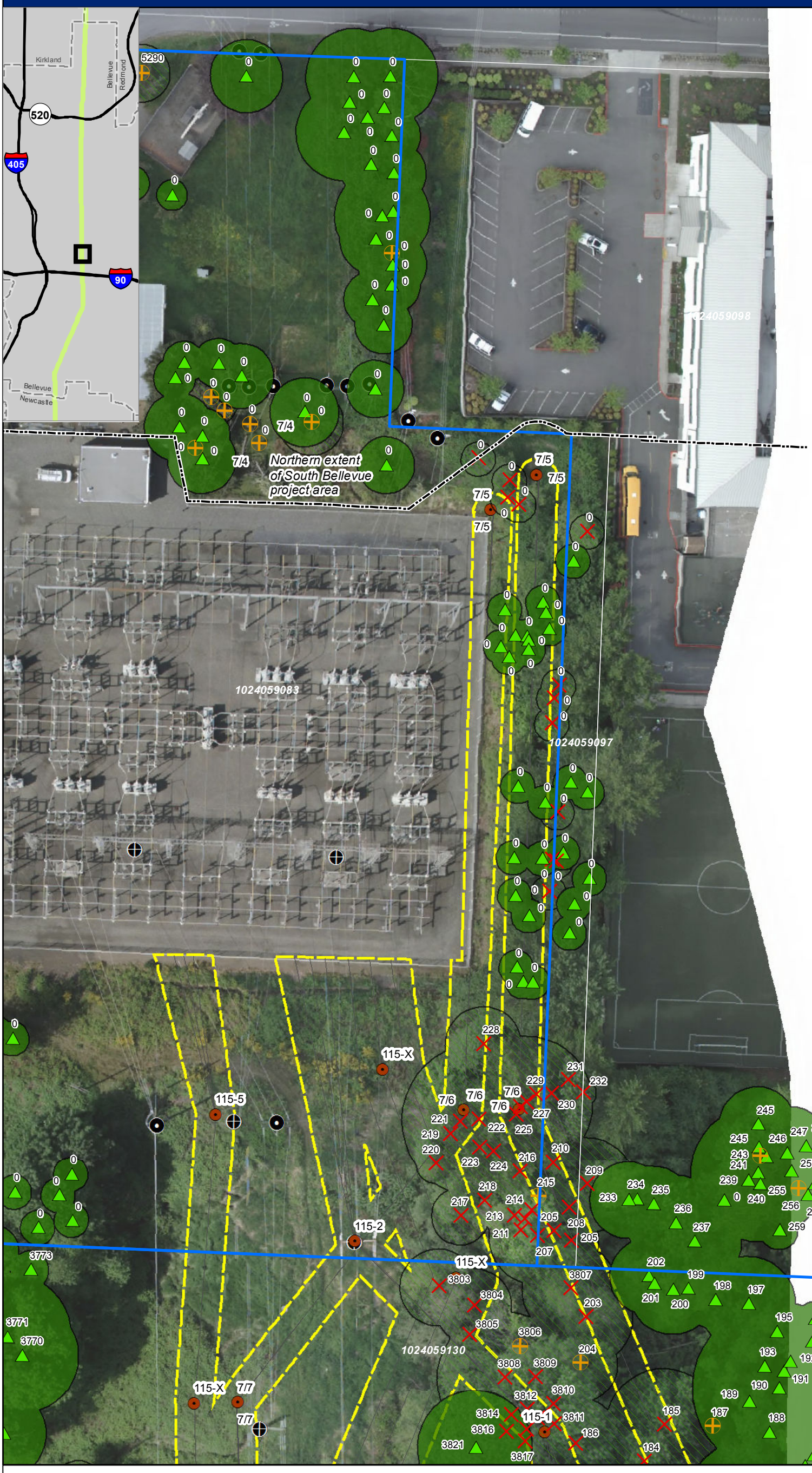
DSD 002595

2

0 20 40
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002596

3

0 20 40
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

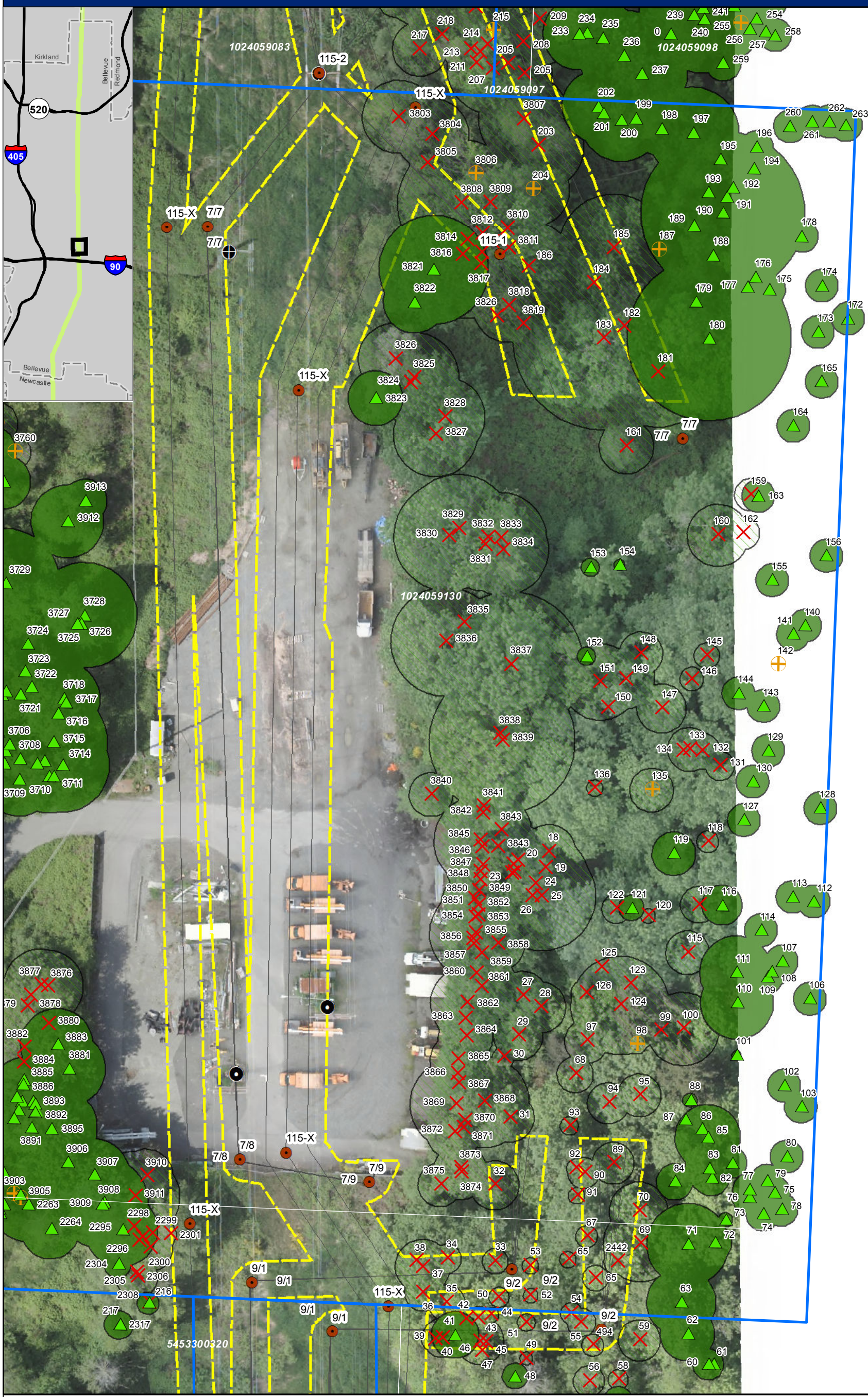
DSD 002597

4

0 20 40
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

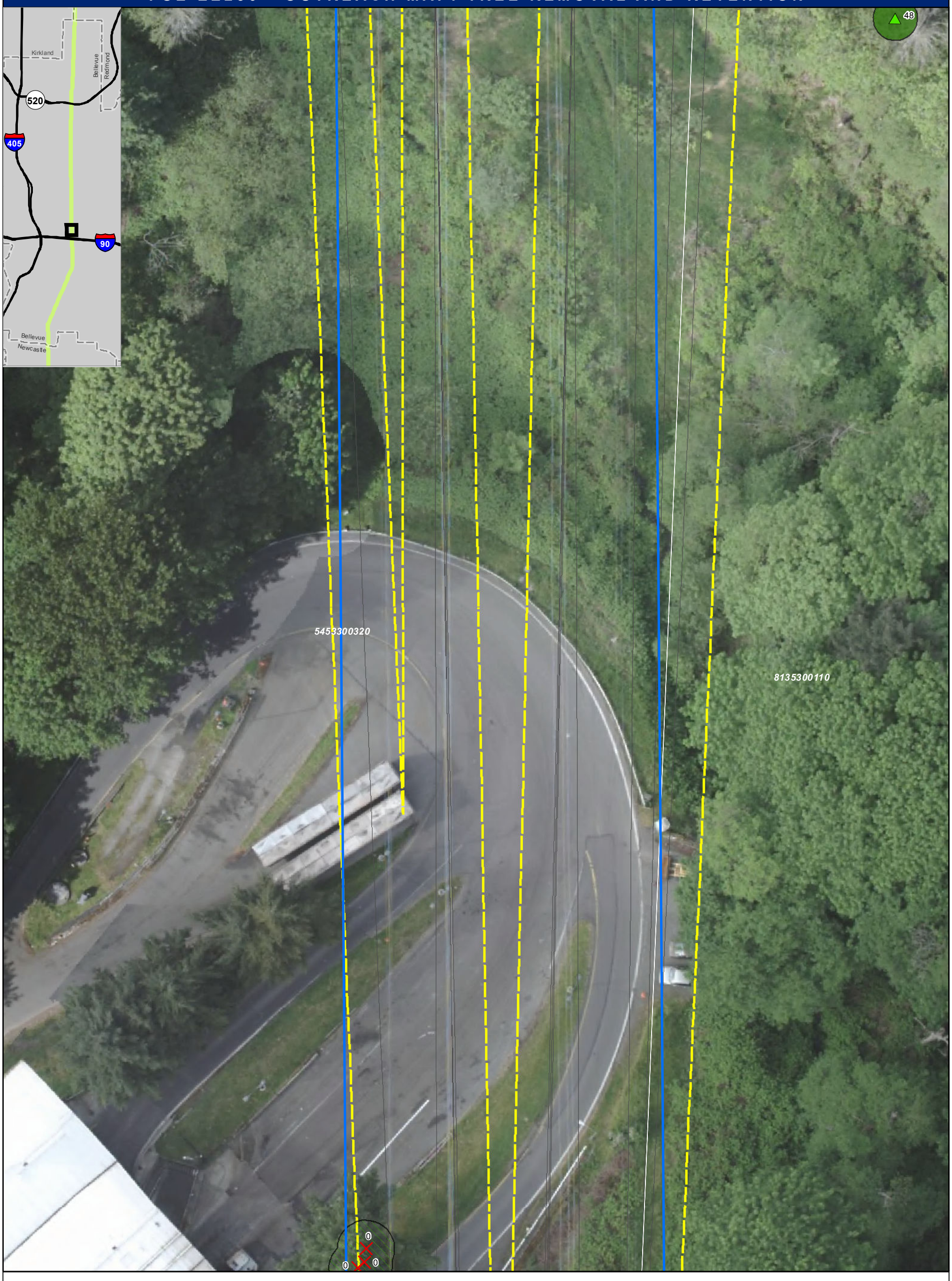
DSD 002598

5

0 20 40
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002599

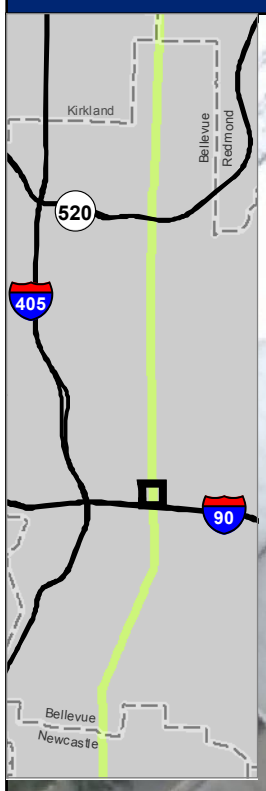
6

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



8135300110

0

5453300320

8/10
8/10
8/10
8/10

8135300020

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

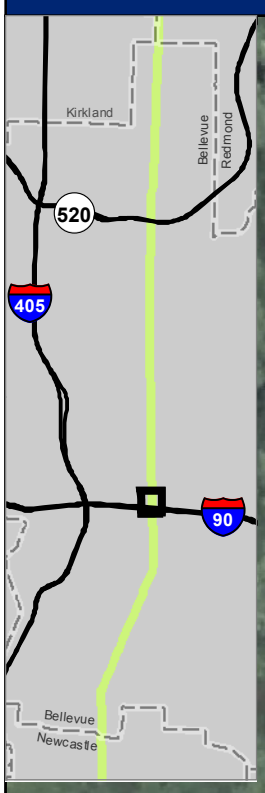
DSD 002600

7

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



5453300320

8135300020

1024059101

2590
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8/9
8/9
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2596

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002601

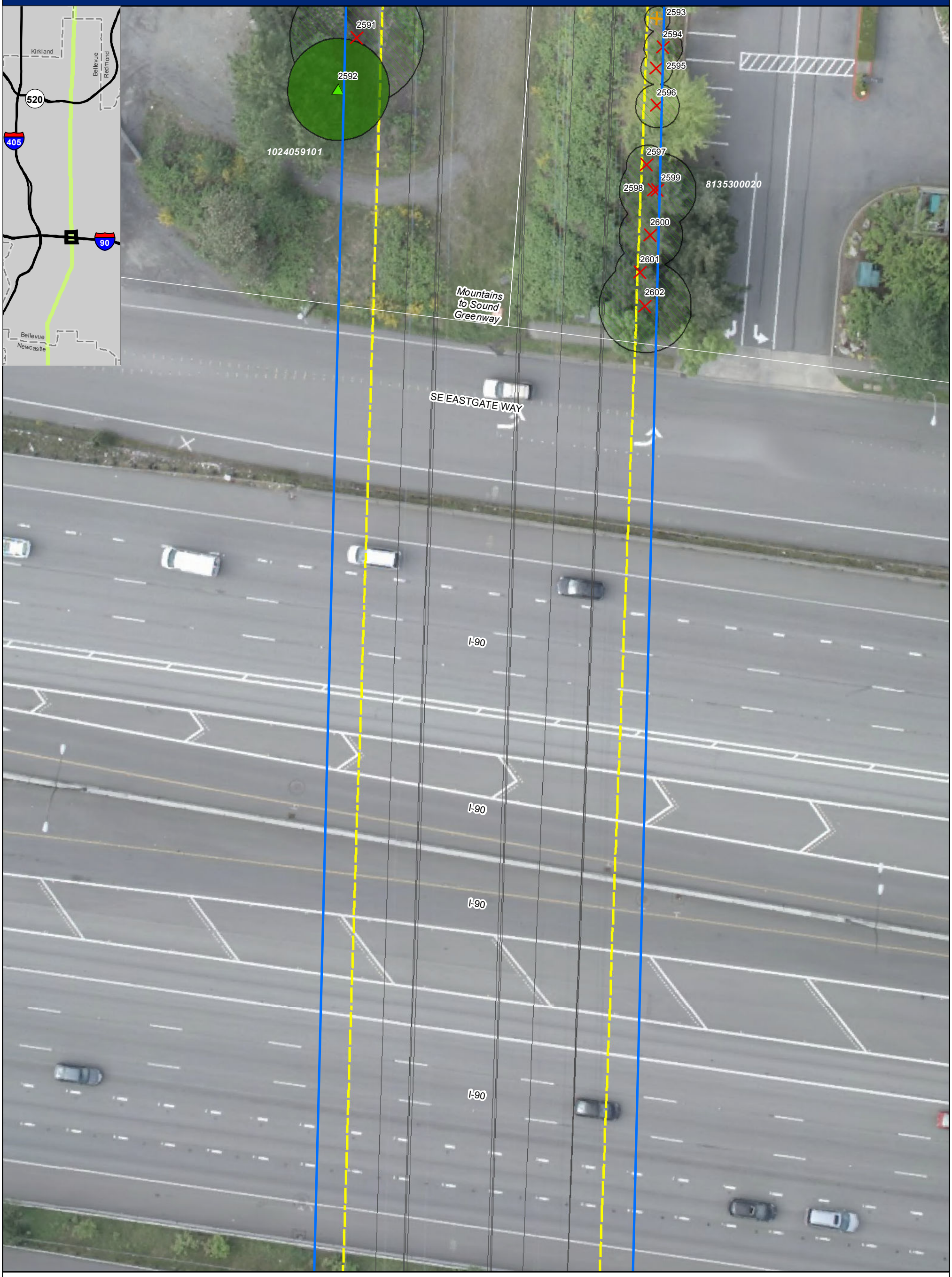
8

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

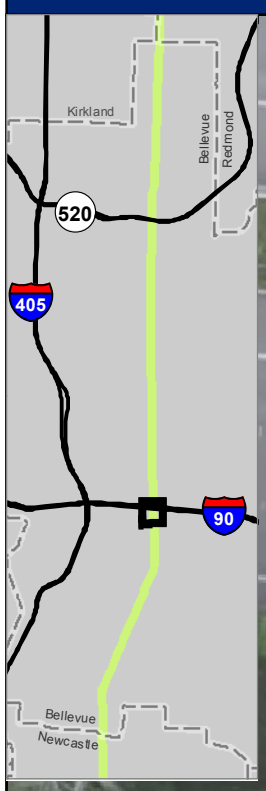
DSD 002602

9

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Mountains to Sound Greenway

SE 36TH ST

3927250020

1024059123

2490 2491 2492 2493 2494 2495 2496 2497 2498 2500 2501 2502 2504 2505 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2536

8/8

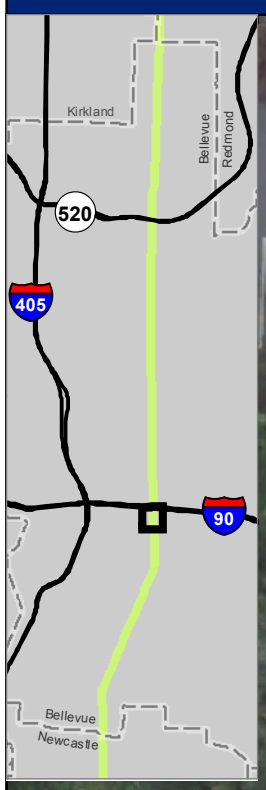
Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002603
10

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



2505
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1024059123
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2206500015
2206500020
2206500025
2540
2206500030
SE 37TH ST
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2549
2547
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2552
2206500220
2206500285
2206500280
2551
2550
2206500225
2553

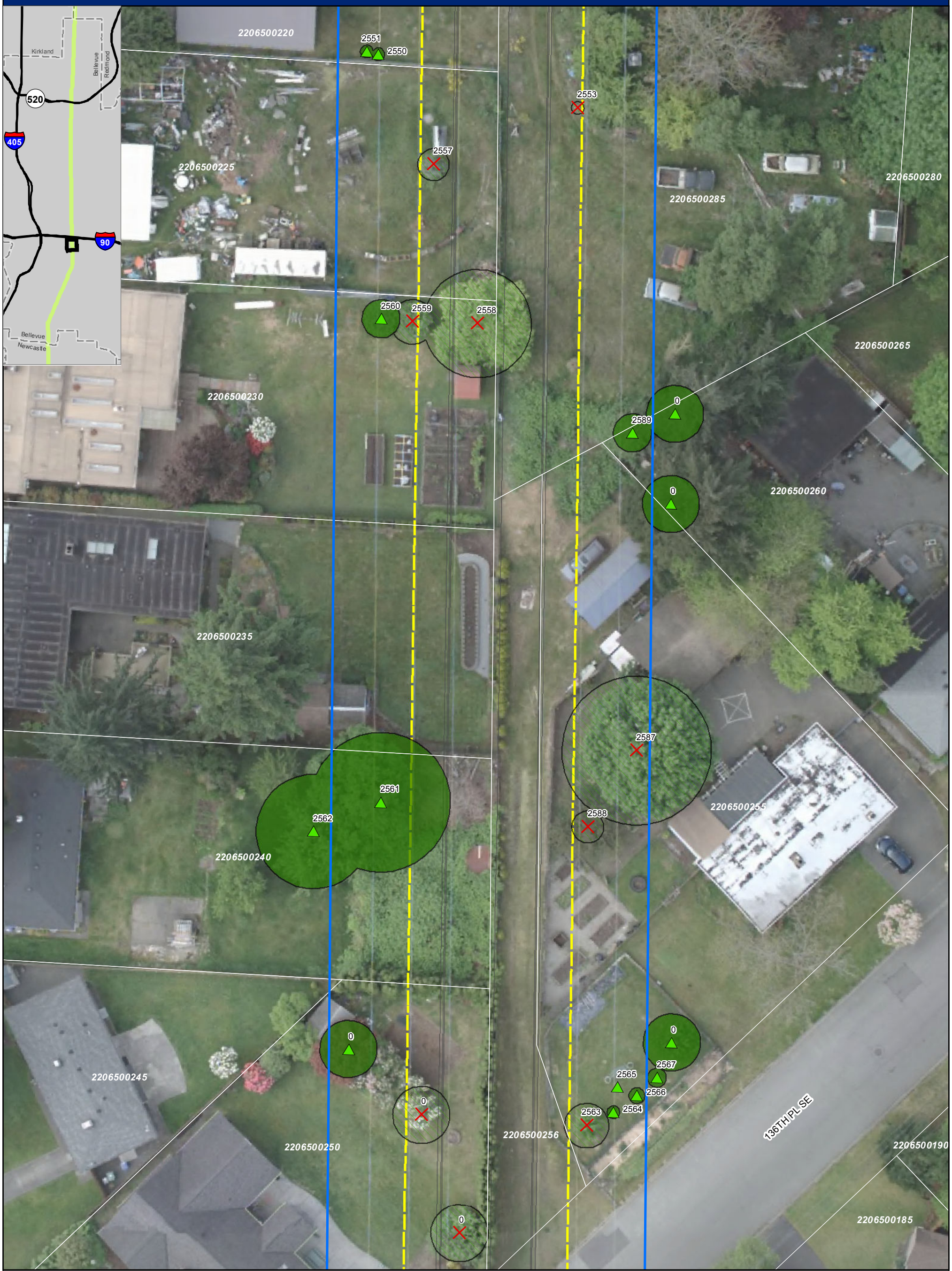
Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002604
11

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

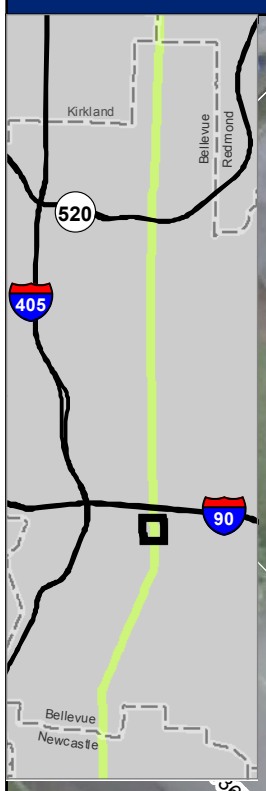
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002605
12

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



2206500255
2206500190
2206500256
2206500250
2206500185
136TH PL SE
36TH AVE SE
SE 38TH ST
2206500330
2206500375
2206500435
2206500380
2206500430
2206500385
2206500425

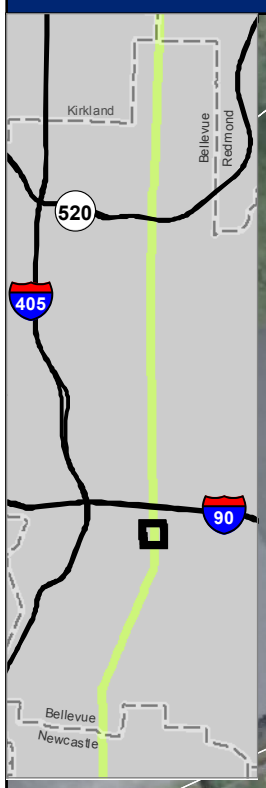
Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002606
13

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



2603 2604 2627 2628 2629 2630 2621 2622 2607 2606 2610 2608 2609 2611 2623 2620 2625 2624 2619 2612 2613 2537 2538 2617 2539 2536 2535 2531 2614 2615 2616 2534 2533 2532 2618 2643 2644 2642 2645 2646 2641 2647 2640 2651 2649 2648 2650 8/5 8/5

2206500425 2206500385 2206500390 2206500420 2206500395 2206500415 2206500400 2206500410 2206500405

SE 40TH ST

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

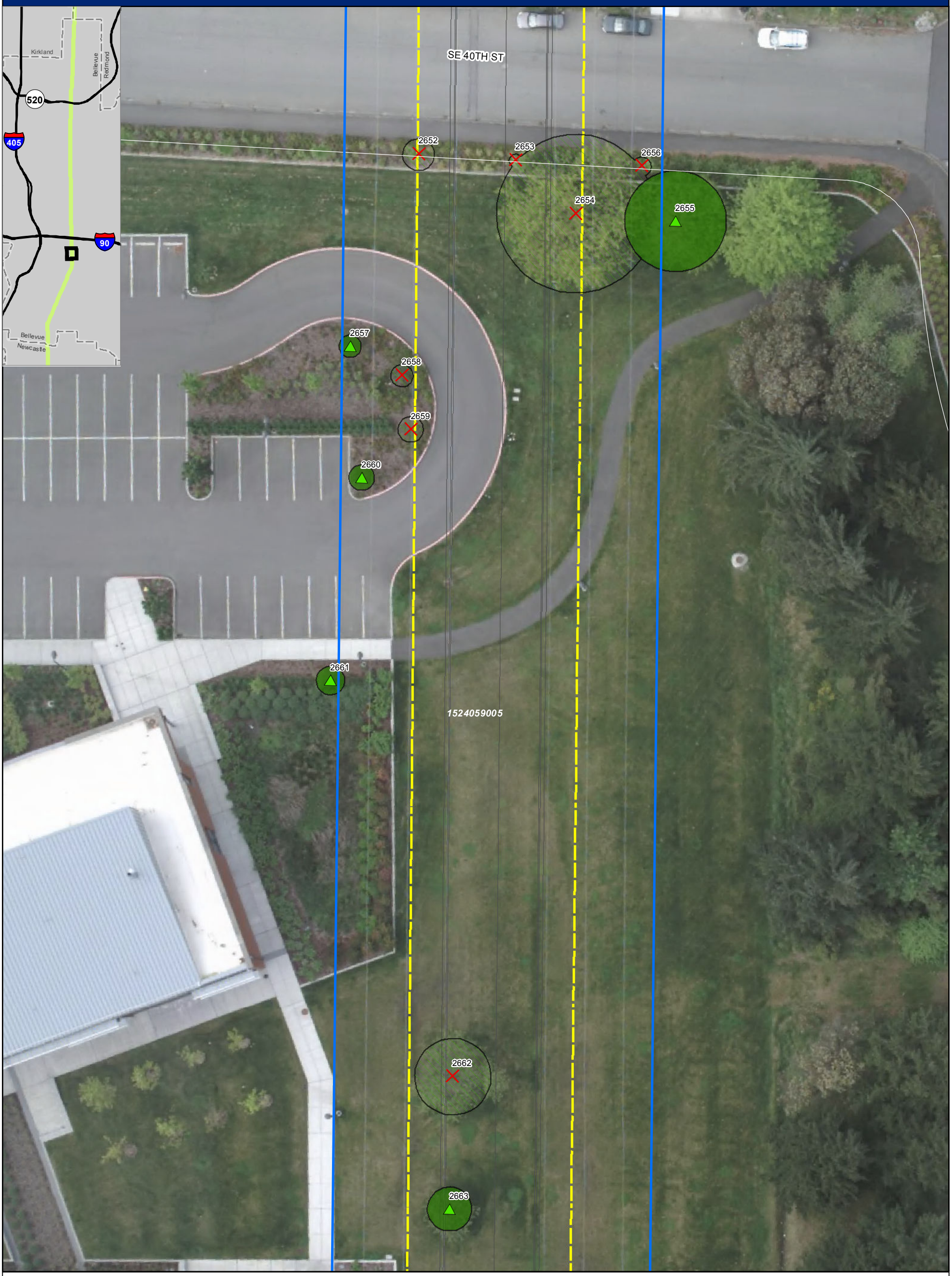
DSD 002607

14

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002608

15

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

2663
8/4
8/4
1524059005
2664
2665
2666
2668
2667
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2671
2672
2673
2674

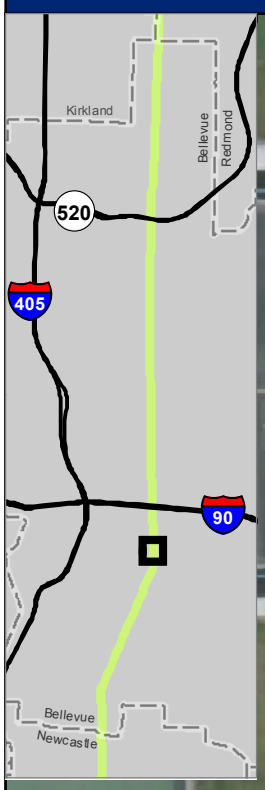
Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002609
16

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



1524059005
1524059080
1524059032
SE ALLEN RD

2712 2713 0 2675 2679 2676 2678 2677 2681 2680 2682 2684 2685 2683 8/3 8/3 8/3 2686 2687 2707 2709 2710 2711 2708 2705 2706 2702 2703 2719 2701 2718 2717 2716 0 2699 2698 2700 2697 2696 2695 2715 2714

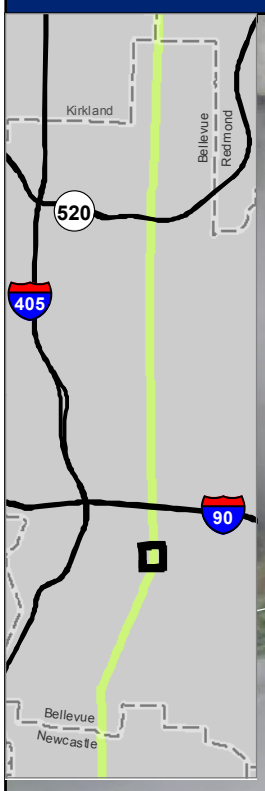
Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002610
17

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



1524059080
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1524059145
1524059141
7856640295
7856420080
7856640010
7855000640
7856420050
7856420040
7856640020
SE NEWPORT WAY
SE 42ND ST

2697 2696 2695 2715 2714 8506 2694 8505 8504 2693 8503 8502 2692 2691 2689 2688 2690 2726 2725 2724 2723 2722 2721 2720 0 0 2728 8000 2727
2743 2742
2744 2745
2817 2816 2819 2820 2818 2821 2822 2823 2832 2831 2824 2825 2830 2829 2827 2826 2834 2833
2754 0 2746 2747 2748 2749 2750 2751 2752 2753 2755 2756 2758 0 0 2767 2757 2760 2762

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002611
18

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002612

19

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002613
20

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

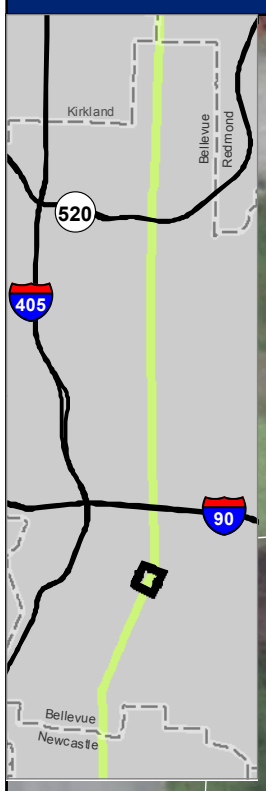
DSD 002614

21

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



2944 2946 2947 1524059142 2948 2950 2952 2951

7855000290

7856660230

7856660240

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7855000300

7856660250

2960 2962 2963

7855000310

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7/8 2964 2965 2967 2968 2971 2969 2970

7855000320

SE 44TH ST

7855000340

7855000325

2979 0 3021

2978 2977

7855000350

SOMERSET BLVD SE

7855000360

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

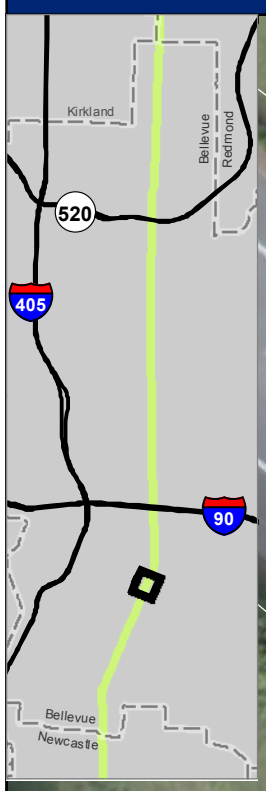
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002615
22

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



7855000325
7855000350
7855600760
7855000360
7855600770
7855000370
7855000380
7855801770

SE 44TH ST
SOMERSET BLVD SE
SOMERSET DR SE

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Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002616
23

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

7855801770
7855800010
7855800020
7855800030
7856410010
7856410440
SOMERSET PLSE
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0

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002617
24

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

7855800020 7855801770 7856410440 7855800030 7855800040 7855800050 7856410010 7856410020 7855800060 7855800070 7856410030 SOMERSET PLSE

3085 3086 3087 3088 3084 3090 3090 3095 3098 3092 3089 3091 3094 3110 3111 3093 3112 3097 3096 3108 3109 3115 3116 3113 3114 3117 3107 3105 3105 3101 3103 3118 3102 3099 3100 3133 3132 3134 3130 3029 3135 3127 3128 3131 3126 3124 3125 3123 3120 3119 3122 3121 0 2993 2992 2991 2990 2995 2994 2989 2984 2988 2986 2983 2987 2981 2985 2982 2980 7/6 7/6 7/6 7/6 3056 0 0 3057 3055 3058 3060 3059 3061 3062 3063 0 3064 3065 3066 3067 3068 3069 3070 3076 3075 3074 3073 3072 3071 3070

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002618
25
0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

7855800070
7855800080
7855800090
7855800100
7855800110
7855800120
7855800060
7856410030
7856410040
7856410050
7856410060
7856410070

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7/6
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3144
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3141
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3148
3151
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3150
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3211
3208
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3207
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3210
3205
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3203
3199
3201
3200
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3202
3153
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0
3155

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002619
26

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

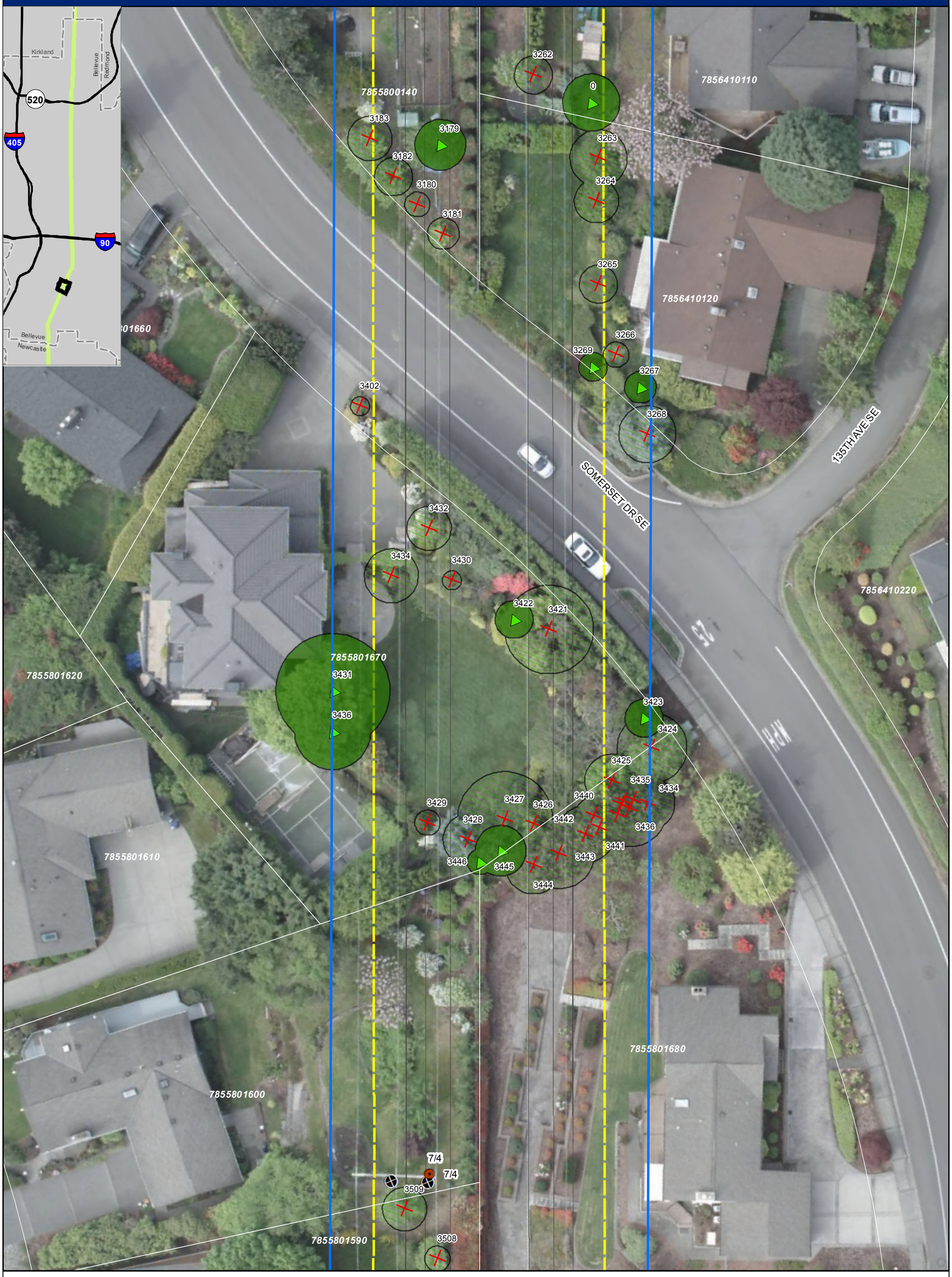
DSD 002620

27

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

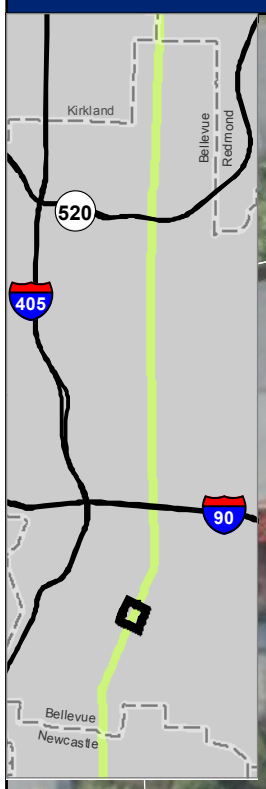
DSD 002621

28

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



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7/4 7/4 7/4 7/4 0 3509 3508 3507 3504 3505 3506 3503 3515 3510 3516 3512 3525 3524 3523 3521 3518 3517 3522 3520 3526 3527 3543 3544 3528 3542 3529 3541 3540 3539 3536 3530 3534 3532 3535 3531 3538 3537 3555 3533 3556 3546 3475 3471 3470 3553 3547 3472 3554 3473 3548 3474 3549 3476 3550 3545 3477 3551 3552 3478 3487 3479 3564 3563 3562 3480 3484 3481 3486 3565 3483 3566 3561 3570 3569 3488 3449 3450 3451

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002622
29

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

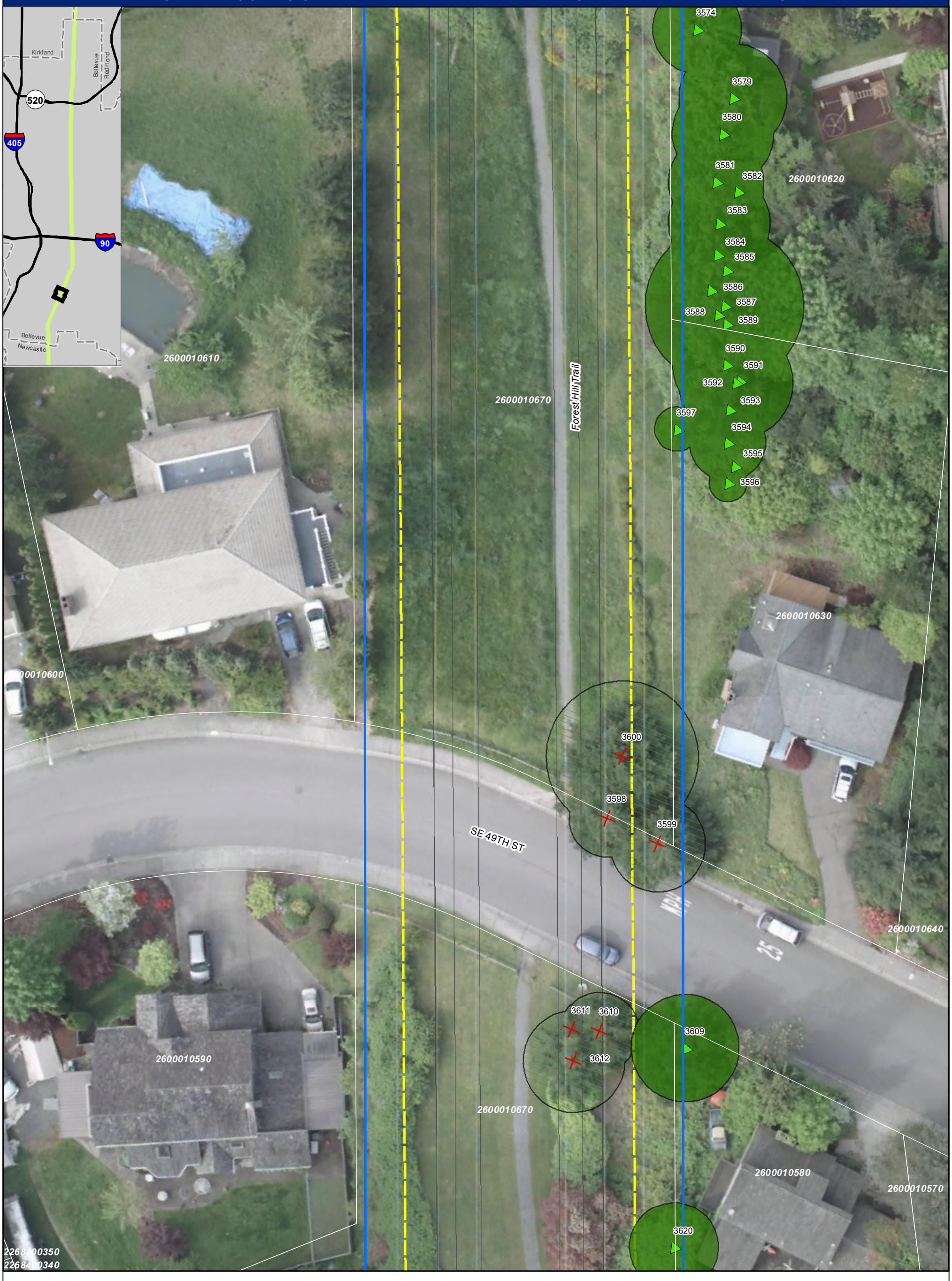
DSD 002623

30

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

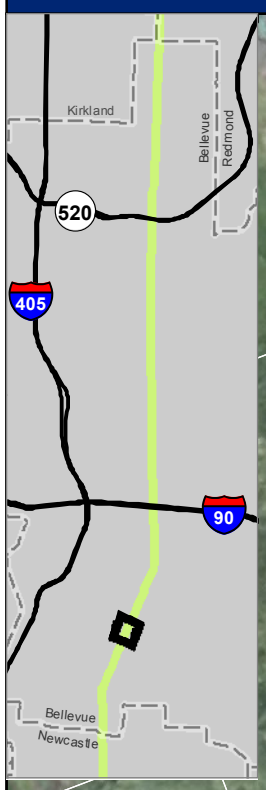
DSD 002624

31

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



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2600010670
2268400330
2268400320
2268400310
2268400300
2268400290

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Foresthill Neighborhood Trail
Forest Hill Trail

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002625
32

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002626

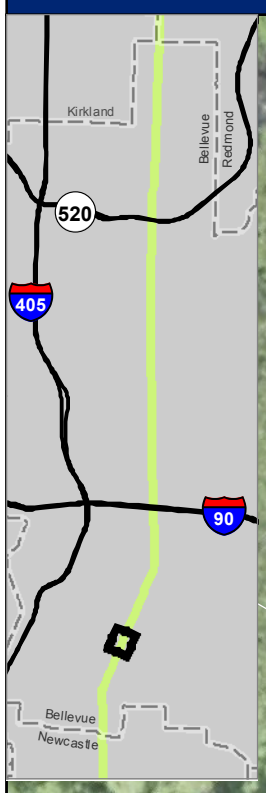
33

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



2600010430
2268400270
2268400280
2600010420
Foresthill Neighborhood Trail
FOREST DR SE
2124059052
2124059071
2124059001

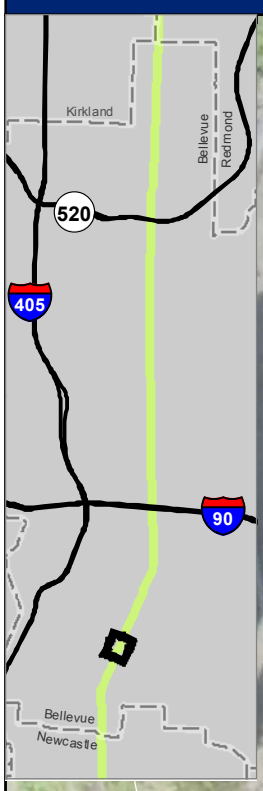
Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002627
34

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



2124059052

2124059071

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2124059001

Foresthill Neighborhood Trail

COAL CREEK PKWY SE

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

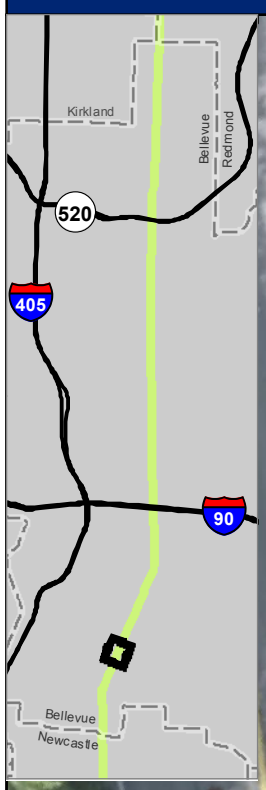
DSD 002628

35

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



2124059052

COAL CREEK PKWY SE

2124059001

Foresthill Neighborhood Trail

2124059001

0

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002629

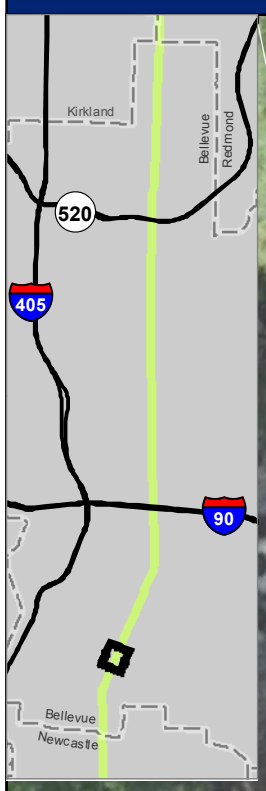
36

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Foresthill Neighborhood Trail

COAL CREEK PKWY SE

2124059001

2124059001

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3797
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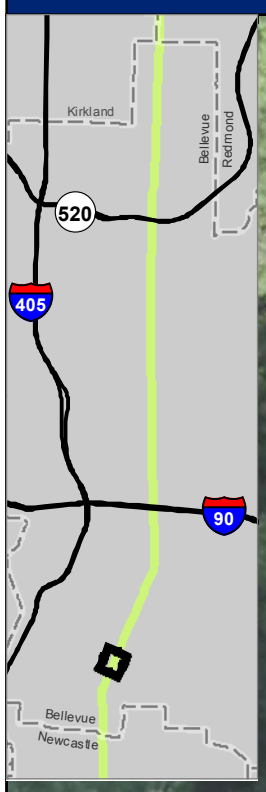
Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002630
37

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



213
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224
2124059001
COAL CREEK PKWY SE

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002631
38

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

2124059001

COAL CREEK PKWY SE

224 225 226 227 228 229 230 218 232 249 233 237 0 236 238 248 0 247 240 242 239 241 243 219 244 245 246 251

6/6
6/6

252 253

2124059001

254

Lower Coal Creek Trail

255

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

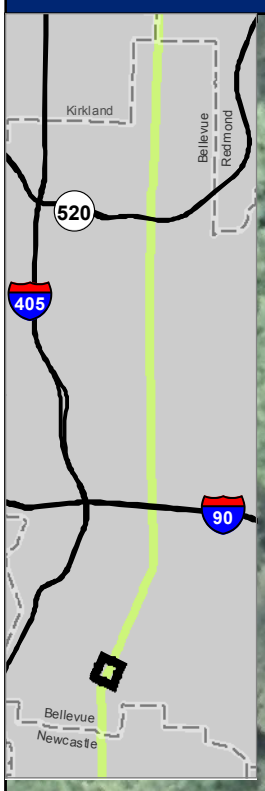
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002632
39

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



255

Lower Coal Creek Trail

2124059001

6071900240

6071900230

6071900220

6071900210

6/5

6/5

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002633

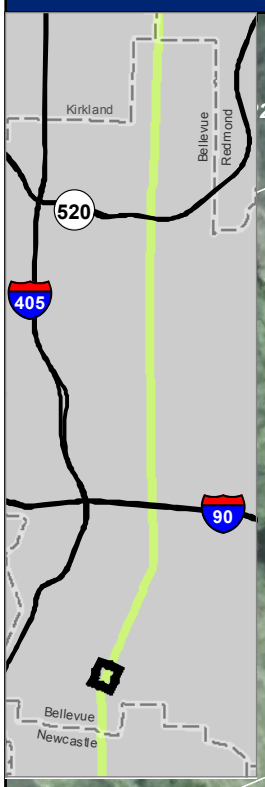
40

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



6071900210

6071900200

6071900190

6071900180

6071900170

2124059001

257

258

259

308

309

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002634

41

0 10 20

Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

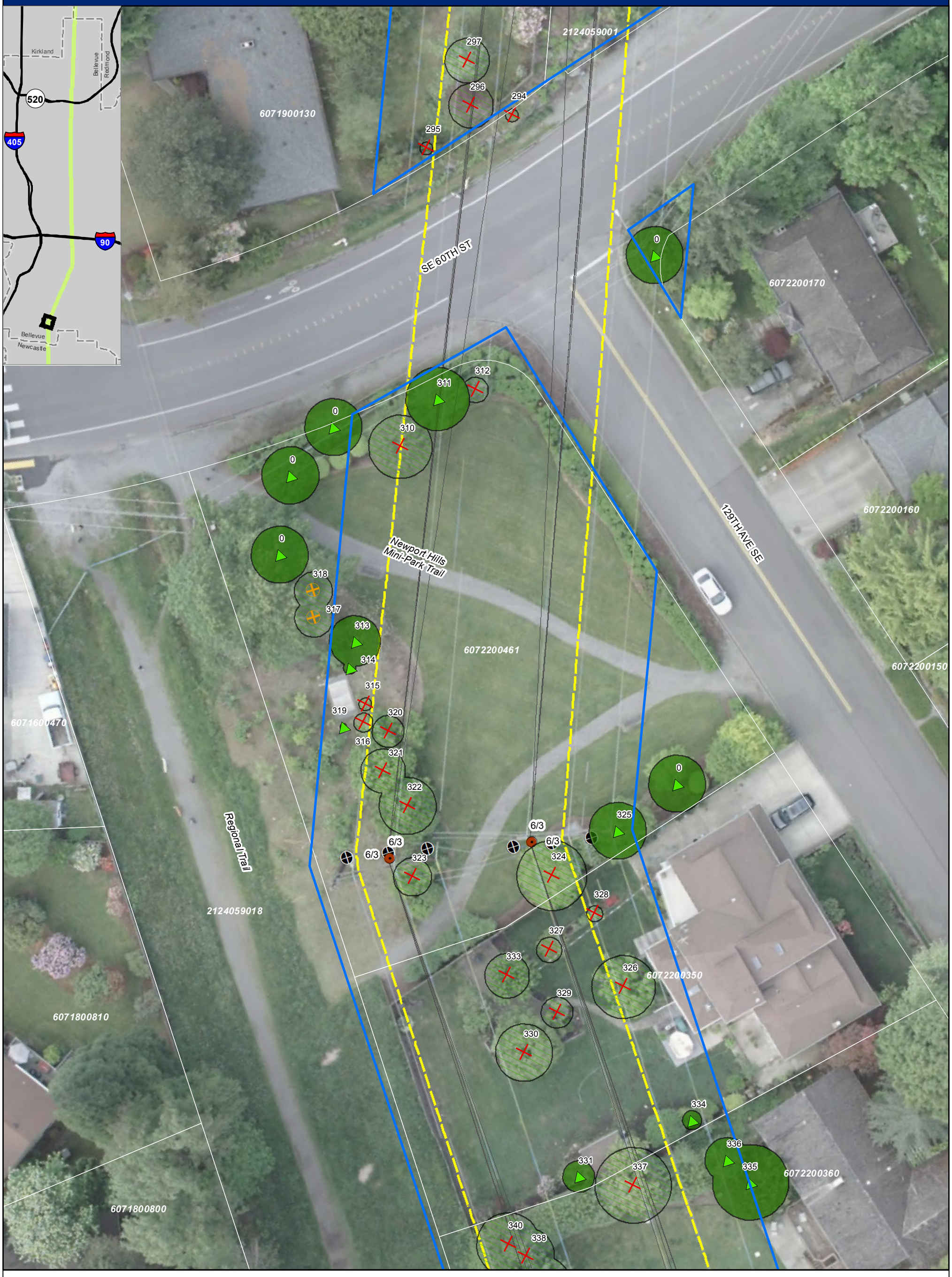
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002635
42

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

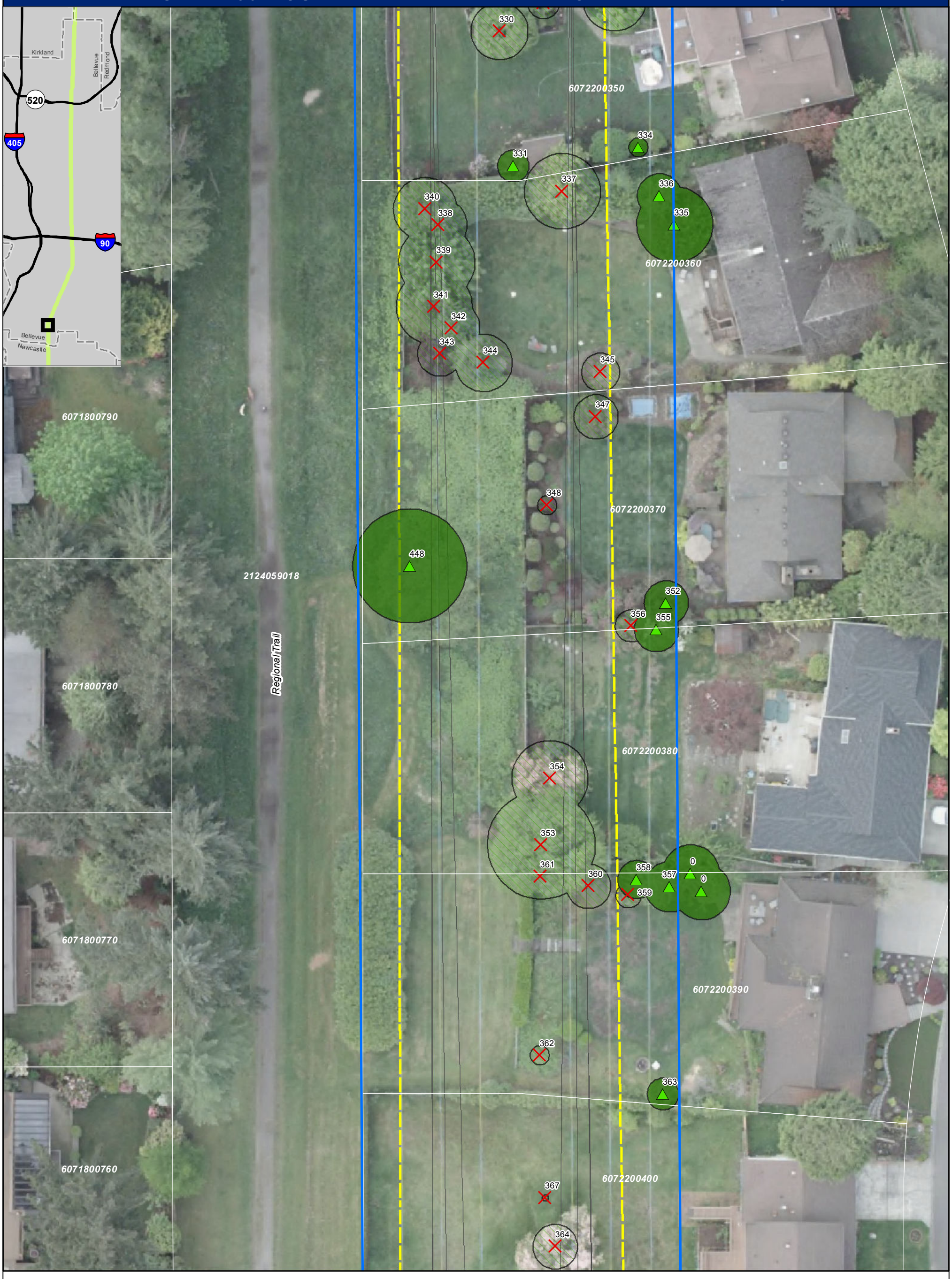
DSD 002636

43

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

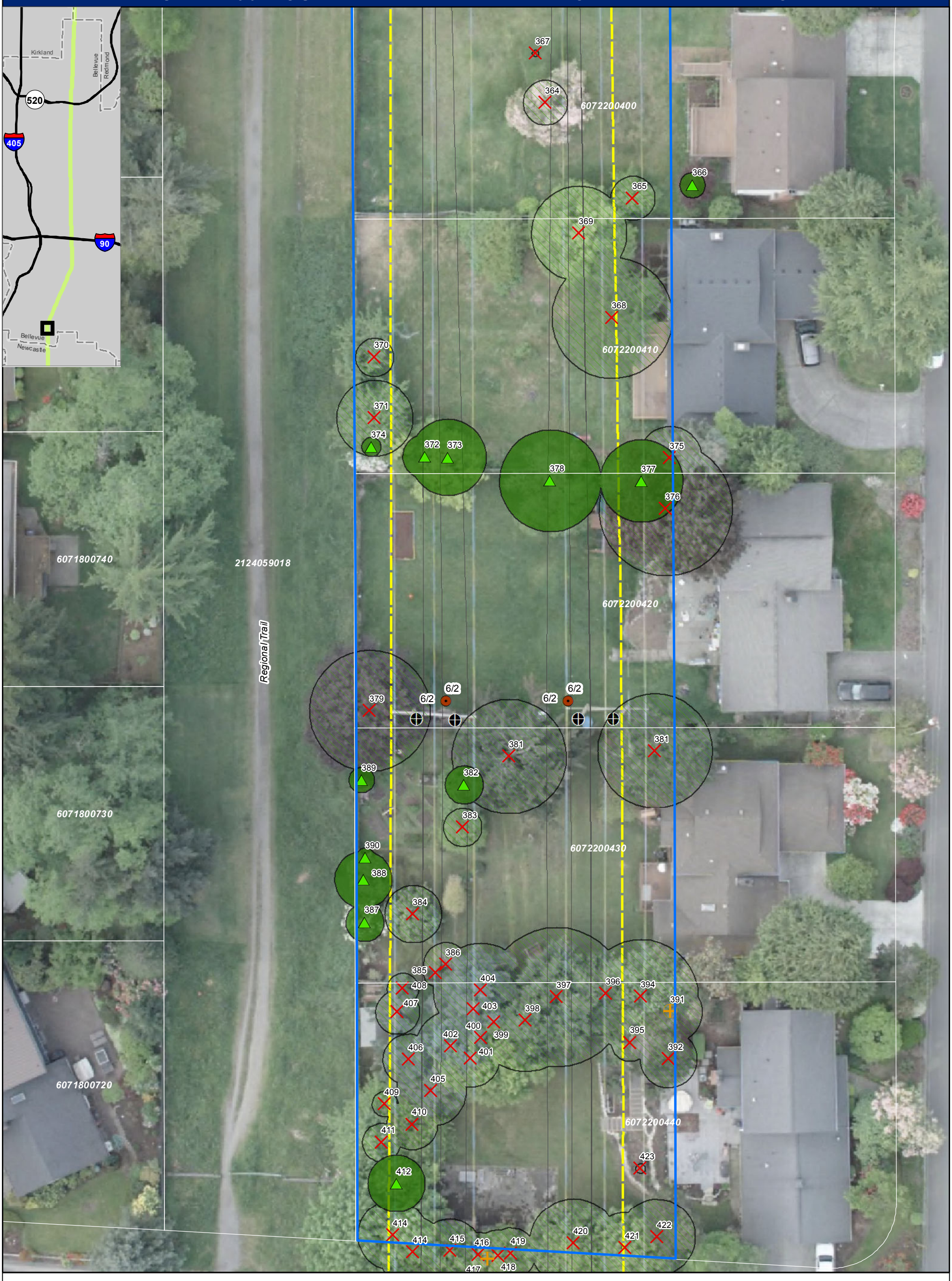
DSD 002637

44

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

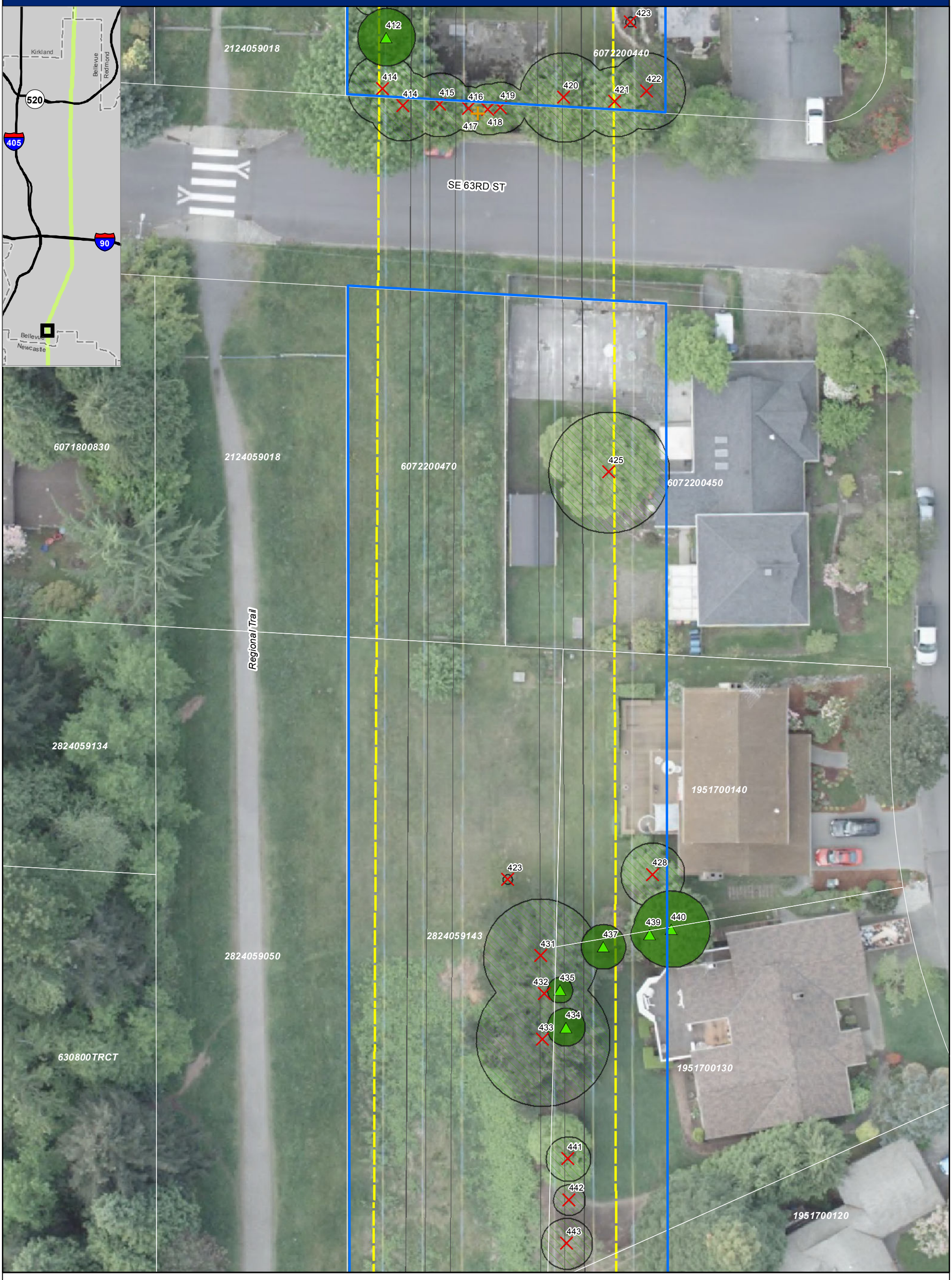
DSD 002638

45

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002639

46

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

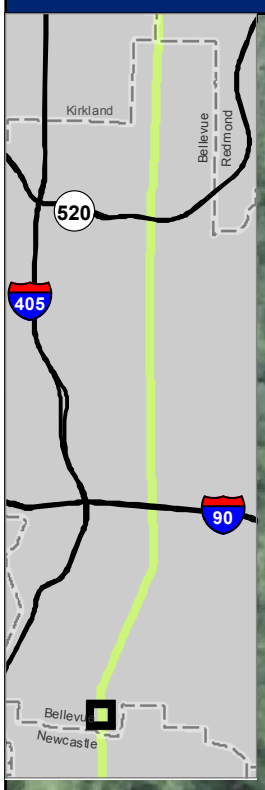
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002640
47

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



488 487 486 485 484 483 482 481 480 479 478 477 472 473 474 475 476 464 463 462 459 460 461 2824059123 1951700800 509 508 513 507 510 512 511 506 514 1951700790 528 529 527 526 525 524 1951700780 2824059050 630800TRCT Regional Trail 523 522 521 516 531 519 520 530 517 518 515 534 538 537 539 536 535 533 532 541 6308000370 1951700760 542 543 0 1951700750 1951700770

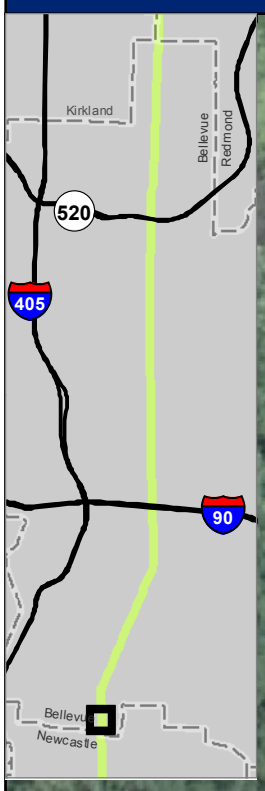
Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002641
48

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



630800TRCT

1951700760 542 543 0 1951700750 545 544 546 0 0 548 547 549 550 551 552 5/9 5/9 596 597 594 593 595 598 592 591 555 553 557 554 558 556 560 559 563 561 562 564 565 566 576 572 571 567 570 590 589 587 573 585 586 583 584 582 574 575 578 581 580 579 577 0 0 0 0 568

Regional Trail

1951700740 1951700730 1951810080 1951810090 1951810100

6308000370 2824059050 6308000190 6308000180 6308000170

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*
Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]
Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002642
49

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

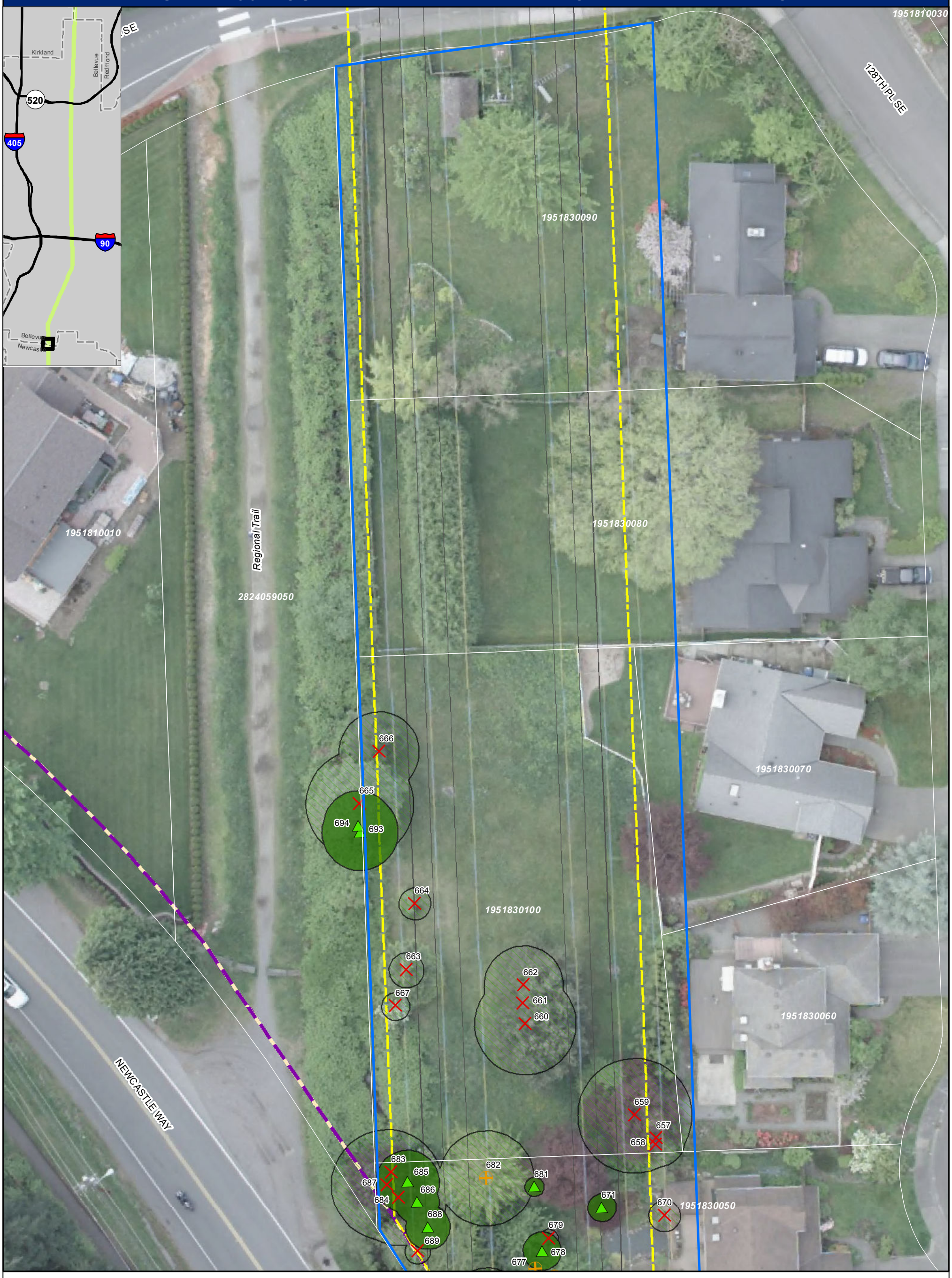
DSD 002643

50

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION



Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002644

51

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

PSE EE230 - OUTREACH MAP: TREE REMOVAL AND RETENTION

Existing Easement Boundary[PSE]
City Limit[KC]
Parcel Boundary[COB] - *white outline*

Wire Zone[PSE]
Wires [PSE]
Existing Poles to Remain[PSE]
Existing Poles to be Removed[PSE]
Proposed Pole Footprints[PSE]

Trees to Retain[TWC]
Trees to Remove[TWC]
Dead / Dying Trees[TWC]
Canopy to be Removed[TWC]
Canopy to Remain[TWC]

DSD 002645

52

0 10 20
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), and King County (KC). Aerial imagery from PSE, 2011.

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
1	5194	2124059001	Pseudotsuga menziesii	Douglas-fir	11.0					3 - Fair	Retain
2	5195	2124059001	Pseudotsuga menziesii	Douglas-fir	9.1					3 - Fair	Retain
3	5196	2124059001	Pseudotsuga menziesii	Douglas-fir	10.2					3 - Fair	Retain
4	5193	2124059001	Pseudotsuga menziesii	Douglas-fir	14.5					4 - Poor	Retain
5	5188	2124059018	Acer macrophyllum	Bigleaf maple	9.8	3.1	3.1			3 - Fair	Retain
6	5189	2124059018	Pseudotsuga menziesii	Douglas-fir	28.8					3 - Fair	Retain
7	5190	2124059018	Pseudotsuga menziesii	Douglas-fir	8.0					4 - Poor	Retain
8	5191	2124059001	Acer macrophyllum	Bigleaf maple	22.5	19.1				3 - Fair	Retain
9	5192	2124059001	Pseudotsuga menziesii	Douglas-fir	28.2					3 - Fair	Retain
10	0	1024059083	Fagus sylvatica 'purpurea'	European beech (purple)	27.3					3 - Fair	Retain
11	0	1024059083	Pinus contorta	Shore pine	10.0					3 - Fair	Retain
12	0	1024059083	Fagus sylvatica 'purpurea'	European beech (purple)	27.0					3 - Fair	Retain
13	0	1024059083	Fagus sylvatica 'purpurea'	European beech (purple)	28.0					3 - Fair	Retain
14	0	1024059083	Pinus nigra	Austrian pine	20.0					4 - Poor	Retain
15	0	1024059083	Pinus nigra	Austrian pine	27.0					4 - Poor	Retain
16	0	1024059083	Pinus nigra	Austrian pine	15.0					4 - Poor	Retain
17	0	1024059083	Pinus nigra	Austrian pine	14.0					4 - Poor	Retain
18	0	1024059083	Pinus nigra	Austrian pine	10.0					4 - Poor	Retain
19	0	1024059083	Pinus nigra	Austrian pine	23.0					4 - Poor	Retain
20	0	1024059083	Pinus nigra	Austrian pine	17.0					4 - Poor	Retain
21	0	1024059083	Pinus nigra	Austrian pine	12.0					4 - Poor	Retain
22	0	1024059083	Pinus nigra	Austrian pine	18.0					4 - Poor	Retain
23	0	1024059083	Pinus nigra	Austrian pine	16.0					4 - Poor	Retain
24	0	1024059083	Pinus nigra	Austrian pine	12.0					4 - Poor	Retain
25	0	1024059083	Pinus nigra	Austrian pine	13.0					4 - Poor	Retain
26	0	1024059083	Pinus nigra	Austrian pine	14.0					4 - Poor	Retain
27	0	1024059083	Pinus nigra	Austrian pine	18.0					4 - Poor	Retain
28	0	1024059083	Pinus nigra	Austrian pine	19.0					4 - Poor	Retain
29	0	1024059083	Betula pendula	European white birch	11.0					4 - Poor	Retain
30	0	1024059083	Pinus nigra	Austrian pine	20.7					4 - Poor	Retain
31	0	1024059083	Betula pendula	European white birch	9.5					4 - Poor	Retain
32	0	1024059083	Betula pendula	European white birch	10.0					4 - Poor	Retain
33	0	1024059083	Pinus nigra	Austrian pine	24.0					4 - Poor	Retain
34	0	1024059083	Pinus nigra	Austrian pine	22.0					4 - Poor	Retain
35	0	1024059083	Pinus nigra	Austrian pine	14.0					4 - Poor	Retain
36	0	1024059083	Pinus nigra	Austrian pine	20.5					4 - Poor	Retain
37	0	1024059083	Pinus nigra	Austrian pine	17.0					4 - Poor	Retain
38	219	2124059001	Acer platanoides	Norway maple	12.0					3 - Fair	Remove
39	1769	0672100160	Pinus sylvestris	Scots pine	19.1					3 - Fair	Retain
40	1770	0672100160	Robinia pseudoacacia	Black locust	12.5					3 - Fair	Retain
41	3776	1024059130	Alnus rubra	Red alder	9.7					3 - Fair	Retain
42	3777	1024059130	Alnus rubra	Red alder	9.7	8.2				3 - Fair	Retain
43	3778	1024059130	Alnus rubra	Red alder	9.0	8.2				3 - Fair	Retain
44	3779	1024059130	Alnus rubra	Red alder	10.0	8	8	6	6	3 - Fair	Retain
45	3772	1024059130	Salix scouleriana	Scouler's willow	15.5					3 - Fair	Retain
46	3775	1024059130	Alnus rubra	Red alder	10.5					3 - Fair	Retain
47	3774	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
48	3771	1024059130	Acer macrophyllum	Bigleaf maple	31.0					3 - Fair	Retain
49	3772	1024059130	Salix scouleriana	Scouler's willow	15.5					3 - Fair	Retain
50	3914	1024059130	Alnus rubra	Red alder	9.0					2 - Good	Retain
51	218	2124059001	Acer platanoides	Norway maple	9.5					3 - Fair	Remove
52	242	1024059130	Populus balsamifera	Black cottonwood	20.3	0				3 - Fair	Retain
53	246	1024059130	Populus balsamifera	Black cottonwood	22.0	0				3 - Fair	Retain
54	3807	1024059130	Alnus rubra	Red alder	12.0	8				3 - Fair	Remove
55	3770	1024059130	Acer macrophyllum	Bigleaf maple	40.0	15	15			3 - Fair	Retain
56	3805	1024059130	Salix lasiandra	Pacific willow	18.0					4 - Poor	Remove
57	3803	1024059130	Alnus rubra	Red alder	8.4	8.2				4 - Poor	Remove
58	3804	1024059130	Salix lasiandra	Pacific willow	13.0					3 - Fair	Remove
59	3808	1024059130	Acer macrophyllum	Bigleaf maple	23.0	14	8			3 - Fair	Remove
60	3809	1024059130	Acer macrophyllum	Bigleaf maple	13.5	13.5				3 - Fair	Remove
61	3812	1024059130	Acer macrophyllum	Bigleaf maple	27.0					3 - Fair	Remove
62	3814	1024059130	Acer macrophyllum	Bigleaf maple	24.0	20	12.8	12		3 - Fair	Remove
63	3816	1024059130	Acer macrophyllum	Bigleaf maple	22.0	20	20	20	20	3 - Fair	Remove
64	3821	1024059130	Salix lasiandra	Pacific willow	9.0					4 - Poor	Retain
65	3810	1024059130	Acer macrophyllum	Bigleaf maple	15.0					3 - Fair	Remove
66	3813	1024059130	Acer macrophyllum	Bigleaf maple	17.3					3 - Fair	Remove
67	3811	1024059130	Acer macrophyllum	Bigleaf maple	21.0					3 - Fair	Remove
68	3817	1024059130	Thuja plicata	Western red cedar	24.0					3 - Fair	Remove
69	3818	1024059130	Thuja plicata	Western red cedar	32.4					3 - Fair	Remove
70	3826	1024059130	Thuja plicata	Western red cedar	8.7	5				3 - Fair	Remove
71	3819	1024059130	Thuja plicata	Western red cedar	9.0					3 - Fair	Remove
72	3826	1024059130	Malus domestica	Apple	11.0					3 - Fair	Remove
73	3747	1024059130	Alnus rubra	Red alder	11.7					3 - Fair	Retain

Field inventory completed on October 13, 2016, and includes trees that may have been removed by others since that time.

DSD 002646

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
74	3748	1024059130	Alnus rubra	Red alder	14.7					4 - Poor	Retain
75	3757	1024059130	Alnus rubra	Red alder	29.7					4 - Poor	Retain
76	3764	1024059130	Acer macrophyllum	Bigleaf maple	16.0					4 - Poor	Retain
77	3763	1024059130	Acer macrophyllum	Bigleaf maple	23.0					4 - Poor	Retain
78	3767	1024059130	Acer macrophyllum	Bigleaf maple	24.0					3 - Fair	Retain
79	3769	1024059130	Acer macrophyllum	Bigleaf maple	24.0	15	15			4 - Poor	Retain
80	3768	1024059130	Acer macrophyllum	Bigleaf maple	15.0					4 - Poor	Retain
81	3753	1024059130	Alnus rubra	Red alder	16.0	9	8			3 - Fair	Retain
82	3754	1024059130	Alnus rubra	Red alder	13.0	11	9			4 - Poor	Retain
83	3755	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
84	3756	1024059130	Alnus rubra	Red alder	20.0					4 - Poor	Retain
85	3752	1024059130	Alnus rubra	Red alder	10.0	5				4 - Poor	Retain
86	3751	1024059130	Alnus rubra	Red alder	10.6					3 - Fair	Retain
87	3750	1024059130	Alnus rubra	Red alder	11.6					4 - Poor	Retain
88	3749	1024059130	Alnus rubra	Red alder	8.0					4 - Poor	Retain
89	3730	1024059130	Alnus rubra	Red alder	24.0					4 - Poor	Retain
90	3729	1024059130	Alnus rubra	Red alder	22.0					4 - Poor	Retain
91	3759	1024059130	Alnus rubra	Red alder	16.5					4 - Poor	Retain
92	3758	1024059130	Alnus rubra	Red alder	16.5					4 - Poor	Retain
93	3746	1024059130	Alnus rubra	Red alder	12.0	12	10	9	8	4 - Poor	Retain
94	3745	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
95	3743	1024059130	Alnus rubra	Red alder	18.0	10	10			4 - Poor	Retain
96	3742	1024059130	Salix sitchensis	Sitka willow	10.0					3 - Fair	Retain
97	3741	1024059130	Alnus rubra	Red alder	20.0	9				4 - Poor	Retain
98	3740	1024059130	Acer macrophyllum	Bigleaf maple	12.0	12	11			3 - Fair	Retain
99	3738	1024059130	Acer macrophyllum	Bigleaf maple	18.0	18	11			3 - Fair	Retain
100	3737	1024059130	Alnus rubra	Red alder	11.5					3 - Fair	Retain
101	3739	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
102	3731	1024059130	Acer macrophyllum	Bigleaf maple	26.0	14				4 - Poor	Retain
103	3735	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
104	3734	1024059130	Alnus rubra	Red alder	11.0					4 - Poor	Retain
105	3698	1024059130	Acer macrophyllum	Bigleaf maple	16.5	15	10	8	8	3 - Fair	Retain
106	3732	1024059130	Alnus rubra	Red alder	13.0					4 - Poor	Retain
107	161	7856420060	Pseudotsuga menziesii	Douglas-fir	11.3					3 - Fair	Remove
108	3825	1024059130	Crataegus monogyna	Common hawthorn	9.0					3 - Fair	Remove
109	3823	1024059130	Prunus emarginata	Bitter cherry	9.2					4 - Poor	Retain
110	3827	1024059130	Acer macrophyllum	Bigleaf maple	20.5					4 - Poor	Remove
111	3828	1024059130	Acer macrophyllum	Bigleaf maple	18.0	16	14	12	12	3 - Fair	Remove
112	3834	1024059130	Acer macrophyllum	Bigleaf maple	20.0	15				4 - Poor	Remove
113	3833	1024059130	Acer macrophyllum	Bigleaf maple	24.0	10				3 - Fair	Remove
114	3832	1024059130	Acer macrophyllum	Bigleaf maple	22.0					4 - Poor	Remove
115	3831	1024059130	Acer macrophyllum	Bigleaf maple	24.0	9				4 - Poor	Remove
116	3830	1024059130	Acer macrophyllum	Bigleaf maple	15.0	13	12	12	10	4 - Poor	Remove
117	3829	1024059130	Acer macrophyllum	Bigleaf maple	17.5					3 - Fair	Remove
118	3719	1024059130	Alnus rubra	Red alder	13.0					3 - Fair	Retain
119	3720	1024059130	Alnus rubra	Red alder	13.0					3 - Fair	Retain
120	3721	1024059130	Alnus rubra	Red alder	10.0					4 - Poor	Retain
121	3722	1024059130	Alnus rubra	Red alder	11.0					3 - Fair	Retain
122	3723	1024059130	Alnus rubra	Red alder	11.0					3 - Fair	Retain
123	3724	1024059130	Alnus rubra	Red alder	20.7					4 - Poor	Retain
124	3725	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
125	3718	1024059130	Alnus rubra	Red alder	8.0					4 - Poor	Retain
126	3717	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
127	3700	1024059130	Alnus rubra	Red alder	13.3					4 - Poor	Retain
128	3728	1024059130	Alnus rubra	Red alder	11.0					3 - Fair	Retain
129	3726	1024059130	Alnus rubra	Red alder	9.0	7				3 - Fair	Retain
130	3727	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
131	3699	1024059130	Alnus rubra	Red alder	16.7					3 - Fair	Retain
132	3697	1024059130	Alnus rubra	Red alder	14.0					4 - Poor	Retain
133	3696	1024059130	Alnus rubra	Red alder	15.0					4 - Poor	Retain
134	3695	1024059130	Alnus rubra	Red alder	11.0					3 - Fair	Retain
135	160	7856640010	Thuja plicata	Western red cedar	22.0					2 - Good	Remove
136	148	2206500400	Pinus sylvestris	Scots pine	11.0					4 - Poor	Remove
137	145	8135300020	Quercus sp.	Oak	10.8					3 - Fair	Remove
138	151	2206500400	Prunus domestica	Plum	13.5					4 - Poor	Remove
139	3835	1024059130	Acer macrophyllum	Bigleaf maple	30.0					4 - Poor	Remove
140	3836	1024059130	Acer macrophyllum	Bigleaf maple	24.0	16	15	15	12	3 - Fair	Remove
141	3837	1024059130	Acer macrophyllum	Bigleaf maple	36.0	36	24	10	10	3 - Fair	Remove
142	146	8135300020	Thuja plicata	Western red cedar	12.0					4 - Poor	Remove
143	147	2206500400	Pinus sylvestris	Scots pine	13.2					4 - Poor	Remove
144	133	8135300020	Pseudotsuga menziesii	Douglas-fir	12.0					3 - Fair	Remove
145	132	8135300020	Pseudotsuga menziesii	Douglas-fir	10.9					3 - Fair	Remove
146	3838	1024059130	Acer macrophyllum	Bigleaf maple	36.0	36				3 - Fair	Remove

Field inventory completed on October 13, 2016, and includes trees that may have been removed by others since that time.

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	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
147	3839	1024059130	Acer macrophyllum	Bigleaf maple	24.0	20				3 - Fair	Remove
148	18	1024059123	Pseudotsuga menziesii	Douglas-fir	11.4					4 - Poor	Remove
149	131	8135300020	Pseudotsuga menziesii	Douglas-fir	12.9					3 - Fair	Remove
150	3853	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Remove
151	3852	1024059130	Alnus rubra	Red alder	11.0	10				3 - Fair	Remove
152	3851	1024059130	Alnus rubra	Red alder	9.0	8	7			3 - Fair	Remove
153	3850	1024059130	Alnus rubra	Red alder	9.0	8				3 - Fair	Remove
154	3849	1024059130	Alnus rubra	Red alder	12.0					3 - Fair	Remove
155	3847	1024059130	Alnus rubra	Red alder	14.0	14				3 - Fair	Remove
156	3846	1024059130	Alnus rubra	Red alder	10.5					3 - Fair	Remove
157	3845	1024059130	Alnus rubra	Red alder	15.0	11	11			3 - Fair	Remove
158	3843	1024059130	Alnus rubra	Red alder	12.0					3 - Fair	Remove
159	3842	1024059130	Alnus rubra	Red alder	14.0					3 - Fair	Remove
160	3841	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Remove
161	19	1024059123	Pseudotsuga menziesii	Douglas-fir	14.0					4 - Poor	Remove
162	20	1024059123	Pseudotsuga menziesii	Douglas-fir	13.2					4 - Poor	Remove
163	21	1024059123	Pseudotsuga menziesii	Douglas-fir	16.1					4 - Poor	Remove
164	22	1024059123	Pseudotsuga menziesii	Douglas-fir	14.1					4 - Poor	Remove
165	23	1024059123	Pseudotsuga menziesii	Douglas-fir	14.0					4 - Poor	Remove
166	24	1024059123	Pseudotsuga menziesii	Douglas-fir	20.5					4 - Poor	Remove
167	3840	1024059130	Alnus rubra	Red alder	12.0	10	8			3 - Fair	Remove
168	3716	1024059130	Alnus rubra	Red alder	15.0					3 - Fair	Retain
169	3715	1024059130	Salix lasiandra	Pacific willow	12.0	12	12			3 - Fair	Retain
170	3714	1024059130	Alnus rubra	Red alder	16.0					3 - Fair	Retain
171	3713	1024059130	Alnus rubra	Red alder	9.0	8	8	7		3 - Fair	Retain
172	3712	1024059130	Alnus rubra	Red alder	9.0					4 - Poor	Retain
173	3710	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
174	3711	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
175	3708	1024059130	Alnus rubra	Red alder	11.0					4 - Poor	Retain
176	3704	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
177	3705	1024059130	Alnus rubra	Red alder	10.0					3 - Fair	Retain
178	3706	1024059130	Alnus rubra	Red alder	12.4					4 - Poor	Retain
179	3707	1024059130	Alnus rubra	Red alder	12.0					3 - Fair	Retain
180	3709	1024059130	Alnus rubra	Red alder	8.0					4 - Poor	Retain
181	3703	1024059130	Alnus rubra	Red alder	15.0					3 - Fair	Retain
182	3702	1024059130	Alnus rubra	Red alder	13.0					3 - Fair	Retain
183	3701	1024059130	Alnus rubra	Red alder	8.0					4 - Poor	Retain
184	1954	0324059066	Alnus rubra	Red alder	12.4					2 - Good	Retain
185	3694	1024059130	Alnus rubra	Red alder	18.3	8.7				3 - Fair	Retain
186	3396	1024059130	Salix lasiandra	Pacific willow	12.0					3 - Fair	Retain
187	3395	1024059130	Salix lasiandra	Pacific willow	12.0	10	6			3 - Fair	Retain
188	3393	1024059130	Alnus rubra	Red alder	10.8					3 - Fair	Retain
189	3398	1024059130	Alnus rubra	Red alder	10.0					3 - Fair	Retain
190	3397	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
191	3394	1024059130	Salix lasiandra	Pacific willow	8.0					3 - Fair	Retain
192	3401	1024059130	Acer macrophyllum	Bigleaf maple	15.8					3 - Fair	Retain
193	3854	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Remove
194	3392	1024059130	Alnus rubra	Red alder	10.0	10	9	6		3 - Fair	Retain
195	3391	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
196	3389	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
197	3384	1024059130	Alnus rubra	Red alder	10.0	9	7	5		3 - Fair	Retain
198	3383	1024059130	Acer macrophyllum	Bigleaf maple	10.0					3 - Fair	Retain
199	3380	1024059130	Alnus rubra	Red alder	9.0	9	7			4 - Poor	Retain
200	3378	1024059130	Alnus rubra	Red alder	11.0	9				3 - Fair	Retain
201	3377	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
202	3376	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
203	3369	1024059130	Alnus rubra	Red alder	10.0	10	9	6		3 - Fair	Retain
204	3375	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
205	3374	1024059130	Salix lasiandra	Pacific willow	12.0					3 - Fair	Retain
206	3373	1024059130	Alnus rubra	Red alder	13.0					3 - Fair	Retain
207	3388	1024059130	Alnus rubra	Red alder	9.5					4 - Poor	Retain
208	3379	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
209	3386	1024059130	Alnus rubra	Red alder	9.5					3 - Fair	Retain
210	3385	1024059130	Alnus rubra	Red alder	9.5					3 - Fair	Retain
211	3400	1024059130	Alnus rubra	Red alder	8.5					4 - Poor	Retain
212	3856	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Remove
213	3855	1024059130	Alnus rubra	Red alder	12.0	8	5	5		3 - Fair	Remove
214	3857	1024059130	Alnus rubra	Red alder	14.0					3 - Fair	Remove
215	3858	1024059130	Acer macrophyllum	Bigleaf maple	8.0					2 - Good	Remove
216	25	1024059123	Acer macrophyllum	Bigleaf maple	13.4					3 - Fair	Remove
217	3859	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Remove
218	3860	1024059130	Alnus rubra	Red alder	10.0					3 - Fair	Remove
219	111	1024059123	Alnus rubra	Red alder	8.5					4 - Poor	Retain

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
220	110	1024059123	Populus balsamifera	Black cottonwood	9.0					4 - Poor	Retain
221	115	1024059123	Acer rubrum	Red maple	13.7					2 - Good	Remove
222	116	2206500435	Acer palmatum	Japanese maple	8.5					2 - Good	Retain
223	117	2206500435	Prunus avium	Sweet cherry	9.1					3 - Fair	Remove
224	3861	1024059130	Alnus rubra	Red alder	10.0	8				3 - Fair	Remove
225	27	3425059010	×Hesperotropsis leylandii	Leyland cypress	8.3					2 - Good	Remove
226	3864	1024059130	Alnus rubra	Red alder	18.0					3 - Fair	Remove
227	3863	1024059130	Acer macrophyllum	Bigleaf maple	8.0					3 - Fair	Remove
228	3862	1024059130	Alnus rubra	Red alder	16.5	7				3 - Fair	Remove
229	3876	1024059130	Alnus rubra	Red alder	12.5					3 - Fair	Remove
230	3878	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Remove
231	3879	1024059130	Alnus rubra	Red alder	14.0					3 - Fair	Remove
232	3880	1024059130	Acer macrophyllum	Bigleaf maple	9.5	5.5				3 - Fair	Remove
233	3877	1024059130	Acer macrophyllum	Bigleaf maple	10.0					3 - Fair	Remove
234	3368	1024059130	Alnus rubra	Red alder	11.0	7				3 - Fair	Retain
235	3367	1024059130	Alnus rubra	Red alder	9.0	7				3 - Fair	Retain
236	3366	1024059130	Alnus rubra	Red alder	11.0					3 - Fair	Retain
237	3365	1024059130	Alnus rubra	Red alder	14.9					3 - Fair	Retain
238	3364	1024059130	Alnus rubra	Red alder	10.0					3 - Fair	Retain
239	3362	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
240	3361	1024059130	Alnus rubra	Red alder	9.0	8	7			3 - Fair	Retain
241	3358	1024059130	Alnus rubra	Red alder	16.5					3 - Fair	Retain
242	3372	1024059130	Alnus rubra	Red alder	12.0	10	6			3 - Fair	Retain
243	3371	1024059130	Alnus rubra	Red alder	11.3					4 - Poor	Retain
244	3360	1024059130	Alnus rubra	Red alder	11.6					3 - Fair	Retain
245	3359	1024059130	Alnus rubra	Red alder	17.8					4 - Poor	Retain
246	3363	1024059130	Alnus rubra	Red alder	12.2					3 - Fair	Retain
247	124	1024059123	Acer rubrum	Red maple	15.5					2 - Good	Remove
248	29	3425059010	×Hesperotropsis leylandii	Leyland cypress	12.3					2 - Good	Remove
249	62	2225059272	Prunus cerasifera	Flowering plum	9.5					2 - Good	Retain
250	2590	1024059101	Arbutus menziesii	Pacific madrone	17.3					2 - Good	Remove
251	2591	1024059101	Arbutus menziesii	Pacific madrone	11.7					3 - Fair	Remove
252	2595	8135300020	Prunus serrulata	Japanese flowering cherry	8.3					4 - Poor	Remove
253	2596	8135300020	Quercus sp.	Oak	10.8					3 - Fair	Remove
254	2597	8135300020	Thuja plicata	Western red cedar	12.0					4 - Poor	Remove
255	2602	8135300020	Fraxinus sp.	Ash species	8.0					2 - Good	Remove
256	2601	8135300020	Pseudotsuga menziesii	Douglas-fir	12.9					3 - Fair	Remove
257	2600	8135300020	Pseudotsuga menziesii	Douglas-fir	10.9					3 - Fair	Remove
258	2599	8135300020	Pseudotsuga menziesii	Douglas-fir	12.0					3 - Fair	Remove
259	2497	1024059123	Pinus sylvestris	Scots pine	13.1					3 - Fair	Remove
260	2494	1024059123	Thuja occidentalis	Eastern arborvitae	8.3					3 - Fair	Remove
261	2495	1024059123	Thuja plicata	Western red cedar	11.6					4 - Poor	Remove
262	2532	1024059123	Acer rubrum	Red maple	13.7					2 - Good	Remove
263	2530	1024059123	Alnus rubra	Red alder	8.5					4 - Poor	Remove
264	2505	1024059123	Pinus sylvestris	Scots pine	9.5					3 - Fair	Remove
265	2501	1024059123	Pinus sylvestris	Scots pine	9.2					4 - Poor	Remove
266	2535	1024059123	Acer rubrum	Red maple	15.5					2 - Good	Remove
267	2507	1024059123	Thuja plicata	Western red cedar	8.0					4 - Poor	Remove
268	2506	1024059123	Pinus sylvestris	Scots pine	9.4					4 - Poor	Remove
269	2515	1024059123	Pseudotsuga menziesii	Douglas-fir	16.1					4 - Poor	Remove
270	2510	1024059123	Pseudotsuga menziesii	Douglas-fir	10.0					3 - Fair	Remove
271	2512	1024059123	Pseudotsuga menziesii	Douglas-fir	11.4					4 - Poor	Remove
272	2511	1024059123	Pseudotsuga menziesii	Douglas-fir	10.0					4 - Poor	Remove
273	2513	1024059123	Pseudotsuga menziesii	Douglas-fir	14.0					4 - Poor	Remove
274	2514	1024059123	Pseudotsuga menziesii	Douglas-fir	13.2					4 - Poor	Remove
275	2546	2206500020	Arbutus menziesii	Pacific madrone	18.7					2 - Good	Remove
276	2545	2206500020	Abies grandis	Grand fir	12.1					4 - Poor	Remove
277	2516	1024059123	Pseudotsuga menziesii	Douglas-fir	14.1					4 - Poor	Remove
278	2520	1024059123	Acer macrophyllum	Bigleaf maple	13.4					3 - Fair	Remove
279	2544	2206500020	Pinus nigra	Austrian pine	8.5					4 - Poor	Remove
280	2541	2206500025	Pseudotsuga menziesii	Douglas-fir	20.6					2 - Good	Retain
281	2543	2206500020	Thuja plicata	Western red cedar	13.0					4 - Poor	Remove
282	2540	2206500025	Pseudotsuga menziesii	Douglas-fir	31.8					2 - Good	Remove
283	2538	2206500025	Acer macrophyllum	Bigleaf maple	10.5					3 - Fair	Remove
284	2542	2206500020	Pseudotsuga menziesii	Douglas-fir	12.3					4 - Poor	Remove
285	2548	2206500220	Malus domestica	Apple	12.0					3 - Fair	Retain
286	2558	2206500230	Prunus domestica	Plum	14.6					3 - Fair	Remove
287	2587	2206500255	Acer platanoides	Norway maple	18.0					2 - Good	Remove
288	2574	2206500435	Platanus occidentalis	American sycamore	18.0					2 - Good	Remove
289	2573	2206500435	Magnolia stellata	Star magnolia	12.4					3 - Fair	Remove
290	2575	2206500435	Platanus occidentalis	American sycamore	13.0					2 - Good	Remove
291	2576	2206500435	Platanus occidentalis	American sycamore	22.1					2 - Good	Remove
292	2577	2206500435	Acer palmatum	Japanese maple	8.5					2 - Good	Retain

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
293	2578	2206500435	Prunus avium	Sweet cherry	9.1					3 - Fair	Remove
294	2579	2206500435	Prunus domestica	Plum	12.0					4 - Poor	Remove
295	2603	2206500425	Prunus avium	Sweet cherry	15.6					3 - Fair	Remove
296	2586	2206500435	Prunus domestica	Plum	8.2					3 - Fair	Retain
297	2610	2206500420	Prunus avium	Sweet cherry	8.3					2 - Good	Remove
298	2608	2206500425	Prunus avium	Sweet cherry	9.1					3 - Fair	Remove
299	2611	2206500420	Prunus avium	Sweet cherry	28.0					3 - Fair	Remove
300	2620	2206500390	Sequoia sempervirens	Redwood	38.0					4 - Poor	Remove
301	2538	2206500025	Acer macrophyllum	Bigleaf maple	10.5					3 - Fair	Remove
302	2617	2206500415	Prunus serrulata	Japanese flowering cherry	10.4					3 - Fair	Retain
303	2535	1024059123	Acer rubrum	Red maple	15.5					2 - Good	Remove
304	2532	1024059123	Acer rubrum	Red maple	13.7					2 - Good	Remove
305	2531	1024059123	Populus balsamifera	Black cottonwood	9.0					4 - Poor	Remove
306	2618	2206500410	Malus domestica	Apple	8.0					1 - Excellent	Remove
307	2654	1524059005	Quercus palustris	Pin oak	15.3					2 - Good	Remove
308	2662	1524059005	Prunus serrulata	Japanese flowering cherry	12.0					3 - Fair	Remove
309	2663	1524059005	Malus domestica	Apple	8.6					3 - Fair	Retain
310	2679	1524059005	Pinus sp. <2 needle>	Pine tree, 2 needle	12.5					3 - Fair	Remove
311	2675	1524059005	Pinus sp. <2 needle>	Pine tree, 2 needle	12.6					3 - Fair	Remove
312	2676	1524059005	Pinus ponderosa	Ponderosa pine	16.4					4 - Poor	Remove
313	2678	1524059005	Pinus sp. <2 needle>	Pine tree, 2 needle	12.3					3 - Fair	Remove
314	2683	1524059005	Pinus sp. <2 needle>	Pine tree, 2 needle	14.6					3 - Fair	Remove
315	2680	1524059005	Pinus sp. <2 needle>	Pine tree, 2 needle	10.3					4 - Poor	Remove
316	2682	1524059005	Pseudotsuga menziesii	Douglas-fir	12.0					3 - Fair	Remove
317	2684	1524059005	Pinus sp. <2 needle>	Pine tree, 2 needle	10.5					4 - Poor	Remove
318	2686	1524059005	Arbutus menziesii	Pacific madrone	11.8					3 - Fair	Remove
319	2685	1524059005	Pinus sp. <2 needle>	Pine tree, 2 needle	11.8					3 - Fair	Remove
320	2709	1524059032	Pseudotsuga menziesii	Douglas-fir	15.5					4 - Poor	Remove
321	2710	1524059032	Thuja plicata	Western red cedar	10.0					4 - Poor	Remove
322	2711	1524059032	Thuja plicata	Western red cedar	11.3					4 - Poor	Remove
323	2707	1524059032	Pseudotsuga menziesii	Douglas-fir	9.3					4 - Poor	Remove
324	2708	1524059032	Pseudotsuga menziesii	Douglas-fir	14.5					4 - Poor	Remove
325	2702	1524059080	Thuja plicata	Western red cedar	15.5					3 - Fair	Remove
326	2698	1524059080	Thuja plicata	Western red cedar	10.8					3 - Fair	Remove
327	2699	1524059080	Thuja plicata	Western red cedar	10.3					3 - Fair	Remove
328	2700	1524059080	Prunus cerasifera	Flowering plum	11.8					3 - Fair	Retain
329	2697	1524059080	Thuja plicata	Western red cedar	16.5					3 - Fair	Remove
330	2716	1524059032	Picea pungens	Colorado spruce	9.5					3 - Fair	Remove
331	2696	1524059080	Thuja plicata	Western red cedar	18.0					3 - Fair	Remove
332	2695	1524059080	Thuja plicata	Western red cedar	20.0					3 - Fair	Remove
333	2694	1524059080	×Hesperotropsis leylandii	Leyland cypress	11.5					3 - Fair	Remove
334	2688	1524059080	×Hesperotropsis leylandii	Leyland cypress	12.0					3 - Fair	Retain
335	2690	1524059080	×Hesperotropsis leylandii	Leyland cypress	9.0					3 - Fair	Retain
336	2722	1524059032	×Hesperotropsis leylandii	Leyland cypress	12.0					3 - Fair	Retain
337	2723	1524059032	×Hesperotropsis leylandii	Leyland cypress	11.8					3 - Fair	Remove
338	2724	1524059032	×Hesperotropsis leylandii	Leyland cypress	11.0					3 - Fair	Remove
339	2726	1524059032	Pinus sylvestris	Scots pine	11.2					4 - Poor	Remove
340	2743	1524059145	Prunus cerasifera	Flowering plum	9.3					3 - Fair	Retain
341	2742	1524059145	Prunus cerasifera	Flowering plum	10.7					3 - Fair	Retain
342	2746	7856640010	Thuja plicata	Western red cedar	17.3					2 - Good	Remove
343	2747	7856640010	Thuja plicata	Western red cedar	13.4					2 - Good	Remove
344	2748	7856640010	Thuja plicata	Western red cedar	16.0					2 - Good	Remove
345	2749	7856640010	Picea pungens	Colorado spruce	8.4					3 - Fair	Remove
346	2817	7856420080	Populus balsamifera	Black cottonwood	13.0					3 - Fair	Remove
347	2820	7856420080	Populus balsamifera	Black cottonwood	15.0					3 - Fair	Remove
348	2819	7856420080	Thuja plicata	Western red cedar	11.0					2 - Good	Remove
349	2821	7856420080	Pseudotsuga menziesii	Douglas-fir	12.3					3 - Fair	Remove
350	2823	7856420080	Thuja plicata	Western red cedar	9.7					3 - Fair	Remove
351	2822	7856420080	Pseudotsuga menziesii	Douglas-fir	9.8					3 - Fair	Remove
352	2824	7856420080	Arbutus menziesii	Pacific madrone	9.5					3 - Fair	Remove
353	2831	7856420050	Salix scouleriana	Scouler's willow	12.5					3 - Fair	Remove
354	2825	7856420080	Pseudotsuga menziesii	Douglas-fir	11.9					4 - Poor	Remove
355	2826	7856420080	Pseudotsuga menziesii	Douglas-fir	8.6					4 - Poor	Remove
356	2826	7856420080	Pseudotsuga menziesii	Douglas-fir	8.6					4 - Poor	Remove
357	2830	7856420080	Arbutus menziesii	Pacific madrone	11.6					3 - Fair	Remove
358	2832	7856420050	Salix scouleriana	Scouler's willow	13.5					3 - Fair	Remove
359	2753	7856640010	Thuja plicata	Western red cedar	22.0					2 - Good	Remove
360	2767	7856640020	Pseudotsuga menziesii	Douglas-fir	17.2					3 - Fair	Remove
361	2756	7856640010	Thuja plicata	Western red cedar	10.4					2 - Good	Remove
362	2762	7856640020	Thuja plicata	Western red cedar	9.7					3 - Fair	Remove
363	2766	7856640020	Pseudotsuga menziesii	Douglas-fir	13.7					3 - Fair	Remove
364	2765	7856640020	Thuja plicata	Western red cedar	11.2					3 - Fair	Remove
365	2772	7856640020	Thuja plicata	Western red cedar	10.1					3 - Fair	Remove

Field inventory completed on October 13, 2016, and includes trees that may have been removed by others since that time.

DSD 002650

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
366	2764	7856640020	Thuja plicata	Western red cedar	9.0					3 - Fair	Remove
367	2768	7856640020	Pseudotsuga menziesii	Douglas-fir	11.6					3 - Fair	Remove
368	2769	7856640020	Pseudotsuga menziesii	Douglas-fir	12.8					3 - Fair	Remove
369	2770	7856640020	Pseudotsuga menziesii	Douglas-fir	13.6					3 - Fair	Remove
370	2775	7856640020	Pseudotsuga menziesii	Douglas-fir	11.7					3 - Fair	Remove
371	2777	7856640020	Thuja plicata	Western red cedar	11.0					3 - Fair	Remove
372	2778	7856640020	Thuja plicata	Western red cedar	8.7					3 - Fair	Remove
373	2779	7856640020	Pseudotsuga menziesii	Douglas-fir	11.3					3 - Fair	Remove
374	2780	7856640020	Pseudotsuga menziesii	Douglas-fir	11.2					3 - Fair	Remove
375	2835	7856420050	Thuja plicata	Western red cedar	23.5					2 - Good	Remove
376	2781	7856640020	Pseudotsuga menziesii	Douglas-fir	9.5					3 - Fair	Remove
377	2782	7856640020	Pseudotsuga menziesii	Douglas-fir	9.9					4 - Poor	Remove
378	2783	7856640020	Pseudotsuga menziesii	Douglas-fir	9.6					4 - Poor	Remove
379	2788	7856640020	Pseudotsuga menziesii	Douglas-fir	9.5					4 - Poor	Remove
380	2786	7856640020	Pinus sylvestris	Scots pine	12.1					4 - Poor	Remove
381	2789	7856640020	Pseudotsuga menziesii	Douglas-fir	17.9					4 - Poor	Remove
382	2790	7856640020	Pseudotsuga menziesii	Douglas-fir	13.2					4 - Poor	Remove
383	2792	7856640020	Pseudotsuga menziesii	Douglas-fir	16.7					4 - Poor	Remove
384	2804	7856640020	Pseudotsuga menziesii	Douglas-fir	24.6					4 - Poor	Remove
385	2795	7856640020	Pseudotsuga menziesii	Douglas-fir	10.3					4 - Poor	Remove
386	2797	7856640020	Pseudotsuga menziesii	Douglas-fir	13.5					4 - Poor	Remove
387	2796	7856640020	Pseudotsuga menziesii	Douglas-fir	11.4					4 - Poor	Remove
388	2803	7856640020	Pseudotsuga menziesii	Douglas-fir	12.6					4 - Poor	Remove
389	2798	7856640020	Thuja plicata	Western red cedar	13.6					4 - Poor	Remove
390	2806	7856640030	Pseudotsuga menziesii	Douglas-fir	16.7					4 - Poor	Remove
391	2802	7856640020	Pseudotsuga menziesii	Douglas-fir	15.5					4 - Poor	Remove
392	2805	7856640030	Pseudotsuga menziesii	Douglas-fir	15.3					4 - Poor	Remove
393	2836	7856420050	Acer macrophyllum	Bigleaf maple	8.6					3 - Fair	Remove
394	2863	7856640430	Tsuga mertensiana	Mountain hemlock	8.3					3 - Fair	Remove
395	2867	7856640430	Prunus cerasifera	Flowering plum	10.5					3 - Fair	Remove
396	2882	7855000230	Prunus serrulata	Japanese flowering cherry	19.0					2 - Good	Retain
397	2877	7856640430	Prunus cerasifera	Flowering plum	8.5					4 - Poor	Remove
398	2868	7856640430	Prunus cerasifera	Flowering plum	11.5					3 - Fair	Remove
399	2869	7856640430	Prunus cerasifera	Flowering plum	9.2					3 - Fair	Remove
400	2872	7856640430	Prunus cerasifera	Flowering plum	10.1					3 - Fair	Remove
401	2881	7855000230	Liquidambar styraciflua	American sweetgum	14.1					3 - Fair	Remove
402	2891	7855000240	×Hesperotropsis leylandii	Leyland cypress	26.0					3 - Fair	Remove
403	2888	7855000240	Callitropsis┬ánootkatensis	Alaska cedar	13.3					3 - Fair	Remove
404	2887	7855000240	Cedrus deodara	Deodar cedar	9.4					3 - Fair	Remove
405	2901	7855000240	Chamaecyparis obtusa	Hinoki Falsecypress	14.1					2 - Good	Retain
406	2885	7855000240	×Hesperotropsis leylandii	Leyland cypress	26.0					2 - Good	Remove
407	2886	7855000240	×Hesperotropsis leylandii	Leyland cypress	22.9					2 - Good	Remove
408	2928	1524059142	Crataegus monogyna	Common hawthorn	10.4					3 - Fair	Remove
409	2934	7855000270	Prunus armeniaca	Apricot	9.0					3 - Fair	Remove
410	2941	1524059142	Pinus nigra	Austrian pine	18.5					4 - Poor	Remove
411	2942	1524059142	Pinus nigra	Austrian pine	19.0					4 - Poor	Remove
412	2944	7855000290	Pinus nigra	Austrian pine	15.5					4 - Poor	Remove
413	2945	7855000290	Pseudotsuga menziesii	Douglas-fir	9.1					4 - Poor	Remove
414	2946	7855000290	Sequoiadendron giganteum	Giant sequoia	31.5					4 - Poor	Remove
415	2947	7855000290	Sequoiadendron giganteum	Giant sequoia	22.5					4 - Poor	Remove
416	2948	7855000290	Sequoiadendron giganteum	Giant sequoia	27.0					4 - Poor	Remove
417	2950	7855000290	Pinus sylvestris	Scots pine	11.0					4 - Poor	Remove
418	3163	7855800120	Malus domestica	Apple	9.0					4 - Poor	Remove
419	3183	7855800140	Prunus domestica	Plum	8.5					3 - Fair	Remove
420	3268	7856410120	Picea pungens	Colorado spruce	14.7					4 - Poor	Remove
421	3431	7855801670	Acer palmatum	Japanese maple	8.4					3 - Fair	Retain
422	3428	7855801670	Picea pungens	Colorado spruce	9.8					4 - Poor	Remove
423	3423	7855801670	Myrica californica	Pacific waxmyrtle	8.4					3 - Fair	Retain
424	3442	7855801680	Pinus nigra	Austrian pine	10.3					3 - Fair	Remove
425	3439	7855801680	Pinus contorta	Shore pine	8.6					3 - Fair	Remove
426	3444	7855801680	Pinus nigra	Austrian pine	12.2					3 - Fair	Remove
427	3504	7855801590	Pinus contorta	Shore pine	18.8					4 - Poor	Remove
428	3506	7855801590	Arbutus menziesii	Pacific madrone	9.0					2 - Good	Remove
429	3449	7855801700	Cornus florida	Flowering dogwood	9.4					3 - Fair	Remove
430	3526	7855801570	Pseudotsuga menziesii	Douglas-fir	9.5					3 - Fair	Remove
431	3543	7855801570	Pseudotsuga menziesii	Douglas-fir	8.5					3 - Fair	Remove
432	3538	7855801570	Pseudotsuga menziesii	Douglas-fir	19.2					3 - Fair	Remove
433	3546	7855801560	Picea pungens	Colorado spruce	13.4					4 - Poor	Remove
434	3547	7855801560	Picea pungens	Colorado spruce	9.5					4 - Poor	Remove
435	3548	7855801560	Picea pungens	Colorado spruce	10.5					4 - Poor	Remove
436	3472	7855801720	Chamaecyparis obtusa	Hinoki Falsecypress	11.0					3 - Fair	Retain
437	3470	7855801720	Chamaecyparis obtusa	Hinoki Falsecypress	9.0					3 - Fair	Remove
438	3549	7855801560	Picea pungens	Colorado spruce	9.4					4 - Poor	Remove

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
439	3550	7855801560	Picea pungens	Colorado spruce	12.5					4 - Poor	Remove
440	3477	7855801720	Prunus domestica	Plum	11.0					2 - Good	Remove
441	3552	7855801560	Picea pungens	Colorado spruce	13.3					4 - Poor	Remove
442	3564	7855801550	Liquidambar styraciflua	American sweetgum	11.2					3 - Fair	Remove
443	3563	7855801550	Picea pungens	Colorado spruce	16.4					4 - Poor	Remove
444	3561	7855801550	Picea pungens	Colorado spruce	10.5					4 - Poor	Remove
445	3560	7855801550	Picea pungens	Colorado spruce	14.5					4 - Poor	Remove
446	3559	7855801550	Picea pungens	Colorado spruce	12.1					4 - Poor	Remove
447	3493	7855801730	Malus domestica	Apple	9.7					3 - Fair	Retain
448	3571	7855801550	Arbutus menziesii	Pacific madrone	11.6					3 - Fair	Remove
449	3557	7855801550	Pseudotsuga menziesii	Douglas-fir	18.6					4 - Poor	Remove
450	3558	7855801550	Pseudotsuga menziesii	Douglas-fir	22.1					4 - Poor	Remove
451	3498	7855801740	Prunus domestica	Plum	9.0					4 - Poor	Remove
452	3604	7855801540	Cedrus deodara	Deodar cedar	18.4					4 - Poor	Remove
453	3600	2600010630	Pseudotsuga menziesii	Douglas-fir	23.0					4 - Poor	Remove
454	3599	2600010630	Pseudotsuga menziesii	Douglas-fir	13.5					4 - Poor	Remove
455	3598	2600010630	Pseudotsuga menziesii	Douglas-fir	16.8					4 - Poor	Remove
456	3610	2600010580	Pseudotsuga menziesii	Douglas-fir	10.6					4 - Poor	Remove
457	3612	2600010580	Pseudotsuga menziesii	Douglas-fir	13.0					4 - Poor	Remove
458	3613	2600010580	Pinus nigra	Austrian pine	17.0					4 - Poor	Remove
459	3614	2600010580	Pinus nigra	Austrian pine	11.7					4 - Poor	Remove
460	3615	2600010580	Pinus nigra	Austrian pine	18.0					4 - Poor	Remove
461	3618	2600010580	Pinus nigra	Austrian pine	14.0					4 - Poor	Remove
462	3616	2600010580	Pinus nigra	Austrian pine	10.0					4 - Poor	Remove
463	3617	2600010580	Pinus nigra	Austrian pine	19.0					4 - Poor	Remove
464	3621	2600010670	Pyrus sp.	Pear tree	8.0					3 - Fair	Remove
465	3629	2268400290	Prunus domestica	Plum	9.4					3 - Fair	Retain
466	3626	2268400290	Prunus serrulata	Japanese flowering cherry	12.8					4 - Poor	Retain
467	3636	2268400280	Pinus nigra	Austrian pine	16.5					2 - Good	Remove
468	3639	2268400280	Acer rubrum	Red maple	11.4					3 - Fair	Remove
469	3642	2268400280	Pinus nigra	Austrian pine	10.4					3 - Fair	Remove
470	3643	2268400280	Prunus serrulata	Japanese flowering cherry	8.3					3 - Fair	Retain
471	3650	2268400280	Acer rubrum	Red maple	9.3					3 - Fair	Remove
472	3656	2268400280	Pinus nigra	Austrian pine	12.2					4 - Poor	Remove
473	3660	2268400280	Quercus palustris	Pin oak	8.3					3 - Fair	Remove
474	3662	2268400280	Betula pendula	European white birch	9.2					3 - Fair	Remove
475	441	1951700130	Malus domestica	Apple	9.0					3 - Fair	Remove
476	443	1951700130	Prunus avium	Sweet cherry	12.0					2 - Good	Remove
477	445	1951700120	Prunus avium	Sweet cherry	9.5					3 - Fair	Remove
478	455	1951700010	Malus domestica	Apple	8.0					2 - Good	Retain
479	452	1951700010	Ilex aquifolium	English holly	12.0					3 - Fair	Remove
480	451	1951700010	Prunus cerasifera 'thundercloud'	Cherry plum	16.0					2 - Good	Remove
481	2490	1024059123	Pseudotsuga menziesii	Douglas-fir	19.1					4 - Poor	Remove
482	2492	1024059123	Thuja plicata	Western red cedar	11.3					3 - Fair	Remove
483	8506	1524059080	×Hesperotropsis leylandii	Leyland cypress	8.0	7	6			2 - Good	Remove
484	2840	7856420060	Abies sp.	Fir species	16.8					4 - Poor	Remove
485	2841	7856420060	Thuja plicata	Western red cedar	17.5					3 - Fair	Remove
486	2842	7856420060	Malus domestica	Apple	11.0					3 - Fair	Remove
487	2844	7856420060	Pseudotsuga menziesii	Douglas-fir	11.3					3 - Fair	Remove
488	2851	7856420070	Prunus avium	Sweet cherry	16.0					2 - Good	Remove
489	2852	7856420070	Acer macrophyllum	Bigleaf maple	32.4					3 - Fair	Remove
490	2943	7855000290	Picea pungens	Colorado spruce	17.0					4 - Poor	Remove
491	2944	7855000290	Pinus nigra	Austrian pine	15.5					4 - Poor	Remove
492	2957	7855000300	Prunus domestica	Plum	15.0					2 - Good	Remove
493	2958	7855000300	Prunus domestica	Plum	10.5					2 - Good	Remove
494	2960	7855000310	Crataegus monogyna	Common hawthorn	8.7					3 - Fair	Remove
495	2962	7855000310	Prunus laurocerasus	Cherry laurel	12.5					3 - Fair	Remove
496	2961	7855000310	Malus domestica	Apple	9.3					3 - Fair	Retain
497	2963	7855000310	Prunus lusitanica	Portuguese laurel	10.2					3 - Fair	Remove
498	2964	7856660250	Pseudotsuga menziesii	Douglas-fir	16.1					4 - Poor	Remove
499	2965	7856660250	Arbutus menziesii	Pacific madrone	10.6					2 - Good	Remove
500	2971	7856660250	Salix matsudana 'Tortuosa'	Corkscrew willow	19.0					3 - Fair	Remove
501	2968	7856660250	Arbutus menziesii	Pacific madrone	15.1					4 - Poor	Remove
502	2969	7856660250	Arbutus menziesii	Pacific madrone	8.4					2 - Good	Remove
503	2970	7856660250	Pinus ponderosa	Ponderosa pine	14.2					3 - Fair	Remove
504	2976	7855000325	Prunus serrulata	Japanese flowering cherry	10.2					3 - Fair	Retain
505	2977	7855000325	Prunus cerasifera	Flowering plum	8.8					3 - Fair	Remove
506	2979	7855000325	Prunus cerasifera	Flowering plum	10.4					3 - Fair	Retain
507	2978	7855000325	Laburnum x watereri	Goldenchain Tree	12.2					3 - Fair	Remove
508	2996	7855000360	Picea pungens	Colorado spruce	14.4					3 - Fair	Remove
509	2997	7855000360	Pinus contorta	Shore pine	14.4					3 - Fair	Remove
510	2999	7855000360	Abies sp.	Fir species	8.2					4 - Poor	Remove
511	3002	7855000360	Abies sp.	Fir species	9.4					4 - Poor	Remove

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
512	3005	7855000360	Abies sp.	Fir species	9.0					4 - Poor	Remove
513	3006	7855000360	Tsuga mertensiana	Mountain hemlock	9.0					4 - Poor	Remove
514	3008	7855000360	Pinus sylvestris	Scots pine	8.1					4 - Poor	Remove
515	3007	7855000360	Abies sp.	Fir species	9.0					4 - Poor	Remove
516	3014	7855000360	Abies sp.	Fir species	11.9					4 - Poor	Remove
517	3014	7855000360	Abies sp.	Fir species	11.9					4 - Poor	Remove
518	3017	7855000360	Juniperus scopulorum	Rocky Mountain Juniper	8.6					3 - Fair	Remove
519	3023	7855801770	Laburnum x watereri	Goldenchain Tree	9.4					3 - Fair	Remove
520	3027	7855801770	Prunus emarginata	Bitter cherry	13.1					3 - Fair	Retain
521	3028	7855801770	Arbutus menziesii	Pacific madrone	16.5					3 - Fair	Remove
522	3035	7855800010	Pseudotsuga menziesii	Douglas-fir	16.3					4 - Poor	Remove
523	3038	7855800010	Pseudotsuga menziesii	Douglas-fir	10.8					4 - Poor	Remove
524	3037	7855800010	Cedrus deodara	Deodar cedar	14.1					4 - Poor	Remove
525	3039	7855800010	Pseudotsuga menziesii	Douglas-fir	13.9					4 - Poor	Remove
526	3041	7855800010	Pinus sylvestris	Scots pine	11.0					4 - Poor	Remove
527	3032	7855801770	Salix scouleriana	Scouler's willow	17.0					4 - Poor	Remove
528	3031	7855801770	Arbutus menziesii	Pacific madrone	9.0					3 - Fair	Remove
529	3042	7855800010	Pseudotsuga menziesii	Douglas-fir	19.4					4 - Poor	Remove
530	3043	7855800010	Cedrus deodara	Deodar cedar	20.1					4 - Poor	Remove
531	3044	7855800010	Pseudotsuga menziesii	Douglas-fir	20.4					4 - Poor	Remove
532	3045	7855800010	Cedrus deodara	Deodar cedar	21.4					4 - Poor	Remove
533	3046	7855800010	Pseudotsuga menziesii	Douglas-fir	12.9					4 - Poor	Remove
534	3048	7855800010	Pseudotsuga menziesii	Douglas-fir	18.0					4 - Poor	Remove
535	3047	7855800010	Pseudotsuga menziesii	Douglas-fir	20.0					4 - Poor	Remove
536	3049	7856410010	Arbutus menziesii	Pacific madrone	13.1					3 - Fair	Remove
537	3051	7856410010	Pseudotsuga menziesii	Douglas-fir	11.0					4 - Poor	Remove
538	3050	7856410010	Pseudotsuga menziesii	Douglas-fir	13.4					4 - Poor	Remove
539	3054	7856410010	Arbutus menziesii	Pacific madrone	10.0					4 - Poor	Remove
540	3084	7855800020	Arbutus menziesii	Pacific madrone	12.0					3 - Fair	Remove
541	3086	7855800020	Acer macrophyllum	Bigleaf maple	17.2					3 - Fair	Remove
542	3056	7856410010	Pseudotsuga menziesii	Douglas-fir	9.6					4 - Poor	Remove
543	3057	7856410010	Arbutus menziesii	Pacific madrone	12.0					3 - Fair	Remove
544	3055	7856410010	Arbutus menziesii	Pacific madrone	8.0					3 - Fair	Remove
545	3095	7855800030	Pseudotsuga menziesii	Douglas-fir	20.5					4 - Poor	Remove
546	3060	7856410010	Arbutus menziesii	Pacific madrone	10.9					4 - Poor	Remove
547	3094	7855800030	Pseudotsuga menziesii	Douglas-fir	16.5					4 - Poor	Remove
548	3059	7856410010	Arbutus menziesii	Pacific madrone	13.7					3 - Fair	Remove
549	3093	7855800030	Pseudotsuga menziesii	Douglas-fir	15.8					4 - Poor	Remove
550	3097	7855800030	Thuja plicata	Western red cedar	12.9					4 - Poor	Remove
551	3108	7855800040	Picea pungens	Colorado spruce	10.6					4 - Poor	Remove
552	3109	7855800040	Picea pungens	Colorado spruce	13.5					4 - Poor	Remove
553	3096	7855800030	Pseudotsuga menziesii	Douglas-fir	19.0					4 - Poor	Remove
554	3061	7856410010	Cladrastis kentukea	American yellowwood	11.5					3 - Fair	Remove
555	3063	7856410010	Pseudotsuga menziesii	Douglas-fir	22.3					3 - Fair	Remove
556	3062	7856410010	Cladrastis kentukea	American yellowwood	20.0					3 - Fair	Remove
557	3115	7855800040	Pseudotsuga menziesii	Douglas-fir	12.4					4 - Poor	Remove
558	3117	7855800040	Picea pungens	Colorado spruce	11.4					4 - Poor	Remove
559	3114	7855800040	Pseudotsuga menziesii	Douglas-fir	15.1					4 - Poor	Remove
560	3113	7855800040	Pseudotsuga menziesii	Douglas-fir	15.1					4 - Poor	Remove
561	3064	7856410010	Prunus avium	Sweet cherry	9.3					3 - Fair	Remove
562	3102	7855800040	Pseudotsuga menziesii	Douglas-fir	12.7					4 - Poor	Remove
563	3101	7855800040	Pseudotsuga menziesii	Douglas-fir	20.5					4 - Poor	Remove
564	3099	7855800040	Pseudotsuga menziesii	Douglas-fir	12.9					4 - Poor	Remove
565	3100	7855800040	Pseudotsuga menziesii	Douglas-fir	20.8					4 - Poor	Remove
566	3133	7855800050	Pseudotsuga menziesii	Douglas-fir	8.2					4 - Poor	Remove
567	3132	7855800050	Pseudotsuga menziesii	Douglas-fir	10.5					4 - Poor	Remove
568	3068	7856410010	Malus domestica	Apple	9.8					3 - Fair	Remove
569	3128	7855800050	Pseudotsuga menziesii	Douglas-fir	12.0					4 - Poor	Remove
570	3127	7855800050	Pseudotsuga menziesii	Douglas-fir	15.2					4 - Poor	Remove
571	3126	7855800050	Pseudotsuga menziesii	Douglas-fir	8.8					4 - Poor	Remove
572	3124	7855800050	Picea pungens	Colorado spruce	11.7					4 - Poor	Remove
573	3123	7855800050	Pseudotsuga menziesii	Douglas-fir	18.8					4 - Poor	Remove
574	3119	7855800050	Pseudotsuga menziesii	Douglas-fir	20.0					4 - Poor	Remove
575	3122	7855800050	Pseudotsuga menziesii	Douglas-fir	14.0					4 - Poor	Remove
576	2993	7855800060	Prunus cerasifera	Flowering plum	13.0					3 - Fair	Retain
577	3070	7856410010	Pseudotsuga menziesii	Douglas-fir	16.5					4 - Poor	Remove
578	2994	7855800060	Picea sp.	Spruce species	8.0					3 - Fair	Remove
579	2984	7855800060	Cedrus deodara	Deodar cedar	14.6					4 - Poor	Remove
580	2988	7855800060	Pseudotsuga menziesii	Douglas-fir	11.6					4 - Poor	Remove
581	2983	7855800060	Cedrus deodara	Deodar cedar	11.2					4 - Poor	Remove
582	2981	7855800060	Sequoiadendron giganteum	Giant sequoia	34.0					3 - Fair	Remove
583	2980	7855800060	Sequoiadendron giganteum	Giant sequoia	32.7					3 - Fair	Remove
584	3071	7856410020	Pseudotsuga menziesii	Douglas-fir	12.3					3 - Fair	Remove

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
585	3070	7856410010	Pseudotsuga menziesii	Douglas-fir	16.5					4 - Poor	Remove
586	3144	7855800080	Abies pinsapo	Spanish fir	9.9					3 - Fair	Remove
587	3145	7855800080	Prunus cerasifera	Flowering plum	15.0					4 - Poor	Retain
588	3208	7856410060	Prunus serrulata	Japanese flowering cherry	14.2					4 - Poor	Remove
589	3207	7856410060	Malus domestica	Apple	10.6					3 - Fair	Remove
590	3205	7856410060	Prunus avium	Sweet cherry	11.8					3 - Fair	Remove
591	3203	7856410060	Picea pungens	Colorado spruce	11.0					4 - Poor	Remove
592	3154	7855800110	Prunus domestica	Plum	9.1					3 - Fair	Remove
593	3156	7855800110	Malus domestica	Apple	8.3					3 - Fair	Retain
594	3160	7855800120	Pseudotsuga menziesii	Douglas-fir	23.5					4 - Poor	Remove
595	3161	7855800120	Cedrus deodara	Deodar cedar	24.9					4 - Poor	Remove
596	3219	7856410080	Magnolia	Loebner Magnolia	9.1					3 - Fair	Remove
597	3162	7855800120	Cedrus deodara	Deodar cedar	21.7					4 - Poor	Remove
598	3235	7856410090	Prunus domestica	Plum	12.0					3 - Fair	Remove
599	3263	7856410120	Prunus avium	Sweet cherry	13.4					4 - Poor	Remove
600	3802	2124059001	Alnus rubra	Red alder	10.2					4 - Poor	Remove
601	3786	2124059001	Salix lasiandra	Pacific willow	8.4					3 - Fair	Retain
602	214	2124059001	Pseudotsuga menziesii	Douglas-fir	19.0					3 - Fair	Remove
603	213	2124059001	Thuja plicata	Western red cedar	9.0					3 - Fair	Remove
604	3788	2124059001	Acer macrophyllum	Bigleaf maple	12.0					4 - Poor	Remove
605	3790	2124059001	Acer macrophyllum	Bigleaf maple	16.2					4 - Poor	Remove
606	220	2124059001	Acer platanoides	Norway maple	12.0					3 - Fair	Remove
607	221	2124059001	Calocedrus decurrens	Incense cedar	14.5					3 - Fair	Remove
608	222	2124059001	Thuja plicata	Western red cedar	17.0					2 - Good	Remove
609	223	2124059001	Betula pendula	European white birch	13.5					3 - Fair	Remove
610	224	2124059001	Thuja plicata	Western red cedar	14.0					2 - Good	Remove
611	226	2124059001	Pseudotsuga menziesii	Douglas-fir	11.0					2 - Good	Remove
612	225	2124059001	Acer macrophyllum	Bigleaf maple	8.5					2 - Good	Remove
613	234	2124059001	Alnus rubra	Red alder	8.5					2 - Good	Remove
614	228	2124059001	Pseudotsuga menziesii	Douglas-fir	13.5					3 - Fair	Remove
615	308	6071900180	Thuja plicata	Western red cedar	18.5					4 - Poor	Remove
616	309	6071900180	Ilex aquifolium	English holly	8.0					4 - Poor	Retain
617	303	6071900140	Fagus sylvatica 'purpurea'	European beech (purple)	29.0					3 - Fair	Remove
618	304	6071900150	Thuja plicata	Western red cedar	29.0					4 - Poor	Remove
619	306	6071900160	Pseudotsuga menziesii	Douglas-fir	34.5					2 - Good	Retain
620	305	6071900160	Thuja plicata	Western red cedar	27.5					4 - Poor	Remove
621	301	6071900140	Acer platanoides	Norway maple	11.0					3 - Fair	Remove
622	300	6071900140	Pinus sylvestris	Scots pine	16.5					4 - Poor	Remove
623	297	6071900130	Malus domestica	Apple	8.0					3 - Fair	Remove
624	333	6072200350	Prunus sp.	Plum or cherry	14.5					2 - Good	Remove
625	326	6072200350	Malus domestica	Apple	12.5					3 - Fair	Remove
626	330	6072200350	Prunus sp.	Plum or cherry	11.0					2 - Good	Remove
627	337	6072200360	Magnolia grandiflora	Southern Magnolia	18.0					2 - Good	Remove
628	336	6072200360	×Hesperotropsis leylandii	Leyland cypress	9.0					2 - Good	Retain
629	338	6072200360	×Hesperotropsis leylandii	Leyland cypress	9.0					2 - Good	Remove
630	342	6072200360	×Hesperotropsis leylandii	Leyland cypress	11.0					2 - Good	Remove
631	344	6072200360	×Hesperotropsis leylandii	Leyland cypress	14.0					2 - Good	Remove
632	347	6072200370	Malus sp. <flowering>	Flowering crabapple	10.0					2 - Good	Remove
633	352	6072200370	Malus sp. <flowering>	Flowering crabapple	8.5					2 - Good	Retain
634	353	6072200380	Prunus sp.	Plum or cherry	10.0					3 - Fair	Remove
635	364	6072200400	Cornus sp.	Ornamental dogwood	11.0					2 - Good	Remove
636	365	6072200400	Prunus avium	Sweet cherry	11.5					3 - Fair	Remove
637	369	6072200410	Acer palmatum	Japanese maple	9.0					2 - Good	Remove
638	368	6072200410	Prunus serrulata	Japanese flowering cherry	18.0					2 - Good	Remove
639	371	6072200410	Malus domestica	Apple	11.0					3 - Fair	Remove
640	370	6072200410	Malus domestica	Apple	11.5					3 - Fair	Remove
641	373	6072200410	Magnolia	Loebner Magnolia	9.5					3 - Fair	Retain
642	377	6072200420	Ilex aquifolium	English holly	14.0					3 - Fair	Retain
643	378	6072200420	Corylus avellana	European filbert	15.5					2 - Good	Retain
644	376	6072200420	Acer platanoides	Norway maple	25.0					2 - Good	Remove
645	381	6072200430	Pseudotsuga menziesii	Douglas-fir	25.0					4 - Poor	Remove
646	381	6072200430	Pseudotsuga menziesii	Douglas-fir	25.0					4 - Poor	Remove
647	379	6072200420	Fagus sylvatica 'purpurea'	European beech (purple)	21.0					2 - Good	Remove
648	384	6072200430	Magnolia grandiflora	Southern Magnolia	8.0					2 - Good	Remove
649	404	6072200440	Abies alba	European silver fir	19.5					4 - Poor	Remove
650	394	6072200440	Malus domestica	Apple	11.5	6.5				3 - Fair	Remove
651	397	6072200440	Tsuga heterophylla	Western hemlock	19.0					3 - Fair	Remove
652	407	6072200440	Abies alba	European silver fir	12.5					4 - Poor	Remove
653	403	6072200440	Abies alba	European silver fir	17.0					3 - Fair	Remove
654	398	6072200440	Tsuga heterophylla	Western hemlock	16.0					3 - Fair	Remove
655	399	6072200440	Abies alba	European silver fir	8.5					3 - Fair	Remove
656	400	6072200440	Abies alba	European silver fir	12.5					3 - Fair	Remove
657	402	6072200440	Abies alba	European silver fir	13.5					3 - Fair	Remove

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
658	401	6072200440	Abies alba	European silver fir	12.0					4 - Poor	Remove
659	406	6072200440	Abies alba	European silver fir	15.0					3 - Fair	Remove
660	405	6072200440	Abies alba	European silver fir	18.0					3 - Fair	Remove
661	410	6072200440	Prunus avium	Sweet cherry	13.0					3 - Fair	Remove
662	411	6072200440	Malus domestica	Apple	12.0					3 - Fair	Remove
663	414	6072200440	Thuja plicata	Western red cedar	14.0					3 - Fair	Remove
664	420	6072200440	Thuja plicata	Western red cedar	32.0					3 - Fair	Remove
665	422	6072200440	Pinus nigra	Austrian pine	16.0					3 - Fair	Remove
666	421	6072200440	Thuja plicata	Western red cedar	22.0					3 - Fair	Remove
667	414	6072200440	Thuja plicata	Western red cedar	14.0					3 - Fair	Remove
668	415	6072200440	Thuja plicata	Western red cedar	15.0	13				3 - Fair	Remove
669	416	6072200440	Thuja plicata	Western red cedar	9.0					3 - Fair	Remove
670	418	6072200440	Thuja plicata	Western red cedar	16.0					4 - Poor	Remove
671	425	6072200450	Acer palmatum	Japanese maple	17.5					2 - Good	Remove
672	428	1951700140	Prunus avium	Sweet cherry	10.0					1 - Excellent	Remove
673	431	1951700130	Pseudotsuga menziesii	Douglas-fir	21.0					4 - Poor	Remove
674	432	1951700130	Pseudotsuga menziesii	Douglas-fir	15.5					4 - Poor	Remove
675	433	1951700130	Pseudotsuga menziesii	Douglas-fir	21.0					4 - Poor	Remove
676	504	1951700800	Ilex aquifolium	English holly	10.0	3	3	3	3	2 - Good	Remove
677	468	1951700800	Aesculus californica	California buckeye	10.0					3 - Fair	Retain
678	467	1951700800	Aesculus californica	California buckeye	8.5					3 - Fair	Retain
679	456	1951700800	Robinia pseudoacacia	Black locust	12.5					3 - Fair	Remove
680	466	1951700800	Aesculus californica	California buckeye	10.0					3 - Fair	Retain
681	465	1951700800	Aesculus californica	California buckeye	12.0					3 - Fair	Retain
682	458	1951700800	Prunus avium	Sweet cherry	8.0					3 - Fair	Remove
683	460	1951700800	Prunus avium	Sweet cherry	13.0					3 - Fair	Remove
684	461	1951700800	Sciadopitys verticillata	Umbrella pine	11.0					3 - Fair	Remove
685	513	1951700790	Malus domestica	Apple	8.0					2 - Good	Remove
686	528	1951700780	Thuja occidentalis	Eastern arborvitae	12.0					2 - Good	Remove
687	529	1951700780	Thuja occidentalis	Eastern arborvitae	9.0					2 - Good	Remove
688	527	1951700780	Thuja occidentalis	Eastern arborvitae	9.0					2 - Good	Remove
689	531	1951700780	Thuja occidentalis	Eastern arborvitae	9.0					2 - Good	Remove
690	530	1951700780	Thuja occidentalis	Eastern arborvitae	8.0					2 - Good	Remove
691	517	1951700780	Prunus sp.	Plum or cherry	11.0					2 - Good	Remove
692	534	1951700770	Prunus avium	Sweet cherry	13.0					3 - Fair	Remove
693	538	6308000370	Pseudotsuga menziesii	Douglas-fir	10.0					4 - Poor	Remove
694	537	6308000370	Picea sp.	Spruce species	10.5					4 - Poor	Remove
695	536	6308000370	Picea sp.	Spruce species	11.0					4 - Poor	Remove
696	535	6308000370	Pseudotsuga menziesii	Douglas-fir	13.0					3 - Fair	Remove
697	549	1951700740	Thuja plicata	Western red cedar	32.0					4 - Poor	Remove
698	550	1951700740	Pseudotsuga menziesii	Douglas-fir	24.0					4 - Poor	Remove
699	551	1951700740	Abies grandis	Grand fir	15.5					4 - Poor	Remove
700	552	1951700740	Picea sp.	Spruce species	12.0					4 - Poor	Remove
701	556	1951700740	Thuja plicata	Western red cedar	9.5					3 - Fair	Remove
702	562	1951700740	Tsuga heterophylla	Western hemlock	14.0					4 - Poor	Remove
703	563	1951700740	Tsuga heterophylla	Western hemlock	12.0					4 - Poor	Remove
704	564	1951700740	Thuja plicata	Western red cedar	15.5					4 - Poor	Remove
705	565	1951700740	Thuja plicata	Western red cedar	10.5					4 - Poor	Remove
706	566	1951700740	Thuja plicata	Western red cedar	14.0					4 - Poor	Remove
707	572	1951810080	Pseudotsuga menziesii	Douglas-fir	10.0					4 - Poor	Remove
708	567	1951700740	Malus domestica	Apple	11.0					3 - Fair	Retain
709	569	1951810080	Thuja sp.	Cedar species	9.0					2 - Good	Retain
710	578	1951810090	Pyrus pyrifolia	Asian pear	8.8					3 - Fair	Retain
711	581	1951810090	Salix lasiandra	Pacific willow	10.0					3 - Fair	Remove
712	580	1951810090	Salix lasiandra	Pacific willow	17.0					3 - Fair	Remove
713	577	1951810090	Pseudotsuga menziesii	Douglas-fir	24.4					3 - Fair	Remove
714	616	1951810110	Thuja occidentalis	Eastern arborvitae	8.0					2 - Good	Remove
715	615	1951810110	Thuja occidentalis	Eastern arborvitae	8.0					2 - Good	Remove
716	614	1951810110	Thuja occidentalis	Eastern arborvitae	8.0					2 - Good	Remove
717	705	1951810120	Betula pendula	European white birch	8.8					2 - Good	Remove
718	666	1951830100	Pseudotsuga menziesii	Douglas-fir	8.4					3 - Fair	Remove
719	663	1951830100	Abies grandis	Grand fir	15.8					4 - Poor	Remove
720	662	1951830100	Pinus nigra	Austrian pine	15.5					3 - Fair	Remove
721	661	1951830100	Pinus nigra	Austrian pine	13.2					3 - Fair	Remove
722	660	1951830100	Pinus nigra	Austrian pine	19.5					3 - Fair	Remove
723	659	1951830100	Prunus cerasifera	Flowering plum	11.4					3 - Fair	Remove
724	683	1951830050	Tsuga heterophylla	Western hemlock	8.3					3 - Fair	Remove
725	687	1951830050	Acer platanoides 'Crimson King'	Norway maple 'Crimson King'	8.8					3 - Fair	Remove
726	692	1951830050	Callitropsis┬ánootkatensis	Alaska cedar	9.0					3 - Fair	Remove
727	3883	1024059130	Acer macrophyllum	Bigleaf maple	11.0					2 - Good	Retain
728	3882	1024059130	Alnus rubra	Red alder	12.0	10	9	7		4 - Poor	Remove
729	3865	1024059130	Alnus rubra	Red alder	11.0	9				3 - Fair	Remove
730	85	1024059089	Salix babylonica	Weeping willow	10.0					3 - Fair	Retain

	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
731	3872	1024059130	Alnus rubra	Red alder	12.0					3 - Fair	Remove
732	3871	1024059130	Alnus rubra	Red alder	10.0					3 - Fair	Remove
733	3870	1024059130	Alnus rubra	Red alder	10.5					3 - Fair	Remove
734	3869	1024059130	Alnus rubra	Red alder	10.0					3 - Fair	Remove
735	3866	1024059130	Alnus rubra	Red alder	12.5	9				3 - Fair	Remove
736	3868	1024059130	Alnus rubra	Red alder	14.5					3 - Fair	Remove
737	94	3425059010	×Hesperotropsis leylandii	Leyland cypress	10.0					2 - Good	Remove
738	93	3425059010	×Hesperotropsis leylandii	Leyland cypress	9.0					2 - Good	Remove
739	31	3425059010	×Hesperotropsis leylandii	Leyland cypress	10.0					2 - Good	Remove
740	89	3425059010	×Hesperotropsis leylandii	Leyland cypress	8.0					2 - Good	Remove
741	92	3425059010	×Hesperotropsis leylandii	Leyland cypress	9.0					2 - Good	Remove
742	3875	1024059130	Alnus rubra	Red alder	8.0					4 - Poor	Remove
743	32	3425059010	×Hesperotropsis leylandii	Leyland cypress	14.0					2 - Good	Remove
744	3874	1024059130	Alnus rubra	Red alder	12.0					4 - Poor	Remove
745	3873	1024059130	Alnus rubra	Red alder	10.0					4 - Poor	Remove
746	71	1024059119	Salix babylonica	Weeping willow	20.0					3 - Fair	Retain
747	70	2225059272	Pseudotsuga menziesii	Douglas-fir	13.0					4 - Poor	Remove
748	3906	1024059130	Acer macrophyllum	Bigleaf maple	10.0					2 - Good	Retain
749	3902	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
750	3898	1024059130	Alnus rubra	Red alder	9.5					3 - Fair	Retain
751	2148	7811210180	Pseudotsuga menziesii	Douglas-fir	13.3					4 - Poor	Retain
752	3899	1024059130	Salix lasiandra	Pacific willow	12.0	6				3 - Fair	Retain
753	3900	1024059130	Salix lasiandra	Pacific willow	14.0	12	10			3 - Fair	Retain
754	3904	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
755	2263	0324059066	Alnus rubra	Red alder	9.2					2 - Good	Retain
756	3908	1024059130	Acer macrophyllum	Bigleaf maple	18.0					3 - Fair	Retain
757	3907	1024059130	Acer macrophyllum	Bigleaf maple	9.8					3 - Fair	Retain
758	3911	1024059130	Alnus rubra	Red alder	12.0					4 - Poor	Remove
759	3910	1024059130	Arbutus menziesii	Pacific madrone	10.0					2 - Good	Remove
760	2295	0324059066	Alnus rubra	Red alder	8.4					3 - Fair	Retain
761	2296	3425059010	×Hesperotropsis leylandii	Leyland cypress	14.0					2 - Good	Remove
762	2297	3425059010	×Hesperotropsis leylandii	Leyland cypress	14.0					2 - Good	Remove
763	2298	3425059010	×Hesperotropsis leylandii	Leyland cypress	18.0					2 - Good	Remove
764	2299	3425059010	×Hesperotropsis leylandii	Leyland cypress	12.5					2 - Good	Remove
765	3347	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
766	2153	7811210180	×Hesperotropsis leylandii	Leyland cypress	8.8					3 - Fair	Retain
767	2154	7811210180	Prunus serrulata	Japanese flowering cherry	8.6					3 - Fair	Retain
768	3884	1024059130	Alnus rubra	Red alder	9.0					2 - Good	Remove
769	3885	1024059130	Alnus rubra	Red alder	8.0					4 - Poor	Retain
770	3886	1024059130	Alnus rubra	Red alder	8.9					4 - Poor	Retain
771	3887	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
772	3889	1024059130	Alnus rubra	Red alder	11.0	5				3 - Fair	Retain
773	3888	1024059130	Alnus rubra	Red alder	8.5					3 - Fair	Retain
774	3894	1024059130	Alnus rubra	Red alder	8.0					3 - Fair	Retain
775	3893	1024059130	Acer macrophyllum	Bigleaf maple	8.0					3 - Fair	Retain
776	3892	1024059130	Alnus rubra	Red alder	9.0	4				3 - Fair	Retain
777	3891	1024059130	Alnus rubra	Red alder	11.0					3 - Fair	Retain
778	3895	1024059130	Acer macrophyllum	Bigleaf maple	10.0					2 - Good	Retain
779	3881	1024059130	Acer macrophyllum	Bigleaf maple	10.0					2 - Good	Retain
780	3890	1024059130	Alnus rubra	Red alder	10.0	8				3 - Fair	Retain
781	3896	1024059130	Alnus rubra	Red alder	14.0					3 - Fair	Retain
782	3897	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
783	3348	1024059130	Alnus rubra	Red alder	8.0	5				3 - Fair	Retain
784	3350	1024059130	Alnus rubra	Red alder	12.0	11				3 - Fair	Retain
785	3349	1024059130	Alnus rubra	Red alder	8.0	8				3 - Fair	Retain
786	3352	1024059130	Alnus rubra	Red alder	9.0	8				3 - Fair	Retain
787	3353	1024059130	Alnus rubra	Red alder	10.0	8	6	5		3 - Fair	Retain
788	3354	1024059130	Alnus rubra	Red alder	8.0	7				3 - Fair	Retain
789	3355	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
790	3356	1024059130	Alnus rubra	Red alder	10.0					3 - Fair	Retain
791	3357	1024059130	Alnus rubra	Red alder	9.0					3 - Fair	Retain
792	33	9538900020	Malus domestica	Apple	8.0					2 - Good	Remove
793	46	9538900030	Prunus serrulata	Japanese flowering cherry	13.7					3 - Fair	Remove
794	48	9538900020	Malus domestica	Apple	11.1					3 - Fair	Retain
795	2655	1524059005	Quercus palustris	Pin oak	13.2					2 - Good	Retain
796	2677	1524059005	Pinus pungens	Table mountain pine	10.8					3 - Fair	Retain
797	2714	1524059032	Pinus nigra	Austrian pine	12.7					2 - Good	Retain
798	2562	2206500240	Malus domestica	Apple	12.4					3 - Fair	Retain
799	2531	1024059123	Populus balsamifera	Black cottonwood	9.0					4 - Poor	Retain
800	2758	7856640010	Thuja plicata	Western red cedar	8.4					3 - Fair	Retain
801	2760	7856640020	Pseudotsuga menziesii	Douglas-fir	12.4					3 - Fair	Retain
802	2787	7856640020	Thuja plicata	Western red cedar	10.8					4 - Poor	Retain
803	2776	7856640020	Prunus avium	Sweet cherry	11.8					3 - Fair	Retain

Field inventory completed on October 13, 2016, and includes trees that may have been removed by others since that time.

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	Tree Tag	Parcel Number	Scientific Name	Common Name	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Condition	Remove or Retain?
804	2800	7856640020	Pseudotsuga menziesii	Douglas-fir	14.6					4 - Poor	Retain
805	2801	7856640020	Acer macrophyllum	Bigleaf maple	8.0					4 - Poor	Retain
806	2815	7856640030	Acer macrophyllum	Bigleaf maple	8.6					3 - Fair	Retain
807	2814	7856640030	Acer macrophyllum	Bigleaf maple	10.2					3 - Fair	Retain
808	3609	2600010580	Pseudotsuga menziesii	Douglas-fir	16.6					4 - Poor	Retain
809	3575	2600010620	Cedrus deodara	Deodar cedar	19.8					4 - Poor	Retain
810	3574	2600010620	Cedrus deodara	Deodar cedar	16.7					4 - Poor	Retain
811	3579	2600010620	Cedrus deodara	Deodar cedar	26.0					4 - Poor	Retain
812	3584	2600010620	Acer macrophyllum	Bigleaf maple	9.0					3 - Fair	Retain
813	3587	2600010630	Arbutus menziesii	Pacific madrone	10.9					3 - Fair	Retain
814	3588	2600010630	Acer macrophyllum	Bigleaf maple	8.6					2 - Good	Retain
815	3591	2600010630	Pseudotsuga menziesii	Douglas-fir	9.0					4 - Poor	Retain
816	3592	2600010630	Pseudotsuga menziesii	Douglas-fir	15.5					4 - Poor	Retain
817	3603	7855801540	Acer platanoides	Norway maple	13.1					3 - Fair	Retain
818	3602	7855801540	Acer platanoides	Norway maple	12.0					3 - Fair	Retain
819	440	1951700130	Thuja plicata	Western red cedar	28.5					2 - Good	Retain
820	568	1951810080	Populus balsamifera	Black cottonwood	47.0	34				2 - Good	Retain
821	620	1951810120	Betula pendula	European white birch	10.1					2 - Good	Remove
822	256	2124059001	Alnus rubra	Red alder	8.5					2 - Good	Retain
823	241	2124059001	Pseudotsuga menziesii	Douglas-fir	11.0					3 - Fair	Remove
824	237	2124059001	Alnus rubra	Red alder	9.5					2 - Good	Remove
825	218	2124059001	Acer platanoides	Norway maple	9.5					3 - Fair	Remove
826	219	2124059001	Acer platanoides	Norway maple	12.0					3 - Fair	Retain
827	3785	2124059001	Pseudotsuga menziesii	Douglas-fir	9.3					4 - Poor	Retain
828	3784	2124059001	Alnus rubra	Red alder	11.1					3 - Fair	Retain
829	3783	2124059001	Alnus rubra	Red alder	11.8					3 - Fair	Retain
830	3780	2124059001	Alnus rubra	Red alder	9.3					3 - Fair	Retain
831	3782	2124059001	Alnus rubra	Red alder	12.1					3 - Fair	Retain
832	3787	2124059001	Salix lasiandra	Pacific willow	9.7					4 - Poor	Retain
833	3792	2124059001	Acer macrophyllum	Bigleaf maple	13.0					4 - Poor	Remove
834	3794	2124059001	Alnus rubra	Red alder	9.3					4 - Poor	Retain
835	3793	2124059001	Acer macrophyllum	Bigleaf maple	11.0					4 - Poor	Remove
836	3797	2124059001	Alnus rubra	Red alder	12.7					4 - Poor	Retain
837	3798	2124059001	Acer macrophyllum	Bigleaf maple	11.7					3 - Fair	Retain
838	3789	2124059001	Alnus rubra	Red alder	16.0					3 - Fair	Retain
839	665	1951830100	Salix scouleriana	Scouler's willow	12.9					2 - Good	Remove
840	694	1951830100	Salix scouleriana	Scouler's willow	8.0					3 - Fair	Retain
841	335	6072200360	Juniperus communis	Common juniper	23.0					3 - Fair	Retain
842	375	6072200410	Picea pungens var. glauca	Colorado blue spruce	19.0					2 - Good	Remove
843	392	6072200440	Pinus nigra	Austrian pine	16.0					4 - Poor	Remove
844	3089	7855800030	Arbutus menziesii	Pacific madrone	16.7					3 - Fair	Retain
845	3103	7855800040	Pseudotsuga menziesii	Douglas-fir	19.5					4 - Poor	Remove
846	3106	7855800040	Pseudotsuga menziesii	Douglas-fir	12.2					4 - Poor	Retain
847	3107	7855800040	Pseudotsuga menziesii	Douglas-fir	17.6					4 - Poor	Retain
848	3058	7856410010	Pinus contorta	Shore pine	9.3					4 - Poor	Retain
849	3337	7856410100	Pinus thunbergii	Japanese black pine	15.3					2 - Good	Remove
850	2959	7855000310	Chamaecyparis lawsoniana	Lawson falsecypress	12.5					2 - Good	Remove

Revised Targeted Critical Areas Geologic Hazard Evaluation

Energize Eastside Project
Bellevue, Washington

for
Puget Sound Energy

July 11, 2017

GeoEngineers
Earth Science + Technology

DSD 002658

Revised Targeted Critical Areas Geologic Hazard Evaluation

Energize Eastside Project
Bellevue, Washington

for
Puget Sound Energy

July 11, 2017

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Revised Targeted Critical Areas Geologic Hazard Evaluation

Energize Eastside Project
Bellevue, Washington

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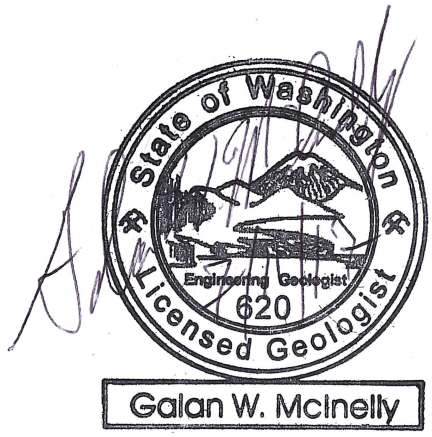

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DSD 002661

INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) is pleased to present the revised results for targeted critical areas evaluation of specific geologic hazards identified by Puget Sound Energy (PSE) for the Energize Eastside Project. Our services have been provided in general accordance with the proposal between GeoEngineers and PSE dated June 21, 2017. These services were authorized by Kelly Purnell with PSE on June 15, 2017, and formal authorization was received on June 26, 2017.

The project area is located along existing PSE rights-of-way and includes areas within the city of Bellevue. We previously provided a geologic hazard evaluation for various routes under consideration, including the route evaluated within this document, in a separate report submitted to PSE on December 19, 2014. The geologic hazards evaluation included in this report focuses on a desktop review for steep slope and landslide hazard areas (geologic hazard areas), as assigned by PSE, relative to proposed vegetation management activities, including tree-removal required for construction access and pole replacement. PSE has provided specific locations for evaluation and also provided a map developed by others which shows proposed pole replacement activities including proposed tree removal, vegetation management zones and access roads.

LOCAL REGULATIONS

GeoEngineers assessed local regulations in the Bellevue Land Use Code, Critical Areas Overlay District for Geologic Hazard Areas (20.25H.120) for the project areas identified by PSE that coincide with regulated geologic hazard areas.

General Geologic Hazard Area Buffers

The City of Bellevue Land Use Code, 20.25H.120, criteria for defining geologic hazards and geologic hazard buffers is described below.

- *Landslide Hazards: Areas of slopes of 15 percent of more with more than 10 feet of rise, which also displace areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides, areas that have shown movement during the past 13,500 years or that are underlain by landslide deposits, slopes that are parallel or subparallel to planes of weakness in subsurface materials, slopes exhibiting geomorphological features indicative of past failures such as hummocky ground and back-rotated benches on slopes, areas with seeps indicating a shallow ground water table on or adjacent to the slope face, or areas of potentially instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.*

  According to the Bellevue Land Use Code, the established critical area buffer in geologic hazard critical areas for landslide hazards is 50 feet from the top of the slope.

- *Steep Slopes: Slope of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.*

  According to the Bellevue Land Use Code, the established critical area buffer in general geologic hazard critical areas for steep slopes is 50 feet from the top of the slope.

EXISTING CONDITIONS

GeoEngineers reviewed a previous report, titled Geologic Hazards Evaluation and Preliminary Geotechnical Engineering Services report, submitted to PSE on December 2014, to assess existing conditions in the project area within City of Bellevue (GeoEngineers 2014). Existing geology in the identified areas mainly consists of glacial drift, recessional outwash, glacially consolidated till and advance outwash deposits, with the exception of a small areas of peat, fill, alluvium and Eocene age sedimentary rocks. Soil types anticipated in the project area include mainly silty gravel, silty sand and silt.

Steep slopes with slopes 40 percent or greater are observed locally within the project area, however the steep slope areas where selected tree removal is proposed are generally developed and include rockeries, landscaped residential slopes and managed right-of-way areas that are unlikely to be adversely impacted. Some undeveloped/natural areas of steep slopes along the project area include the Coal Creek drainage east and west locally along Coal Creek Parkway. These Coal Creek drainage areas also include localized mapped landslide hazards. We observed no active areas of slope movement or instability for project areas that include mapped steep slope areas or steep slope and landslide areas within the Coal Creek drainage area.

IMPACT ASSESSMENT

Tree Removal

There are two primary ways in which tree removal activities may impact slope stability on steep slopes or landslide hazard areas. After tree removal, root decay causes both the numbers of roots and the tensile strength of the remaining individual roots to decrease with time (Burroughs and Thomas 1977). Studies show that the period of minimum root strength is typically from 3 to 5 years after harvest (Ziemer 1981a; 1981b), but can extend up to 10 to 20 years depending on the tree species. For example, minimum root strength in evergreens is typically 10 years after harvest, alders have a minimum root strength of 5 to 10 years after harvest, and maples typically maintain full root strength after harvest (because they regrow from the existing stump). The reductions in root strength result in a net decrease in the cohesive strength of the near-surface soil mass.

Tree removal likely will modify surface and subsurface hydrology. Tree removal may increase soil moisture by reducing canopy interception and evapotranspiration. Ground-based yarding equipment can compact soil, which may alter hydrologic processes in certain soil types.

Elevated groundwater levels decreases the stability of slopes by reducing the shear strength of the soil and by adding additional weight. The probability of landsliding from increased groundwater levels depends on the magnitude of the increase and the existing stability of the slope. The magnitude of potential changes in groundwater levels from tree removal is highly variable and depends on several factors, including the tree size, silviculture, subsurface conditions and topography.

In general, tree removal will increase the impact on slope stability for steep slopes or landslide hazard areas. However, fewer impacts are expected in areas where tree removal is isolated to one or two trees and the steep slope or landslide hazard area is otherwise stable and well vegetated. Additionally, fewer impacts are expected at the toe of the slope, compared to tree removal within the body or at the top of the slope.

Much of the tree removal near/on steep slope areas north of I-90 are situated in the PSE parcel that will be developed for the Richards Creek Substation. GeoEngineers completed a geotechnical engineering report for this substation in a report dated September 23, 2016 and an addendum report dated April 4, 2017. The new substation will require some retaining walls along the south side of the parcel where existing steep slopes are mapped, and a soldier pile wall on the east side of the site. The soldier pile wall (and eastern limits of the new substation) will be located east of the existing eastern steep slope area. Thus, construction of the substation and soldier wall will result in removal of this small steep slope area and the hillside will be stabilized by the wall. As such, the proposed tree removal located within the steep slopes of the substation limits will not affect the stability of the hillside.

Access Construction

Temporary access routes will generally follow previously established access trails and routes, and in some cases, will cross existing developed landscape. Therefore, little cutting or filling will be required. Small amounts of quarry spalls might be necessary to stabilize portions of existing routes. Many of the existing routes are overgrown with vegetation and, thus, will need to be cleared. Standard erosion control best management practices (BMPs) should be followed during clearing and use of the temporary access routes. Following completion of construction activities, restoration BMPs such as mulching and/or placing jute matting, should be implemented.

Pole Installation

Where new poles are located in steep slope or landslide hazard areas, a temporary working bench might be necessary to install the pole. We anticipate that these benches might vary from about 10 feet by 10 feet to 30 feet by 30 feet in dimension. The same considerations discussed above for access routes also apply to benches needed for pole installation. We recommend that clearing activities be restricted to that necessary to auger the hole for the pole.

Recommendations for the design and construction of poles are presented in our Geotechnical Engineering Services report dated June 8, 2016. In general, most of the site soils along the proposed route consist of recessional deposits or glacially consolidated deposits, and in some limited locations, bedrock. These soils should provide adequate support for the new poles, and it is our opinion that once the pole is installed, the pole will not adversely impact slope stability since the pole should actually provide additional resisting force against slope failure, provided the pole is embedded to a sufficient depth.

Conclusions

Mapped steep slopes in Bellevue that include slopes 40 percent or greater are observed locally within the project area, however many of these areas are developed and include rockeries, landscaped residential or commercial development slopes and cut slopes associated with paved roadways and include the following:

- Two trees removed from just north of 132nd Avenue SE.
- Multiple trees removed and access just east of the intersection of Somerset Drive SE and 134th Place SE, north to Somerset Place SE.
- Multiple trees removed just east of the intersection of Somerset Drive SE and Somerset Boulevard SE.

- Multiple trees removed just east of 136th Place SE between SE 43rd Place and SE 43rd Street; and two trees between this area and the intersection of Somerset Drive SE and Somerset Boulevard SE.
- Two trees removed and access north of the intersection of SE 43rd St. and the PSE right-of-way.
- Multiple trees removed south of SE 42nd Street.
- Multiple trees removed between SE 37th Street and SE 36th Street.
- Access east of SE 32nd Street.
- Multiple trees removed in the Richards Creek Substation and Lakeside Substation area.
- Multiple trees removed and access south of SE 26th Street.

A localized natural area of steep slopes in the project area includes the Coal Creek drainage east and west locally along Coal Creek Parkway; this area also has localized mapped landslide hazards. The project area is within an existing right-of-way that is maintained for vegetation by PSE and includes a narrower right-of-way managed by a private petroleum pipeline company. The right-of-way for the buried petroleum pipeline includes areas with no trees and grass that is mowed regularly for vegetation management. We observed no indication of slope movement in the pipeline right-of-way that is included within the PSE right-of-way. The proposed removal of 11 selected trees in this area is consistent with the management activities of the existing pipeline right-of-way and is not anticipated to impact the mapped geologic hazard areas within the Coal Creek drainage, in our opinion, provided that no tracked or rubber-tired equipment is used to remove the trees.

Conceptual Impact Mitigation Strategy

Vegetation Management and Tree Removal

For vegetation management and tree removal in the City of Bellevue within the mapped geohazard areas outlined in the proposed PSE project segment, GeoEngineers suggests the following options for mitigating impacts after tree removal.

In general, to limit impacts on slope stability from vegetation management and tree removal within steep slope and landslide hazard areas, the sites should be accessed by foot to reduce equipment impacts. Hand cutting with chainsaws should be implemented to trim branches and remove trees. Stumps should remain in place, but can be cut to ground level. Branches, limbs, trunks and other tree debris should be chipped and scattered around the removal site within the right-of-way. Where chipping is not feasible, unchipped tree debris can be scattered.

In areas where tree removal is widely spaced within steep slope and landslide buffer areas, the trees should be cut, stumps left in place, and trimmed branches and trunks can be scattered within the right-of-way.

In areas where tree removal is clustered, erosion control BMPs, such as grass seeding, leaving stumps, scattering straw and/or replacement planting of native shrubs or small trees, should be implemented to reduce concentrated flows and minimize disturbance.

In areas where houses are located within 25 to 50 feet of vegetation management and tree removal, all tree debris should be removed from the owner's property and communication with the property owner is

suggested to identify possible reseeding, replacement tree or shrub, or landscaping options. If agreeable to the property owner, it is possible that the tree trunk can be cut and left below ground surface to maintain root strength (up to 5 to 10 years, depending on tree type), and a replacement tree or shrub may be planted near the trimmed trunk.

Reestablish Access Routes

Where vegetation clearing is required to reestablish the access on existing trails and access routes, BMPs should be implemented; these BMPs can include, but are not limited to: outsloping road surfaces, crowning road surfaces (where appropriate, such as at ridge tops and where roads climb gently inclined surfaces) and installing water bars or rolling dips at regularly spaced intervals to avoid concentrating surface water flow along the road surface. The spacing depends on the grade of the route, the soil type present, proximity to streams and the intended use of the road (e.g., temporary or permanent).

Most, if not all, access routes will be temporary and will be abandoned following construction of the transmission line. In the transmission corridor, no temporary access roads will cross any drainages situated in geologic hazard areas (i.e. Coal Creek).

It is the contractor's responsibility to complete construction work safely and in accordance with applicable local, state and federal laws. After access use is complete, where it is deemed necessary, limited regrading of the access route is recommended to avoid concentrating surface runoff along tracks, ruts or other potential flowpaths. Following completion of construction activities, the construction access routes will be graded to a stable free-draining configuration, treated with appropriate erosion control measures, such as mulching and/or placing jute matting and installation of water bars as needed to control runoff, and seeded. If jute mat is determined a necessary BMP, the jute mat should be anchored at the upslope and downslope ends and secured with staples per the manufacturer's recommendations.

Pole Installation

Where a bench is required to install a pole on a steep slope or landslide hazard area, the recommendations presented above for temporary access routes also apply for pole installation. Appropriate erosion control BMPs should be implemented during construction, and the disturbed area should be restored after pole installation by seeding or revegetating and covering the disturbed area with appropriate BMPs. Soil removed from the new pole excavations should be scattered into vegetation away from the any landscaped areas. Any areas of exposed soil must be seeded and mulched (or covered with hog fuel) to prevent transport of sediment down the steep slopes or into the seepage area during rain events. If the work area is wet or has standing water, driving mats should be used under all equipment and all soils should be removed from the site for off-site disposal.

For poles located in geologic hazards areas, the old poles should be cut off approximately 1 to 2 feet below the ground surface and the remaining portion of each pole left in place. If poles are installed on slopes steeper than 2H:1V (horizontal:vertical), they should be embedded at least 3 feet deeper than the typical design embedment.

CODE COMPLIANCE

20.25H.125 Performance standards – Landslide hazards and steep slopes

In addition to generally applicable performance standards set forth in LUC 20.25H.055 and 20.25H.065, development within a landslide hazard or steep slope critical area or the critical area buffers of such hazards shall incorporate the following additional performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.

A. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography.

Response to Code Requirement: No structures will be constructed as part of the proposed project. Site improvements (pole removal, pole replacement, access roads, and vegetation management) are not anticipated to adversely impact the natural contour of the slope. The proposed site activities that include vegetation management, tree removal, and temporary access roads (associated with the proposed pole replacement activities) will maintain overall existing site topography.

B. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation.

Response to Code Requirement: No structures will be constructed as part of the proposed project. Site improvements include localized vegetation management, including tree removal, and use of existing access routes (associated with the proposed pole replacement activities). The proposed tree removal and surface disturbance will be limited to reduce potential impacts to natural landforms and vegetation.

C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties.

Response to Code Requirement: The proposed development includes vegetation management, including tree removal and use of existing access routes (associated with the proposed pole replacement activities) that will be followed by mitigation measures to reduce potential impacts to geologic hazards that include landslide and steep slope hazards. Mitigation measures include a variety of BMPs to reduce potential impacts to geologic hazards in the vicinity of neighboring properties. BMPs include plant replacement, scattering trimmed or removed tree debris, and chipping wood to reduce potential impacts to work areas as appropriate. Removal of vegetation by hand and/or using limited access machinery will reduce potential impacts to landslide and steep slope hazard areas. It is our opinion that the proposed project will not require additional buffers.

D. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall.

Response to Code Requirement: In the transmission corridor, no retaining walls or grading activities are proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities). The development of soldier pile walls and retaining walls for the Richards Creek Substation is discussed in detail in the substation-specific geotechnical engineering report dated September 23, 2016, and in an addendum report dated April 4, 2017. The use of retaining walls for the new substation will reduce disturbance

and grading of the existing natural slopes, which would be otherwise necessary without construction of the walls.

E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer.

Response to Code Requirement: No new impervious surfaces are proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities) within mapped critical area and mapped critical area buffers of the transmission corridor. Five narrow, and relatively small (low square footage), steep slopes are located on the future Richards Creek Substation property (comprising 8.46 acres), which is partially developed with an existing pole yard (existing hard surface/impervious surface of 1.58 acres). Only two mapped steep slopes are located within the limits of the new substation (one of which is mapped in the graded/compacted gravel pole yard). Based on the design of the future Richards Creek Substation, site development will be limited to that area necessary for the substation, leaving the surrounding vegetation and grade intact. As such, only one of the mapped steep slopes in the future Richards Creek Substation property will experience an increase in impervious surface.

F. Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with these criteria.

Response to Code Requirement: No change in grade is proposed relative to the proposed vegetation management, tree removal and access route activities (associated with the proposed pole replacement activities) within the transmission corridor. Within the new substation, grade transitions along the east side (up to 24 feet in height) will be supported with a soldier pile wall (cantilever and with tiebacks). Grade transitions along the west side (up to 6 feet in height) will be supported by fill slopes and a cast-in-place retaining wall.

G. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation.

Response to Code Requirement: No building foundations are proposed relative to the proposed vegetation management and tree removal activities associated with the proposed pole replacement activities within the transmission corridor. However, for stability purposes, drilled pier foundations will be utilized on select poles in the corridor where appropriate. The new substation is not a building and, thus, does not have typical foundation walls; as such, soldier pile and retaining walls will be necessary to retain the required grade changes.

H. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification.

Response to Code Requirement: No pole-type structures are proposed relative to the proposed vegetation management and tree removal activities. The new poles will meet the preferred construction type (which is pole-type construction). The new substation cannot be tiered and was situated east of the existing Olympic pipeline. This requires construction of a soldier pile wall east of

the existing steep slope area. While this results in grading in the steep slope area, the area of disturbance is minimized by construction of a vertical wall.

I. On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types.

Response to Code Requirement: No structures requiring pile deck support are proposed relative to the proposed vegetation management and tree removal activities. The new poles will meet the preferred construction type (which is pole-type construction).

No parking or garage structures are planned for the new substation. Pile-supported deck structures are not feasible for a substation. The substation grades will require cutting into the steep slope on the east side, which will then be retained with a soldier pile wall.

J. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210. (Ord. 5680, 6-26-06, § 3).

Response to Code Requirement: Temporary disturbance for the proposed vegetation management and tree removal activities and access routes (associated with the proposed pole replacement activities) within the existing transmission corridor will be mitigated by scattering and/or chipping trimmed limbs and logs, replanting vegetation, and using limited access equipment or accessing only by foot as appropriate. For steep slope areas in the vicinity of the new substation that will be disturbed during construction, the disturbed areas should be restored by seeding/revegetating and covering the planted area with mulch or other appropriate BMPs.

LIMITATIONS

We have prepared this report for the exclusive use of PSE and their authorized agents for the Energize Eastside project located in Bellevue, Washington.

The purpose of our services was to review slope stability and landslide hazard impacts in relation to vegetation management and tree removal and temporary access routes (associated with the proposed pole replacement activities) in steep slope and landslide critical hazard areas along the transmission line corridor within the City of Bellevue. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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CITY OF BELLEVUE CRITICAL AREAS DELINEATION REPORT

Puget Sound Energy – Energize Eastside Project

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111103

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Cite this document as:
The Watershed Company. May 2016. City of Bellevue Critical Areas Delineation Report: Puget Sound Energy – Energize Eastside Project. Prepared for PSE.

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CITY OF BELLEVUE DELINEATION REPORT

PUGET SOUND ENERGY – ENERGIZE EASTSIDE

1 INTRODUCTION

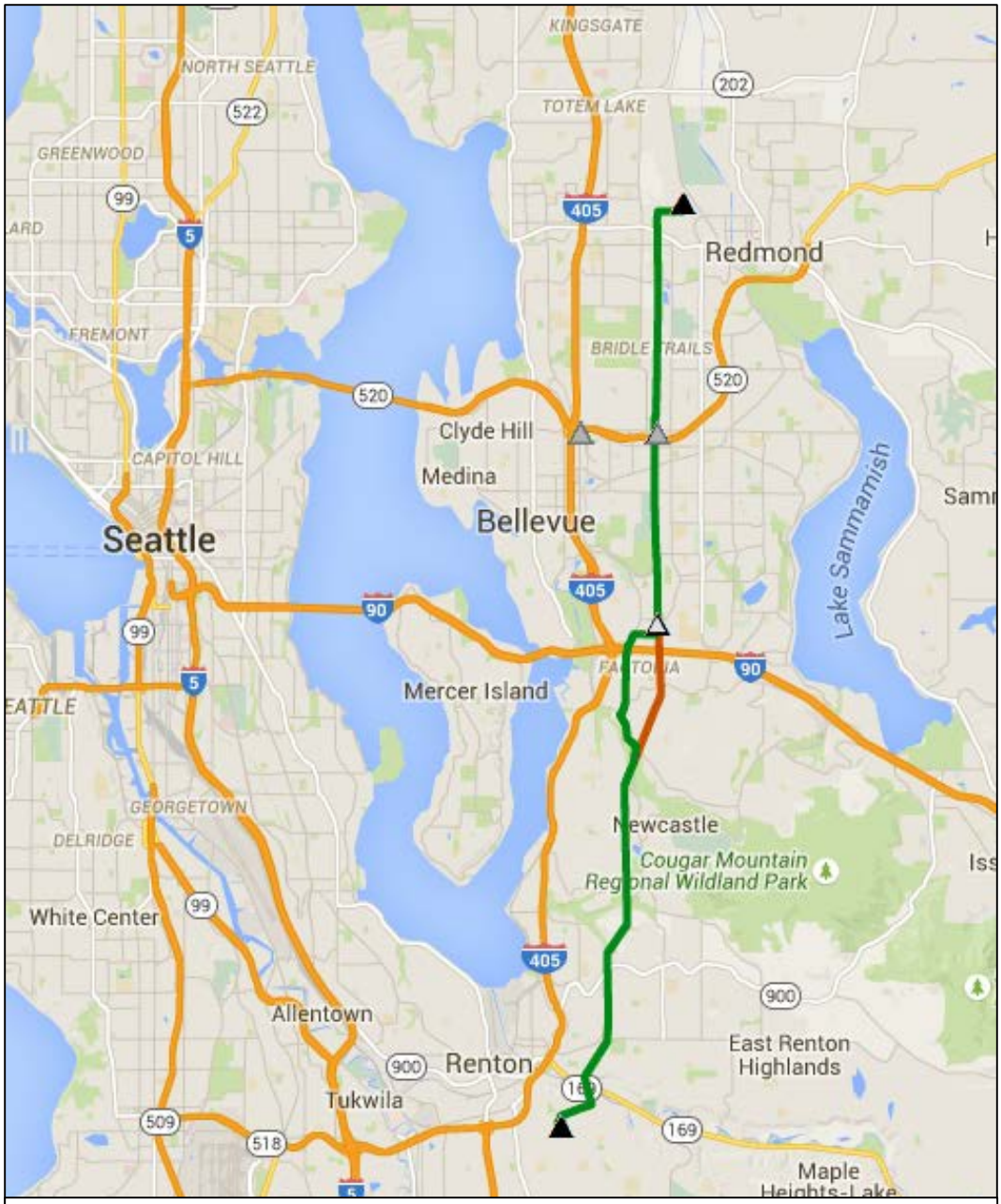
1.1 Background and Purpose

The purpose of this report is to identify and document potential critical areas associated with Puget Sound Energy's (PSE's) Energize Eastside project. The Energize Eastside project proposes to build a new electric substation and higher capacity transmission lines to serve homes and businesses on the Eastside. Current route options include 'Oak' and 'Willow' routes that will extend from Redmond to Renton (Figure 1). Each route option includes a set of PSE-labeled segments. The Oak route comprises Segments A, C, E, G2, I, K2, M, and N. The Willow route comprises Segments A, C, E, J, M, and N. This report addresses critical areas located along the proposed routes in the City of Bellevue, and includes PSE-labeled Segments C, E, G2, I, K2, M, and J[1] (Figures 2, 3, 4, and 5).

The length of the study area corridor in the City of Bellevue totals approximately 11.3 miles from NE 60th Street to SE 69th Way. For segments C, E, J and M within the study area corridor, two existing 115 kV transmission lines are spaced approximately 50 feet apart on center. Each line is composed of three conductors (wires) connected to H-frame pole structures. Segments G2, I, and K2 have existing single circuit 115 kV transmission lines. The study area corridor is approximately 50 to 100 feet wide.

[1] PSE segments C and E comprise a portion of Phase 2 Draft Environmental Impact Statement (DEIS) Segment 1. PSE segments G2, I, and K2 comprise Phase 2 DEIS Segment 2. PSE segment M comprises a portion of Phase 2 DEIS Segment 3.

DSD 002675



DISCLAIMER: This interactive map is for illustrative purposes only and search results depicted on it are approximate. It is not used for project planning or engineering purposes. If you have questions about the interactive map, please contact the project team at energizeeastside@pse.com.

Figure 1. Map of proposed Oak and Willow routes from the Energize Eastside website. The Oak route is depicted in green while the Willow route variation is shown in orange.

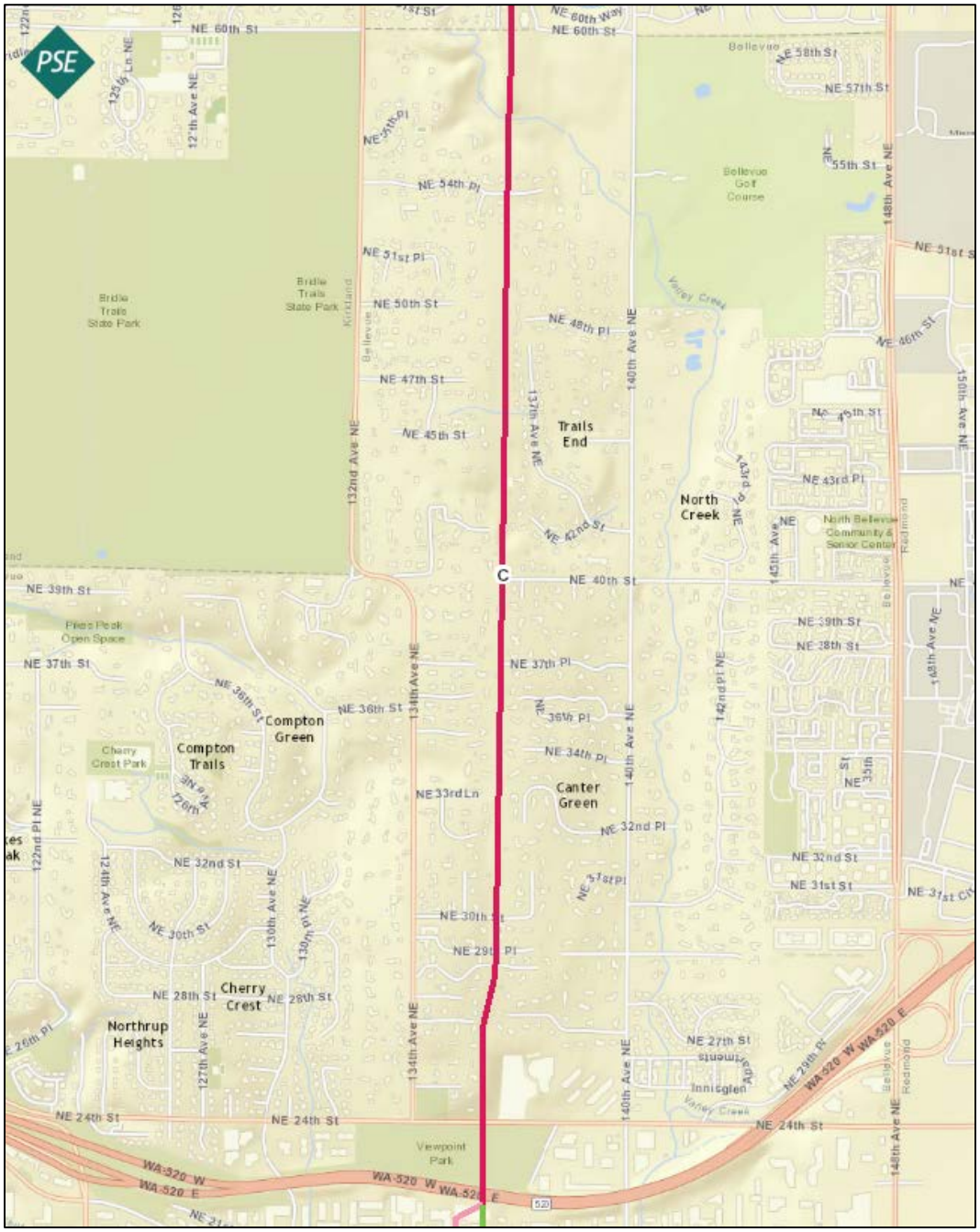


Figure 2. Energize Eastside study area corridor (Segment C) in the City of Bellevue north of WA-520.

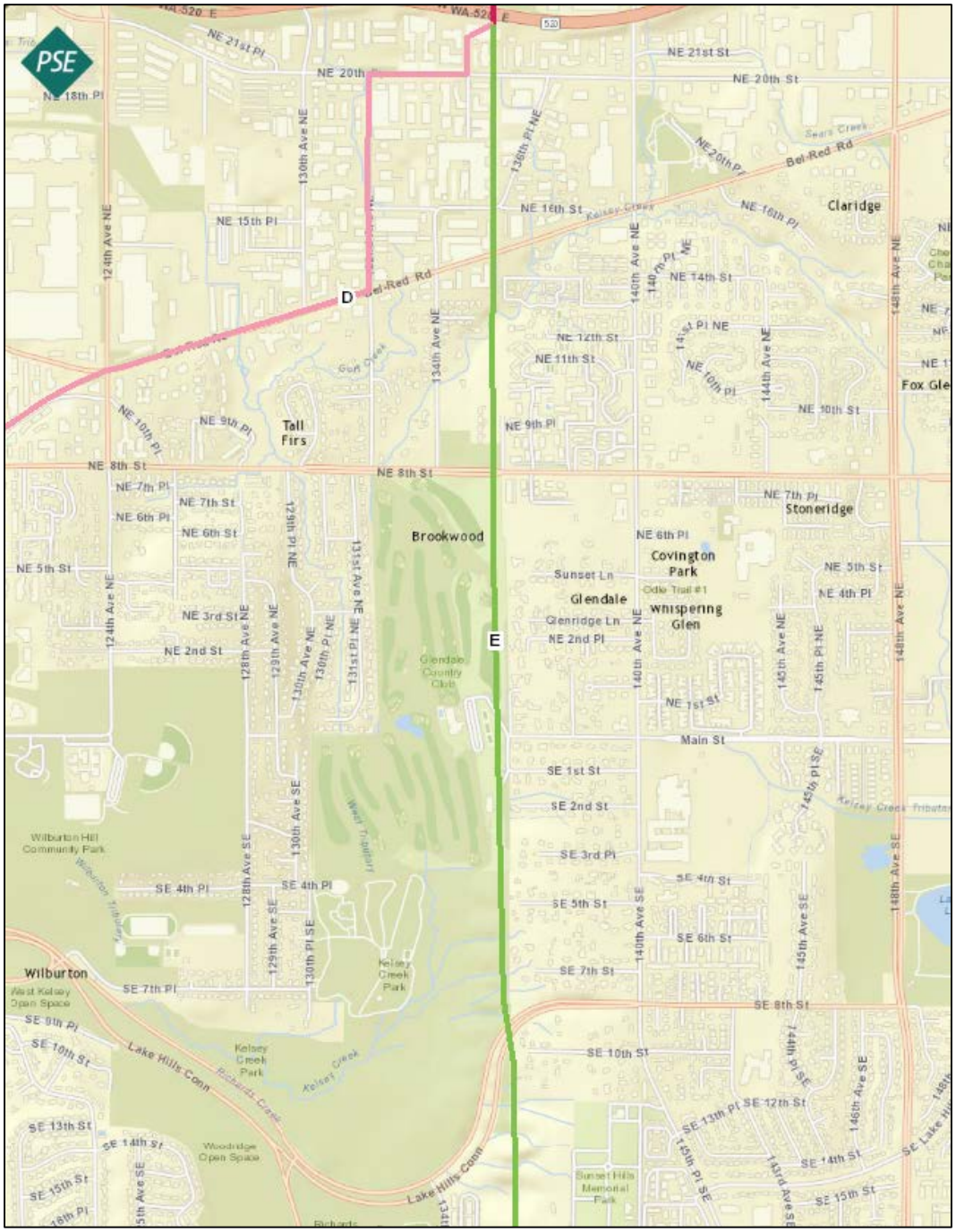


Figure 3. Energize Eastside study area corridor (Segment E) in the City of Bellevue between WA-520 and Lake Hills Connector.

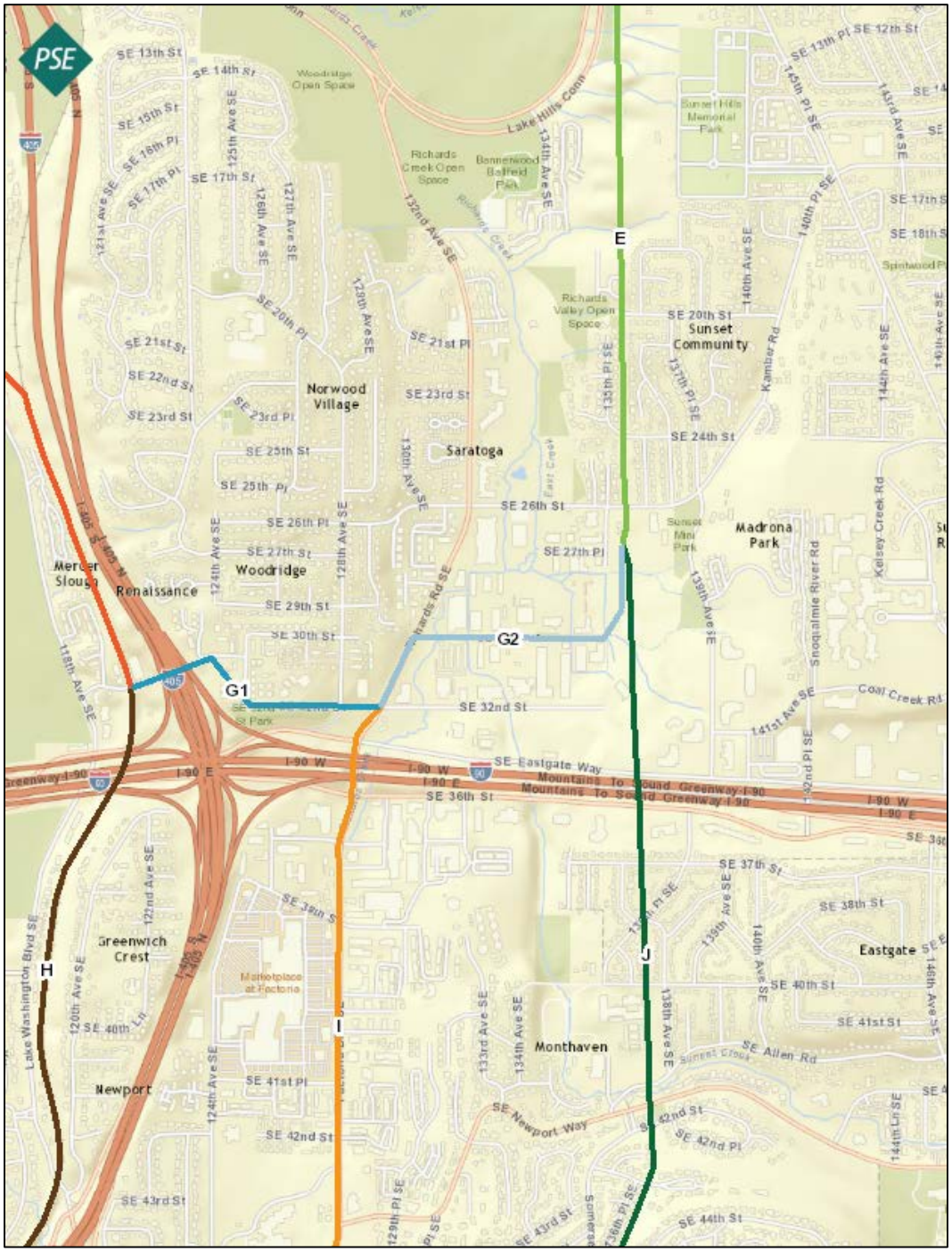


Figure 4. Energize Eastside study area corridor (Segments E, J, G2, and I) in City of Bellevue in the vicinity of I-90.

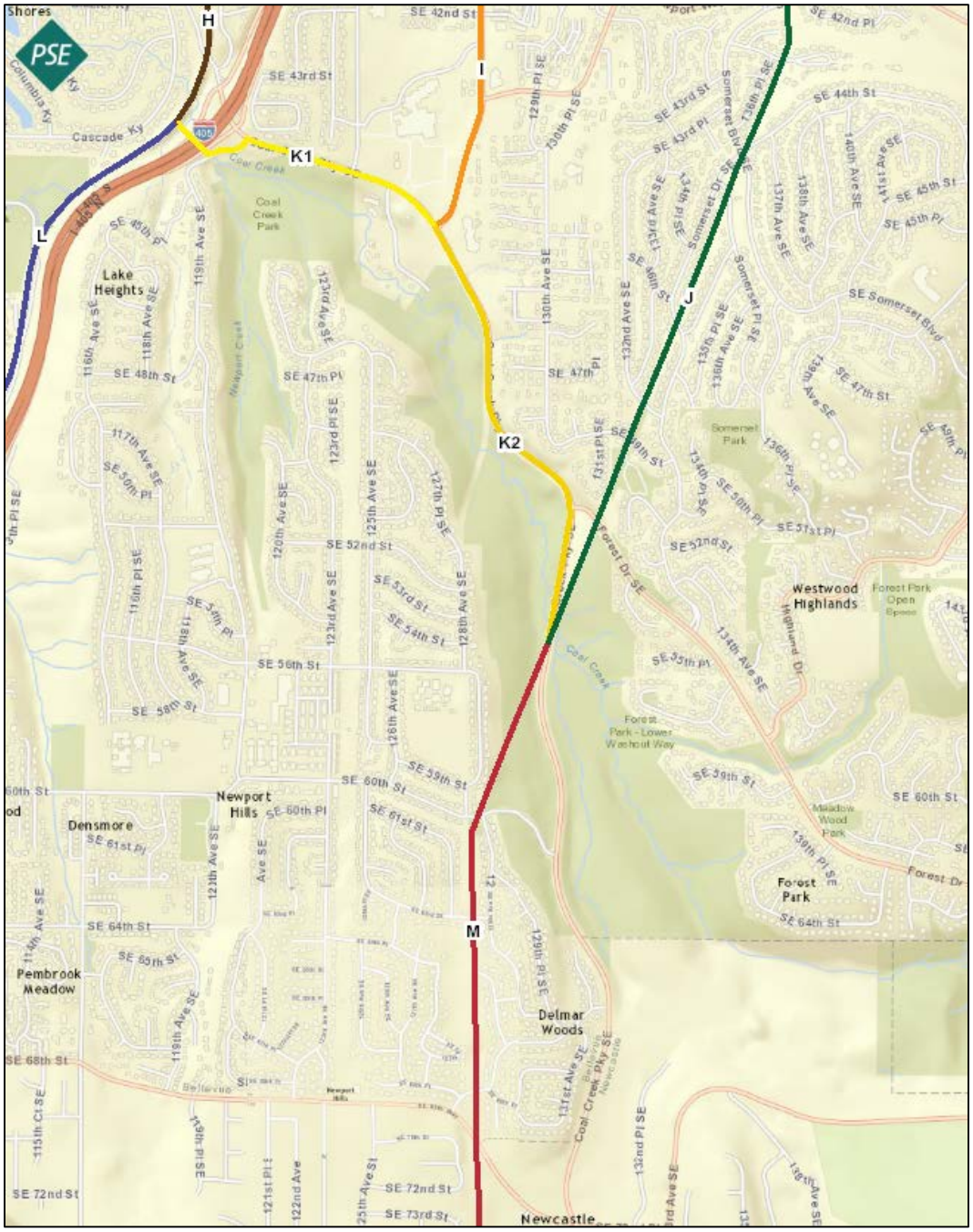


Figure 5. Energize Eastside study area corridor (Segment J, I, K2, and M) in the City of Bellevue north of SE 69th Way.

1.2 Methods

Limits of the study area were determined in the field using aerial maps, GPS, and by measuring 25 feet out from the center of each pole set. The study area for segments G2, I and K2 was measured differently and only included parcels where PSE secured right-of-entry. For segments G2 and I, the study area limits were approximated by measuring 50 feet from the edge of the sidewalk. For

segment K2, the study area limits were approximated by measuring 50 feet from the fog lines on Coal Creek Parkway.

Public-domain information on the study area corridor was reviewed for this critical areas study. These sources include USDA Natural Resources Conservation Service (NRCS) soil maps, U.S. Fish and Wildlife Service National Wetland Inventory (NWI) maps, Washington Department of Fish and Wildlife interactive mapping programs (PHS on the Web and SalmonScape), the mapping tool associated with Washington Department of Natural Resources Forest Practices Application Review System (FPARS), City of Bellevue's interactive mapping website (nwmaps.net), and King County's GIS mapping website (iMAP).

The study area corridor was evaluated for wetlands using methodology from the Regional Supplement (Corps 2010). The wetland boundary was determined on the basis of an examination of vegetation, soils, and hydrology. Areas meeting the criteria set forth in the Regional Supplement were determined to be wetland. Soil, vegetation, and hydrologic parameters were sampled at several locations along the wetland boundary to make the determination. Data were recorded at fifty-four of these locations. Data sheets are included in Appendix B. Delineated wetlands were classified using the Rating System (Hruby 2004). Wetlands that extended off-site were rated based on what could be seen from on-site and through aerial images. Wetland rating forms are included in Appendix C.

Watercourses were determined to be streams if they met the definition provided by the City of Bellevue. The centerlines of streams in the study area were recorded in the field, with stream widths either visually approximated in the field or later approximated based on aerial photometry and elevation contours. Streams were classified according to the City of Bellevue Land Use Code.

A private 2013 wetland and stream delineation study was performed by The Watershed Company on Overlake Farms (parcel numbers 1525059269 and 1525059247). Permission was granted to share the information directly relevant to the 100 foot-wide PSE easement (Cristina Gugoni, pers comm.).

Information from the 2012 and 2014 wetland and stream delineations performed by The Watershed Company (TWC) for PSE on the Lakeside substation parcels have also been incorporated (parcel numbers 1024059083 and 1024059130).

Wetland boundaries, stream centerlines, data points, and other features (such as culverts) were GPS-located using a hand-held Trimble Geo-XH unit. Following field location, the GPS data was differentially corrected using GPS Pathfinder Office and exported into ESRI ArcGIS software for mapping. Stream and wetland delineation maps are included in Appendix A.

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Incidental wildlife observations and detections were recorded during field studies and summarized in Section 3.3 of this report.

Possible mitigation opportunities were noted during field studies. The approximate extent of these areas is shown on aerial photos included in Section 5 of this report.

2 SITE DESCRIPTION

The study area corridor bisects the Bridle Trails, Bel-Red, Eastgate, Factoria, Somerset, and Newport neighborhoods in the City of Bellevue; it also runs north-south between the neighborhoods of Wilburton/Crossroads and Woodridge/Lake Hills. The majority of the study area is zoned single-family residential at various densities; exceptions include the Bel-Red area and I-90 vicinity, generally zoned commercial and light industrial/office and limited business, respectively. The corridor is located in the following public land survey sections: Sections 15, 22, 27, and 34 of Township 25N, Range 05E, and; Sections 3, 9, 10, 15, 16, 21, 22, and 28 of Township 24N, Range 05E.

The study area is also located in the Cedar-Sammamish Watershed (WRIA 8), and spans three drainage basins which include the Kelsey Creek, Mercer Slough, and Coal Creek drainage basins, from north to south.

On developed parcels, vegetation in the corridor is generally limited to landscaped beds and maintained yards. On parcels that are undeveloped, or where the area under the powerline corridor remains undeveloped, vegetation is often weedy and dominated by Himalayan blackberry and various grasses; young trees and shrubs are present in some locations where they have presumably grown from seed. These areas are often regularly mowed/cleared for utility access and maintenance purposes. The exceptions are the undeveloped City of Bellevue Parks parcels along Coal Creek Parkway; these parcels are densely wooded with steep slopes.

3 CRITICAL AREAS

A total of forty-two wetlands and thirty-six stream segments are located along the proposed Energize Eastside corridor in the City of Bellevue. They are described below. Sign or presence of any regulated wildlife species or habitat were also noted and are described in this section.

DSD 002682

For the purposes of this study, the nomenclature used to identify critical areas has been based on the PSE segment in which a feature is located, and the local jurisdiction. Critical areas were then numbered sequentially, in the order in which they were inventoried, generally north to south. For example, the first wetland inventoried as a part of this study on Segment C in Bellevue is called "CB01." For wetlands that were previously identified in other reports, the names assigned in the earlier report (e.g. "Wetland A (Overlake Farms)") are maintained unless the feature was re-delineated; re-delineated features adopt the aforementioned naming convention.

3.1 Wetlands

Overlake Farms, Wetland A (previously delineated by TWC)

A private 2013 delineation study was performed by The Watershed Company that included the PSE easement corridor on Overlake Farms (parcel numbers 1525059269 and 1525059247) (Appendix A, Page No. 3). The west corner of the wetland identified as Wetland A extends into the 100-foot PSE corridor in parcel 1525059247. This wetland is a slope and depressional wetland with forested and scrub-shrub Cowardin vegetation classes. Dominant vegetation includes western red cedar, red alder, vine maple, salmonberry, skunk cabbage, and lady fern. Sampled soils (Overlake Farms DP-1; Appendix B) in 2013 met the criteria for Hydrogen Sulfide (A4). Wetland hydrology was also noted based on saturation to the surface (A3) and hydrogen sulfide odor (C1).

Wetland CB01

Wetland CB01 is a relatively large slope wetland located at the southern end of PSE Segment C, north of SR-520 (Appendix A, Page No. 19). Wetland CB01 hydrology is mainly provided by groundwater seeps. Wetland CB01 contains palustrine forested, palustrine scrub-shrub, and palustrine emergent Cowardin vegetation classes. Common vegetation observed includes red alder, various willow species, salmonberry, reed canarygrass, creeping buttercup, giant horsetail, small-fruited bulrush and lady fern. Sampled soils (DP-8; Appendix B) meet the criteria for both Depleted Matrix (F3) and Redox Dark Surface (F6). The wetland also meets one primary wetland hydrology indicator and two secondary wetland hydrology indicators (Appendix B).

Wetland EB01

Wetland EB01 is a small slope wetland located south of Bel-Red Road near Kelsey Creek (Appendix A, Page No. 24). This wetland contains palustrine forested, palustrine scrub-shrub, and palustrine emergent Cowardin vegetation classes. Common vegetation observed includes red alder, Sitka willow, salmonberry, giant horsetail, small-fruited bulrush and soft rush. Hydrogen sulfide odor was detected at the test pit (DP-6; Appendix B), meeting the criteria for both hydric soil and wetland hydrology. In addition, soils were saturated to

DSD 002683

the surface and a water table was observed at seven inches below the soil surface. Wetland EB01 hydrology is mainly provided by groundwater seeps.

Wetland EB02

Wetland EB02 is a relatively large slope wetland located in the northeast corner of the Glendale Golf and Country Club (Appendix A, Page No. 27 and 28). This wetland contains palustrine forested, palustrine scrub-shrub, and palustrine emergent Cowardin vegetation classes. Common vegetation observed includes English hawthorn, red alder, Himalayan blackberry, reed canary grass, soft rush and small-fruited bulrush. The sampled soils (DP 11, Appendix B) meet hydric soil indicator F3 – Depleted Matrix. Oxidized rhizospheres were present along living roots, indicative of primary wetland hydrology indicator C3. Two secondary wetland hydrology indicators were also noted.

Wetlands EB03 through EB10

Wetlands EB03 through EB10 are located on two large parcels north of Lake Hills Connector (Appendix A, Page No. 31, 32, 33 and 35). The northern parcel is owned by the Glendale County Club; the southern property is owned by the City of Bellevue Parks Department. The study area in these parcels is dominated by grasses, Himalayan blackberry, and a few trees and shrubs. It also includes a compact gravel walking trail that runs north-south through the corridor.

The eight wetlands identified in this general area are fairly similar in character. They are small, disturbed wetlands that are located in depressions, swales, or breaks in slopes. All are rated as slope or depressional features, and are classified as either Category III or IV wetlands (Appendix C). Many are associated with small stream channels also present in this area. These wetlands are primarily supported by groundwater seeps. Common vegetation observed includes Himalayan blackberry, reed canarygrass, soft rush, sawbeak sedge, small-fruited bulrush, and giant horsetail. Each wetland met the criteria for at least one hydric soil indicator as well as one primary or two secondary hydrology indicators (Appendix B).

Wetland EB11 through EB19

Wetlands EB11 through EB19 are located south of Lake Hills Connector (Appendix A, Page No. 35, 36, 37, 38 and 40); most of these features are located on a large parcel owned by SCI Management Corp. Similar to the previously described area north of Lake Hills Connector the study area south of Lake Hills Connector to 130th Place SE is generally dominated by grasses, Himalayan blackberry, and a few trees and shrubs. It also includes a compact gravel walking trail that runs north-south through the corridor.

These nine wetlands are fairly similar in character. They are mostly small, disturbed wetlands that are located in depressions, swales, or breaks in slopes.

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All are rated as slope or depressional features, and are classified as either Category III or IV wetlands (Appendix C). Many are associated with small stream channels also present in the area. These wetlands are primarily supported by groundwater seeps. The forested areas are composed of red alder and black cottonwood trees, with lady fern and reed canarygrass in the understory. Other common emergent and shrub vegetation observed included Himalayan blackberry, reed canarygrass, soft rush, small-fruited bulrush, and giant horsetail. Each wetland met the criteria for at least one hydric soil indicator as well as at least one primary or two secondary hydrology indicators (Appendix B).

Wetland EB20

Wetland EB20 is a slope wetland located north of SE 26th Street on parcels 1024059089 and 1024059065 (Appendix A, Page No. 44). The wetland contains scrub-shrub and emergent Cowardin vegetation classes, comprised primarily of Pacific willow, Himalayan blackberry, and reed canarygrass. The soils sampled meet the criteria for hydric soil indicator F6 – Redox Dark Surface. The wetland also displays one primary wetland hydrology indicator and two secondary hydrology indicators (Appendix B).

Wetland G2B01

Wetland G2B01 is a riverine wetland located at the southeast corner of Richards Road and SE 30th Street (Appendix A, Page No. 49 and 50). Richards Creek meanders through this wetland from south to north. Wetland G2B01 is entirely comprised of a palustrine emergent Cowardin class. The dominant vegetation includes reed canarygrass and broadleaf cattail, with patches of red-osier dogwood, Pacific willow, and twinberry. The stream areas abound with watercress and water parsley. The soils sampled (DP 47, Appendix B) meet the hydric soil indicator F6 - Redox Dark Surface and have a slight hydrogen sulfide odor below four inches deep. The water table was present at ten inches deep and saturation was present to the surface. In addition, oxidized rhizospheres were observed along living roots, meeting an additional hydrology indicator. The site has three hydroperiods: seasonally flooded, saturated only, and it has a permanently flowing stream in the wetland. Like IB01, this wetland has a higher habitat score than the other smaller wetlands along Factoria Boulevard SE.

Wetland IB01

Wetland IB01 is located at the furthest downstream location of Richards Creek and is along Factoria Boulevard SE, just west of the QFC shopping center parking lot (Appendix A, Page No. 53). No data point was taken here due to difficulty of access. This wetland is entirely comprised of the palustrine emergent Cowardin vegetation class. The vegetation observed includes reed canarygrass, Himalayan blackberry and black locust. NRCS maps the soils as Indianola loamy sand. Although Wetland IB01 has low interspersion of habitats,

it does have three hydroperiods since a permanently flowing stream flows into the site. Because Richards Creek is flowing to the site, this wetland has greater habitat functions than many of the other smaller wetlands in the area.

Wetland IB02

Wetland IB02 is a small depressional wetland located along the east side of Factoria Boulevard SE, between SE 41st Lane and SE Newport Way (Appendix A, Page No. 57). It is located in the grassy area next to an apartment complex. This wetland is entirely comprised of the palustrine emergent Cowardin vegetation class. Common vegetation observed includes creeping buttercup, reed canarygrass, and mowed grass. The sampled soils (DP-50; Appendix B) meet hydric soil indicator F6 - Redox Dark Surface. At the time of the site visit, the wetland was saturated to the surface with a water table observed at five inches below ground surface, meeting the criteria wetland hydrology. Wetland IB02 hydrology is mainly provided by surface water sheet flow, directed both by culverts and the general landscape; water exits the wetland through a single drain. Although the wetland had a low habitat quality overall, there is a standing snag on the edge of the wetland. Garbage was also observed in the wetland area and in the soils.

Wetland IB03

Wetland IB03 is a small slope wetland located at Newport High School, at the far south end of the property and adjacent to the southern baseball diamond (Appendix A, Page No. 61). This wetland contains a palustrine emergent Cowardin vegetation class only. Common vegetation observed includes creeping buttercup, soft rush, field bindweed, birdsfoot trefoil, and giant horsetail. Pacific willow and bigleaf maple are also in the vicinity, but rooted outside of the wetland. The sampled soils (DP 52, Appendix B) meet hydric soil indicator F3 - Depleted Matrix from six to fourteen inches below ground surface. Oxidized rhizopheres were observed along living roots, meeting the wetland hydrology indicator C3. A pileated woodpecker flew overhead while the wetland was being rated and likely uses habitat on the Newport High School campus.

Wetland IB04

Wetland IB04 is a small depressional wetland, also located at Newport High School along the edge of a parking lot that is near the intersection of Factoria Boulevard SE and SE Newport Way (Appendix A, Page No. 59). This wetland contains palustrine scrub-shrub and palustrine emergent Cowardin vegetation classes. The wetland is densely vegetated with cattails, soft rush and reed canarygrass, with Himalayan blackberry extending down the surrounding slopes into the wetland. Hydric soils are present, but redox features were obscured by the high water table. Cobble was present below the soil matrix at eight inches

DSD 002686

deep. The water table was present at one inch and saturation was present at the surface at DP 52. The wetland has a permanently flowing surface outlet through a culvert.

Wetland JB01 and other previously delineated PSE Lakeside substation wetlands

The PSE Lakeside substation and the parcel south of it (parcels 1024059083 and 1024059097) were previously assessed for critical areas by The Watershed Company in 2012 and 2014. One of the previously delineated wetlands, Wetland H, was re-delineated as Wetland JB01 during this study to capture the full extent of the wetland within the PSE corridor. The other wetlands delineated as part of the PSE Lakeside substation studies include Wetland BC (2012 and 2014), Wetland EE (2014), and Wetland FG (2012) (Appendix A, Page No. 44, 45, 46 and 68) . Wetlands BC and EE are a slope wetlands while Wetland FG is a riverine wetland. These wetlands are described in more detail in the 2012 delineation report and the 2015 Critical Areas Report.

Wetland JB01 is a relatively large slope wetland located south of the PSE Lakeside Substation property (Appendix A, Page No. 46 and 68). Wetland JB01 has a moderate level of function (Category III). Dense vegetation covers over 95 percent of the wetland. The wetland has high species diversity (>19 species) and contains palustrine emergent, palustrine scrub-shrub, and palustrine forested Cowardin vegetation classes. The dominant plants include birdsfoot trefoil and beaked sedge. Hydrogen sulfide emanated from DP 35, meeting indicators for both hydric soils (A4) and wetland hydrology (C1). Like the nearby streams previously delineated, the stream adjacent to Wetland JB01 is also a tributary to Richards Creek. A high water table at four inches below the ground surface and saturation throughout the soil were also observed. Wetland JB01 has habitat features including downed wood, standing snags and undercut banks. The wetland also has increased habitat value because it is near a stream and has a high interspersion of habitats.

Wetlands JB02 and JB03

Wetlands JB02 and JB03 are small slope wetlands located on the west side of the Somerset Recreation Club near the corner of Somerset Drive SE and Somerset Place SE (Appendix A, Page No. 78 and 79). These wetlands are separated by less than 100 feet and are very similar in character. Both Wetlands JB02 and JB03 have palustrine emergent and palustrine scrub-shrub Cowardin vegetation classes. The dominant plants include slough sedge and giant horsetail. The soils sampled meet the hydric soil indicator F2 -Loamy Gleyed Matrix (DP 37, Appendix B). The hydroperiod at these wetlands is saturated only and groundwater was present at seven inches below the ground surface. Although these wetlands have a low function overall, they have low cover of invasive species and provide some habitat functions.

DSD 002687

Wetland JB04

Wetland JB04 is a slope wetland located along Forest Drive SE, north of the intersection of Forest Drive SE and SE 54th Place (Appendix A, Page No. 84). The Cowardin vegetation classes present are palustrine emergent and palustrine scrub-shrub. The dominant vegetation includes red-osier dogwood, Himalayan blackberry, broadleaf cattail and soft rush. The sampled soils meet hydric soil indicator F2 -Loamy Gleyed Matrix (DP 38, Appendix B). During the site visit, Wetland JB04 had saturation throughout the soil and has hydroperiod areas that are occasionally flooded and areas that are saturated only. Other hydrology indicators observed were drainage patterns, geomorphic position and the FAC-neutral test. This area contributes towards the habitat functions of these wetlands.

Wetland JB05 – JB08

Wetlands JB05-JB08 are slope wetlands located on the east side of Coal Creek Parkway SE, below the intersection of Coal Creek Parkway SE and Forest Drive SE (Appendix A, Page No. 67, 84, 85, 86; Wetland JB08 also contains depressional areas. Wetland JB08 is a combination slope-depressional wetland. Common vegetation observed includes black cottonwood saplings, red alder, Sitka willow, reed canarygrass, soft rush, Canada thistle and giant horsetail. Wetland JB05 contains palustrine emergent and scrub-shrub Cowardin vegetation classes. Wetlands JB06 and JB07 are entirely composed of an emergent Cowardin vegetation class. Wetland JB08 contains scrub-shrub and forested Cowardin vegetation classes. Each wetland met the criteria for at least one hydric soil indicator as well as at least one primary or two secondary hydrology indicators (Appendix B). These wetlands are located adjacent to a relatively undisturbed forested area. All of the wetlands consequently have at least one WDFW priority habitat within 330 feet. JB05 in particular has four WDFW priority habitats within 330 feet: biodiversity areas and corridors, riparian, instream, and snags and logs.

Wetland MB01

Wetland MB01 is a depressional wetland located north of 128th Avenue SE. The Cowardin vegetation classes consist of palustrine scrub-shrub and palustrine forested (Appendix A, Page No. 93). Dominant vegetation includes Pacific willow, red-osier dogwood, bitter nightshade, and Himalayan blackberry. The soils sampled (DP 1, Appendix B) were extremely saturated at the time of the site visit; redoximorphic features were not identified, likely due to the high moisture content and organics masking redoximorphic features. The wetland met criteria for four primary wetland hydrology indicators and two secondary indicators.

DSD 002688

Wetland MB02 and MB03

Wetland MB02 and MB03 are two small slope wetlands on the City of Bellevue Parks parcel near Coal Creek Parkway SE (Appendix A, Page No. 88). Both contain only a palustrine emergent Cowardin vegetation class that consists of regularly mowed herbaceous species such as reed canarygrass, soft rush, broadleaf plantain, and other grasses. Some Himalayan blackberry and field bindweed are also present. Wetland MB02 meets hydric soil indicator S5 – Sandy Redox, while Wetland MB03 meets hydric soil indicator F2 – Loamy Gleyed Matrix (DPs 4 and 5, Appendix B). Both also meet criteria for at one primary wetland hydrology indicator and two secondary wetland hydrology indicators.

Wetland MB04

Wetland MB04 is a slope-depressional wetland located at the base of the same hillslope as Wetland MB02 and MB03, west of Coal Creek Parkway SE (Appendix A, Page No. 86 and 87). It extends beyond the project area to the northwest. Palustrine emergent and palustrine scrub-shrub Cowardin vegetation classes are present. Dominant vegetation includes mowed grasses, small-fruited bulrush, willowherb, bittercress, and giant horsetail in the corridor with some mitigation plantings consisting of young shrubs such as red-osier dogwood. There is some skunk cabbage in the less disturbed areas along the edge of the corridor. Along with seeps along the hillslope, Streams MB02 and MB03 both flow through the wetland and serve as a source of hydrology. Sampled soils meet criteria for hydric soil indicators A4 – Hydrogen Sulfide and A11 – Depleted Below Dark Surface. The wetland also meets criteria for multiple primary and secondary wetland hydrology indicators.

Wetland MB04 was previously identified as Wetland W2 in 2011 by CH2M Hill as part of an investigation into mitigation for culvert replacement. During the TWC investigative fieldwork, it was clear that the wetland boundary and conditions have changed, likely due to the implementation of the mitigation plantings. CH2M Hill classified the wetland as a Category III wetland. However, TWC ecologists re-rated this wetland as a Category IV wetland. The largest point differences occur in the scoring for water quality function and hydrologic function. CH2M Hill previously identified the wetland as containing persistent, ungrazed vegetation greater than 95% of the area (water quality - 5 points). Per Ecology guidance, mowed vegetation counts as grazed vegetation. However, because a large portion of the wetland occurs in the mowed PSE corridor in the 2015 TWC delineation, today less than one half of the area consists of persistent, ungrazed vegetation (water quality – 1 point). In addition, the culvert replacement that occurred after the CH2M Hill delineation likely altered hydrologic conditions so that there is no longer a constricted outlet nor substantial ponding, resulting in a decrease of 10 points for hydrologic function.

DSD 002689

If impacts are proposed here, the offsite portions of the wetland may need to be assessed to confirm the change in the rating.

3.2 Streams

Stream EB01 (Kelsey Creek)

Stream EB01, commonly known as Kelsey Creek, is a perennial fish-bearing stream that flows northeast to southwest across the PSE corridor south of Bellevue Redmond Road (parcel numbers 760580TRCT and 0672100140) (Appendix A, Page No. 24). It is in the Kelsey Creek drainage basin. Wetland EB01 is adjacent to the creek. Fall Chinook, coho, winter steelhead, and sockeye salmonids have been documented in Kelsey Creek (WDFW Salmonscape 2015). Stream EB01 is an F-type stream per the City of Bellevue Land Use Code (LUC 20.25H.075.B).

Stream EB02 – EB05

Streams EB02 – EB05 are small non-fishbearing intermittent streams that day-light and reenter culverts along the PSE corridor on the Glendale Country Club property (parcel 3425059010) (Appendix A, Page No. 28, 29, 31, 32 and 33). These streams are in the Kelsey Creek drainage basin. They are N-type streams that have not been mapped previously (LUC 20.25H.075.B).

Streams EB06 through EB14

Streams EB06 – EB14 also occur in the Kelsey Creek drainage basin in the Lake Hills Connector area (Appendix A, Page No. 34, 35, 36, 37 and 38. They are non-fishbearing, intermittent streams that are often piped under the trail or were noted to enter culverts. Streams EB06 and EB07 are also mapped in the City of Bellevue drainage map; the other streams are not documented. These streams are N-type streams.

Streams JB01, JB02, and PSE Lakeside Substation Streams (previously delineated by TWC)

Streams JB01, JB02, and the streams noted in the PSE Lakeside Substation studies (TWC 2015) are in the East Creek drainage basin (Appendix A, Page No. 46 and 68). They are part of the same stream network that flows roughly southeast to northwest before becoming East Creek (PSE parcels 1024059083 and 1024059097 and parcel 8135300110). Streams A, B, and F in the PSE corridor were noted in the 2014 delineation as part of the 2015 Critical Areas Report for the PSE Lakeside Substation (Appendix A, Page No. 45). These three streams are tributaries that join Stream C in the PSE parcels (TWC 2015); Stream C flows outside of the study area but likely has an encumbering buffer (Appendix A, Page No. 46 and 68). Stream JB01 is the upstream segment of Stream C described in the 2015 report, south of the culvert under the roadway by SE 30th Street, while Stream JB02 is a tributary that joins Stream JB01.

DSD 002690

Stream A originates to the east of Wetland BC; once it enters Wetland BC, it transforms to sheet flow, losing channel structure. It does not support fish, and is thus classified an N-type stream. Streams B, C, and F, on the other hand are considered to be fish-bearing because they all three contain suitable habitat and are not along steep gradients. Stream C also has salmonid use documented by WDFW PHS. Streams B, C, and F are F-type streams.

Stream JB01 is the upstream reach of the same perennial stream identified as Stream C. It is also identified as Stream 0263 (HDR 2010). There is no identifiable natural feature nor a steep gradient that would preclude fish-use. As such, Stream JB01 is also an F-type stream. Stream JB02, a seasonal tributary to Stream JB01, is also an F-type stream within the project area.

Stream JB03

Stream JB03 is a backyard drainage feature located north of the Somerset Drive SE and 135th Avenue SE intersection. Seeps channelize to Stream JB03 before entering a drain system (Appendix A, Page No. 80 and 81). The stream is not previously mapped, nor does it connect through an aboveground system to fish-bearing waters. It is classified as an O-type stream.

Stream JB04

JB04 is a seasonal tributary to Coal Creek that flows through the mitigation planting area of Wetland JB08 before entering a culvert to Coal Creek (Appendix A, Page No. 86). There is no identifiable natural feature nor a steep gradient that would preclude fish-use. Since Coal Creek has well-documented salmonid use, it is assumed that Stream JB04 is likely fish-bearing. Stream JB04 is an F-type stream.

Stream JB05 (Coal Creek)

Stream JB05 refers to the reach of Coal Creek that occurs within the PSE corridor (Appendix A, Page No. 86 and 87). It is a perennial stream that has well-documented salmonid use by fall Chinook, coho, sockeye, winter steelhead, and coastal cutthroat (WDFW PHS). Stream JB05 enters the PSE corridor as it crosses south to north underneath Coal Creek Parkway SE. The riparian vegetation along the open stream segments are lush dense stands of red alder and bigleaf maple trees. Stream JB05 is an F-type stream.

Stream MB01

Stream MB01 is a seasonal ditched stream that flows north to south from north of 128th Avenue SE to Newcastle Way, just north of the jurisdictional boundary of Bellevue and Newcastle (Appendix A, Page No. 94). It contains both culverted and daylight segments. It is unclear where the stream originates or where it flows, as it has not previously been mapped, and it has a limited extent in the study area. Stream MB01 is an N-type stream.

DSD 002691

Stream MB02

Stream MB02 is a tributary to Coal Creek that originates from seeps upslope of Wetland MB04, southwest of Coal Creek Parkway SE (Appendix A, Page No. 86). As the seeps channelize as Stream MB02, the stream flows north and eventually joins Coal Creek. Because of its proximity to Coal Creek with no observed natural barriers, this stream is likely fish-bearing. As such, it is an F-type stream.

Stream MB03

Stream MB03 channelizes from seeps along the steep slope south of Coal Creek Parkway SE before entering a culvert under Coal Creek Parkway SE (Appendix A, Page No. 86). It is unclear where this culvert outlets, but flow likely enters Coal Creek. The stream is not suitable fish habitat, as it occurs along a steep slope with a gradient of greater than 20%. Stream MB03 is an N-type stream.

Stream G2B01 (Sunset Creek)

Stream G2B01, also known as Sunset Creek, is a perennial creek that flows south to north (Appendix A, Page No. 48). As the result of a rerouting project to reduce flooding, the creek is artificially channelized with mitigation plantings on both sides of SE 30th Street. Stream G2B01 has documented coho salmon use (WDFW PHS). Stream G2B01 is an F-type stream.

Stream G2B02 and IB01 (Richards Creek)

Stream G2B02 is the downstream Richards Creek segment north of the I-90 interchange (Appendix A, Page No. 49), while Stream IB01 is upstream Richards Creek segment south of the I-90 interchange, along Factoria Boulevard SE (Appendix A, Page No. 52 and 53). The two segments are characteristically different with differing classifications.

Stream G2B02, the downstream segment, meanders through Wetland G2B01 and has coho salmon use documented (WDFW PHS). This downstream segment of Richards Creek is classified as an F-type stream.

Stream IB01, the upstream segment of Richards Creek, has been placed in an artificial channel with very steep slopes to either side and is only daylighted for a short segment. The segment likely experiences flashy hydrologic peaks and does not contain suitable riparian and bed characteristics to support fish use. As such, south of the I-90 interchange, Richards Creek (Stream IB01) is an N-type stream.

Stream G2B03

Stream G2B03 is an intermittent stream that occurs in a steep ravine in the PSE property west of Richards Road (parcel 545300240) (Appendix A, Page No. 49 and 50). Due to the steep gradient of the slope, the stream is unlikely to be fish-bearing. Stream G2B03 in an N-type stream.

DSD 002692

Streams K2B01 – K2B06

Streams K2B01 through K2B06 are all small tributaries to Coal Creek that cross under Coal Creek Parkway SE from north to south before merging with Coal Creek at the base of the slope (Appendix A, Page No. 62, 63, 64 and 66). Streams K2B02 and K2B04 appear to be perennial, while the other streams are likely intermittent. Additionally, these streams are mostly just piped for the duration of the study area, with outlets observed outside of the study area. Where daylighted, these streams may have encumbering critical areas buffers to the project. These streams are all N-type streams due to the prevention of fish passage as a result of the steep gradient of the hillslope leading to Coal Creek.

3.3 Wildlife and Habitat

The City of Bellevue regulates habitat associated with Species of Local Importance as critical areas.

Washington State Priority Habitat and Species (PHS) maps were reviewed for the project vicinity. Other than the salmonid fish use discussed in the stream section above, there are two biodiversity areas and corridors highlighted: the Kelsey Creek Open Space Areas and Coal Creek Park.

Significant wildlife observations were recorded during field investigations. A pileated woodpecker flew overhead while the wetland was being rated and likely uses habitat on the Newport High School campus.

Areas with habitat potential include the forested and residential areas near Bridle Trails; Viewpoint Park, north of SR520; the Glendale Country Club; Kelsey Creek Park and associated open spaces; and Coal Creek Park.

3.4 Classifications and Standard Buffers

Critical areas in the City of Bellevue are regulated in the Bellevue Land Use Code (LUC), Part 20.25H Critical Areas Overlay District.

3.4.1 Wetlands

According to LUC 20.25H.095, wetlands are classified based on the 2004 Rating System (Hruby). Wetland buffers are based upon the wetland rating and associated habitat score, the size of the wetland, and whether or not the wetlands are developed. Under the LUC wetland regulations, developed is defined as when a parcel has been previously recorded with a NGPE prior to August 1, 2006. None of the wetlands encountered in the study area occur on parcels with NGPEs, so they are all considered undeveloped under the LUC. Wetland buffers are measured perpendicular from the wetland edge. Structure setbacks are also often required when a primary structure is being developed.

DSD 002693

The following table shows wetland classifications, associated standard buffer widths, and structure setbacks.

Table 1. Wetland rating summary.

Wetland Name	2004 Ecology Wetland Rating				Category	Standard Buffer Width (ft)	Structure Setback (ft)
	Water Quality	Hydrologic Function	Habitat	Total			
A+	10	16	17	43	III	60	15
CB01	6	10	15	31	III	60	15
EB01	6	10	15	31	III	60	15
EB02	6	10	16	32	III	60	15
EB03	12	16	9	37	III	60	15
EB04	14	10	9	33	III	60	15
EB05	6	10	12	28	IV	40	-
EB06	12	16	11	39	III	60	15
EB07	0	4	8	11	IV	*	-
EB08	12	10	10	33	III	60	15
EB09	20	6	15	41	III	60	15
EB10	12	16	14	42	III	60	15
EB11	12	0	16	28	IV	40	-
EB12	4	10	15	29	IV	40	-
EB13	12	10	18	40	III	60	15
EB14	2	10	15	27	IV	*	-
EB15	4	16	17	37	III	60	15
EB16	6	6	18	30	III	60	15
EB17	6	6	23	35	III	110	15
EB18	4	10	13	27	IV	*	-
EB19	12	16	11	39	III	60	15
EB20	12	16	8	36	III	60	15
BC++	6	10	23	39	III	110	15
EE++	6	10	14	30	III	60	15
FG++	12	12	20	44	III	110	15
JB01	6	16	19	41	III	60	15
JB02	0	0	7	7	IV	*	-
JB03	0	0	7	7	IV	*	-
JB04	2	6	9	17	IV	*	-

DSD 002694

Wetland Name	2004 Ecology Wetland Rating				Category	Standard Buffer Width (ft)	Structure Setback (ft)
	Water Quality	Hydrologic Function	Habitat	Total			
JB05	2	6	13	21	IV	40	-
JB06	0	4	9	13	IV	*	-
JB07	0	4	10	14	IV	*	-
JB08	8	12	21	41	III	110	15
MB01	16	20	12	48	III	60	15
MB02	2	4	9	15	IV	*	-
MB03	0	4	9	13	IV	*	-
MB04	4	0	17	21	IV	40	-
G2B01	16	26	15	57	II	75	20
IB01	6	8	12	26	IV	*	-
IB02	8	10	7	25	IV	*	-
IB03	6	0	6	12	IV	*	-
IB04	16	0	9	25	IV	*	-

[+] Overlake Farms, 2013 delineation
[++] PSE Lakeside Substation, 2012 and 2014 delineation
* Category IV wetlands that are less than 2,500sf are not regulated by City of Bellevue.
- Category IV wetlands do not have structure setbacks.

3.4.2 Streams

Stream critical areas are regulated in the City of Bellevue under LUC 20.25H – Critical Areas Ordinance. Streams are classified based on status as Shoreline of the State, whether or not the channel contains fish use or fish habitat, and whether or not the stream is physically connected by an aboveground channel system, stream or wetland. Stream buffers are measured from the top-of-bank and are based on stream classification and whether or not a parcel is considered developed. The definition of developed is different for streams than as it is described above for wetlands. For streams, the LUC defines developed as whether a parcel contains an NGPE approved prior to August 1, 2006 or a primary structure; primary structures are defined below. It is possible for the same stream to have different buffers on different parcels if some of the parcels are developed and some are not.

DSD 002695

Primary Structure. The structure on a site that houses the principal use. For residential uses, the primary structure houses the dwelling unit(s). For nonresidential uses, the primary structure houses the use undertaken on the site, as classified by LUC 20.10.440 and district-specific land use charts contained in Chapter 20.25 LUC. Primary structures do not include structures that contain only certain functions or equipment that support the principal use, such as sheds, garages, or mechanical equipment structures.

A summary of stream types and buffer widths is provided in Table 2, below.

Table 2. Summary of stream classification and associated standard buffer widths.

Stream Name	Type	Primary Structure?	Buffer (feet)	Setback (feet)	Total	Closed Segment Buffer
EB01	F-type	No	100	20	120	50*
EB02	N-type	Yes	25	25	50	50*
EB03	N-type	Yes	25	25	50	50*
EB04	N-type	Yes	25	25	50	50*
EB05	N-type	Yes	25	25	50	50*
EB06	N-type	Yes	25	25	50	50*
EB07	N-type	Yes	25	25	50	50*
EB08	N-type	Yes	25	25	50	50*
EB09	N-type	No	50	15	65	50*
EB10	N-type	Yes	25	25	50	50*
EB11	N-type	Yes	25	25	50	50*
EB12	N-type	No	50	15	65	50*
EB13	N-type	No	50	15	65	50*
EB14	N-type	No	50	15	65	50*
A (PSE Lakeside)	N-type	Yes- Parcel 1020459083	25	25	50	10
		No- Parcel 1024059130	50	15	65	10
B (PSE Lakeside)	F-type	Yes- Parcel 1020459083	50	50	100	10
		No- Parcel 1024059130	100	20	120	10
C (PSE Lakeside)	F-type	Yes- Parcel 1020459083	50	50	100	10
		No- Parcel 1024059130	100	20	120	10
F (PSE Lakeside)	F-type	Yes- Parcel 1020459083	50	50	100	10
		No- Parcel 1024059130	100	20	120	10
JB01	F-type	Yes	50	50	100	10
JB02	F-type	Yes	50	50	100	10
JB03	O-type	Yes	25	0	25	10

Stream Name	Type	Primary Structure?	Buffer (feet)	Setback (feet)	Total	Closed Segment Buffer
JB04	F-type	No	100	20	120	10
JB05	F-type	No	100	20	120	10
MB01	N-type	No	50	15	65	10
MB02	F-type	No	100	20	120	10
MB03	N-type	No	50	15	65	10
G2B01	F-type	Yes	50	50	100	10
G2B02	F-type	Yes	50	50	100	10
G2B03	N-type	Yes	25	25	50	10
IB01	N-type	Yes	25	25	50	10
K2B01	N-type	Yes	25	25	50	10
K2B02	N-type	Yes	25	25	50	10
K2B03 (offsite)	N-type	No	50	15	65	10
K2B04 (offsite)	N-type	No	50	15	65	10
K2B05 (offsite)	N-type	No	50	15	65	10
K2B06	N-type	No	50	15	65	10

*Closed segments in the Kelsey Creek Drainage Basin receive a 50ft setback.

4 MITIGATION OPPORTUNITIES

Mitigation opportunities located in the study area were noted during field investigations. Sites discussed in this section are limited to parcels owned by public entities or PSE. These areas include degraded/disturbed wetland and stream critical areas and their buffers under existing powerline corridors; they do not include degraded upland areas outside of critical area buffers. Existing vegetation at these locations is generally dominated by invasive species (Himalayan blackberry and reed canarygrass). Any proposed revegetation would need to adhere to vegetation height limits prescribed by PSE standards. Locations where mitigation opportunities exist have been briefly summarized below.

4.1 Viewpoint Park

Viewpoint Park and the adjacent PSE parcel provide opportunity for mitigation (City of Bellevue-owned parcel number 2725059045 and PSE-owned parcel number 2725059116; Figure 6). It includes Wetland CB01 and its critical area buffer. Underneath the corridor is mostly just mowed herbaceous species; habitat function could be improved via mitigation.

DSD 002697

Figure 6. Viewpoint Park

4.2 Kelsey Creek Park

Kelsey Creek Park also contains opportunities for mitigation (City of Bellevue-owned parcels 3425059016, 0324059009, and 0324059122; Figure 7). Multiple critical areas and their buffers are present, including Streams EB06. EB07, EB08, EB09, EB10, EB11; and Wetlands EB09, EB10, and EB11. Opportunities to improve function include removal of invasive species such as Himalayan blackberry and reed canarygrass.

Figure 7. Kelsey Creek Park (left to right, north to south)

4.3 PSE Lakeside Substation

The PSE Lakeside Substation and the proposed Richards Creek Substation site provides opportunity for mitigation (PSE-owned parcels 1024059083 and 1024059130; Figure 8). These parcels include Wetlands BC, EE, FG, and JB01 as well as Streams A, B, C, F, and JB01. This area contains dense areas of invasive Himalayan blackberry and reed canarygrass that could be replaced to improve riparian and wetland function.

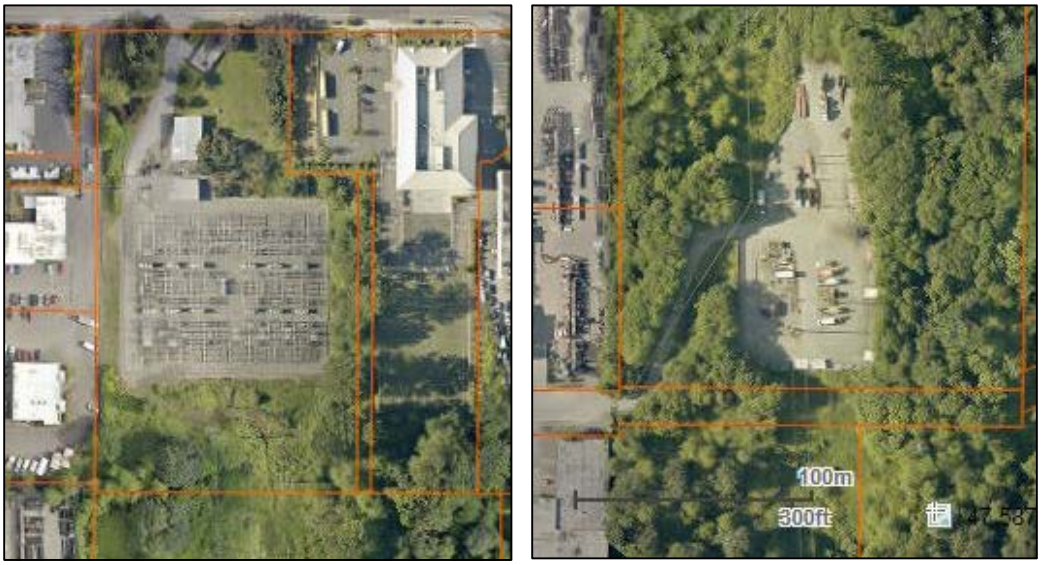

Figure 8. PSE Lakeside substation and adjacent PSE parcel (left to right, north to south)

4.4 Coal Creek Park

The segments of the existing PSE corridor adjacent to Coal Creek Park also provide additional opportunities for mitigation (City of Bellevue-owned parcel 2124059001 and PSE-owned parcel 2124059071; Figures 9 and 10). These parcels include Wetlands MB02, MB03, MB04, JB05, JB06, JB07, and JB08; and Streams MB02, MB03, JB04, and JB05. Underneath the corridor is mostly just mowed herbaceous species; habitat function could be improved via mitigation.

Figure 9. Coal Creek Park and PSE parcel, east of Coal Creek Parkway SE

Figure 10. Coal Creek Park, west of Coal Creek Parkway.

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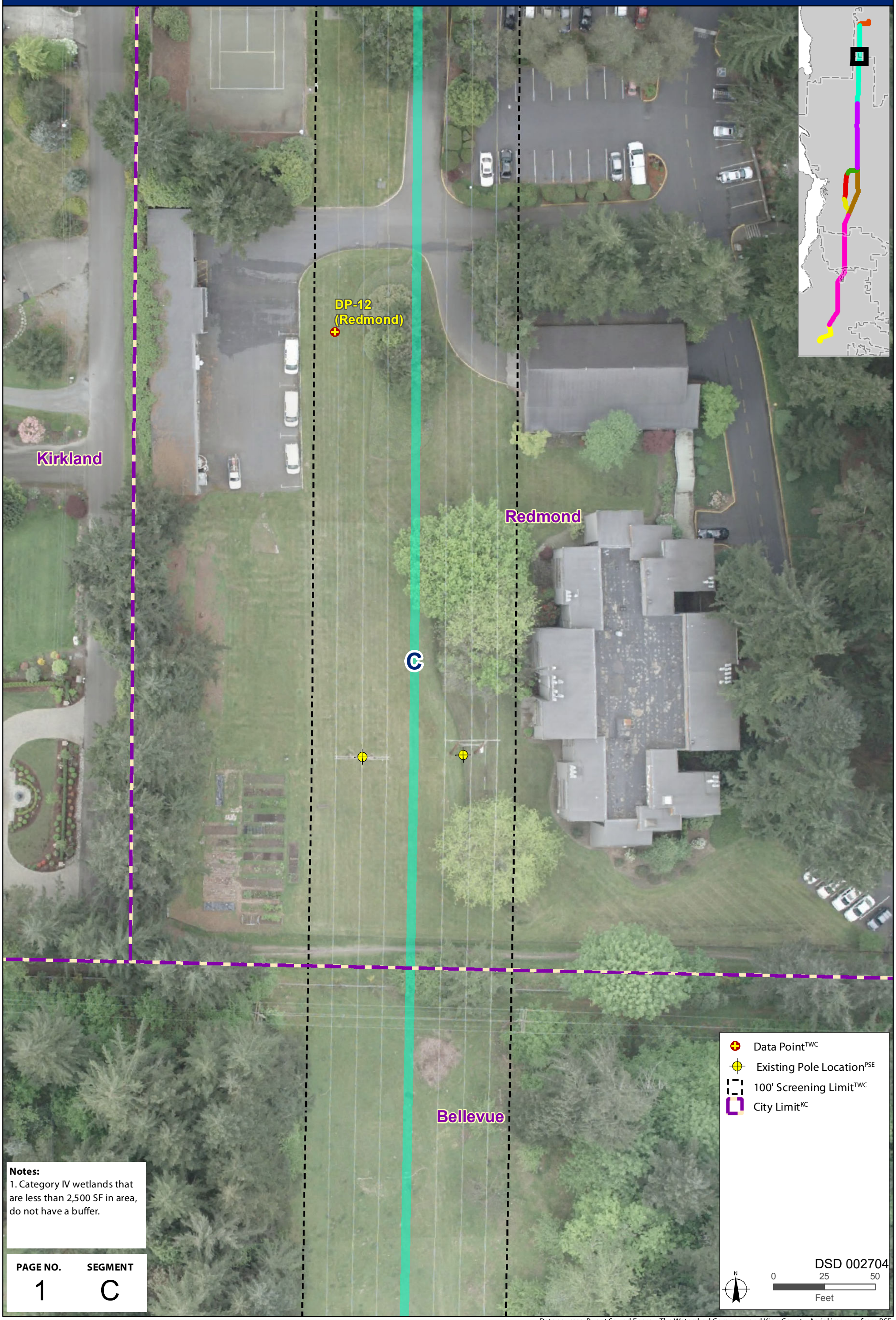
APPENDIX A

Critical Area Delineation Maps

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

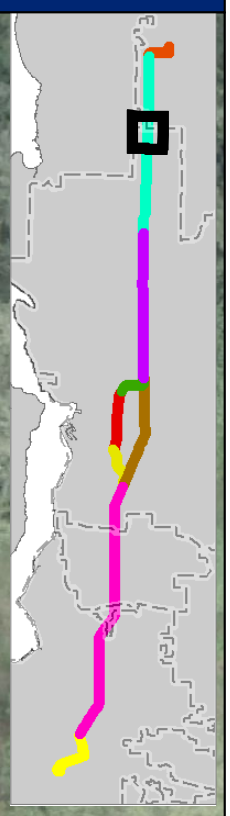


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
1	C

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Bellevue

C

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
2	C

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

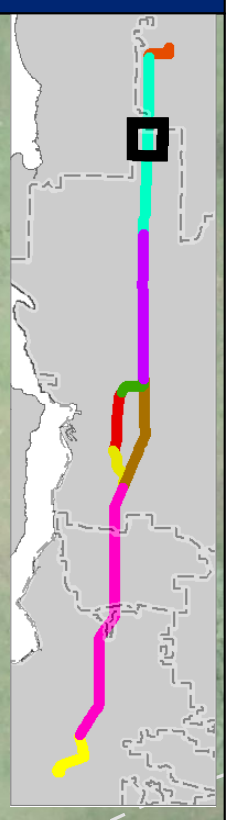
DSD 002705

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Bellevue

C

WETLAND A (Overlake Farms)

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
3	C

Delineated Wetland Boundary[TWC]
Wetland
Critical Area Buffer[TWC]
Building Setback Line[TWC]
Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

N

0 25 50
Feet

DSD 002706

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

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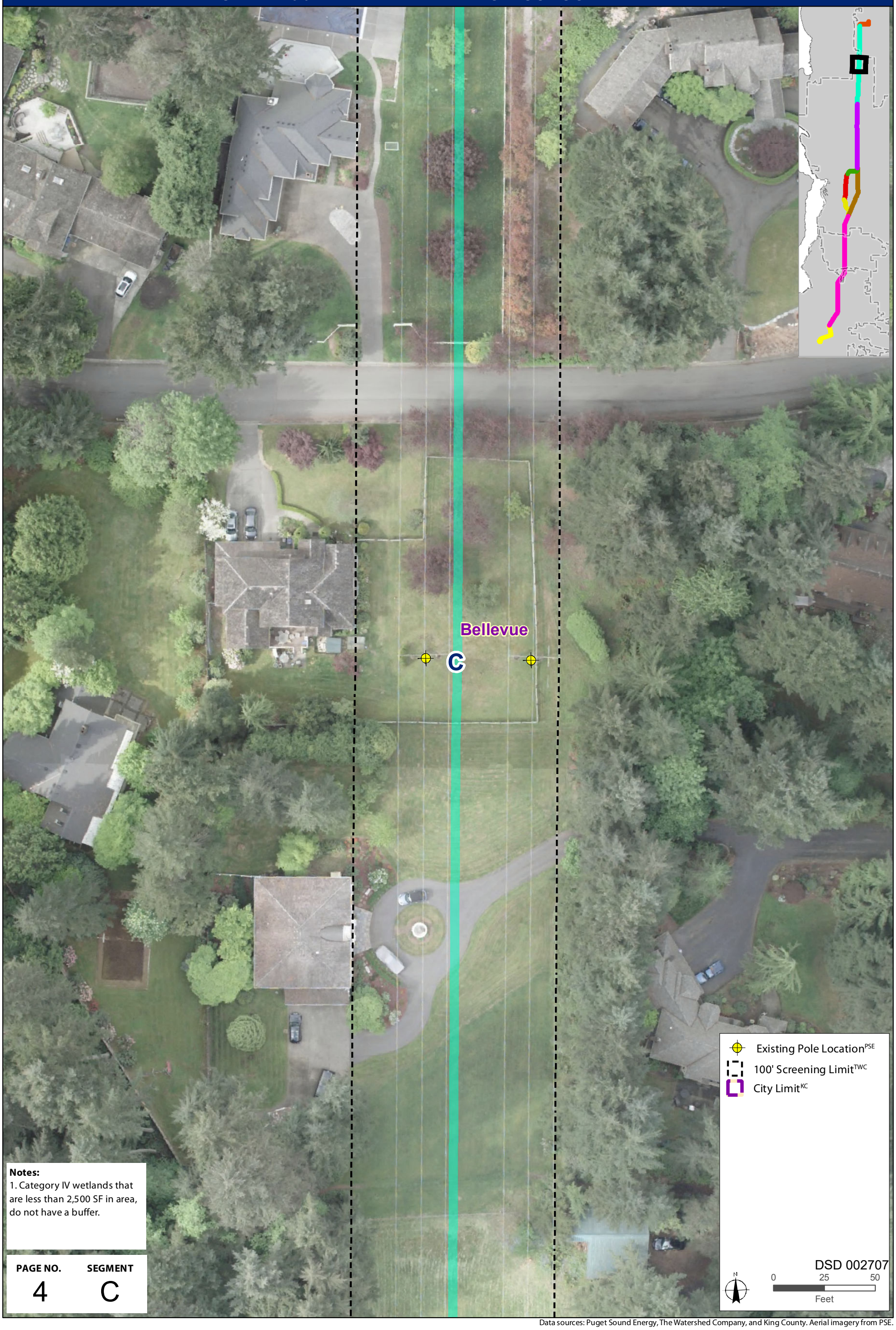

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
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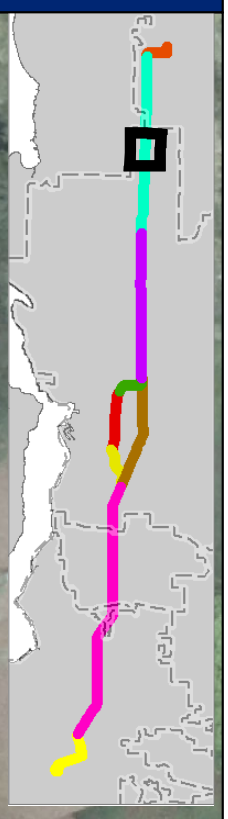
Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Bellevue

C

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
5	C

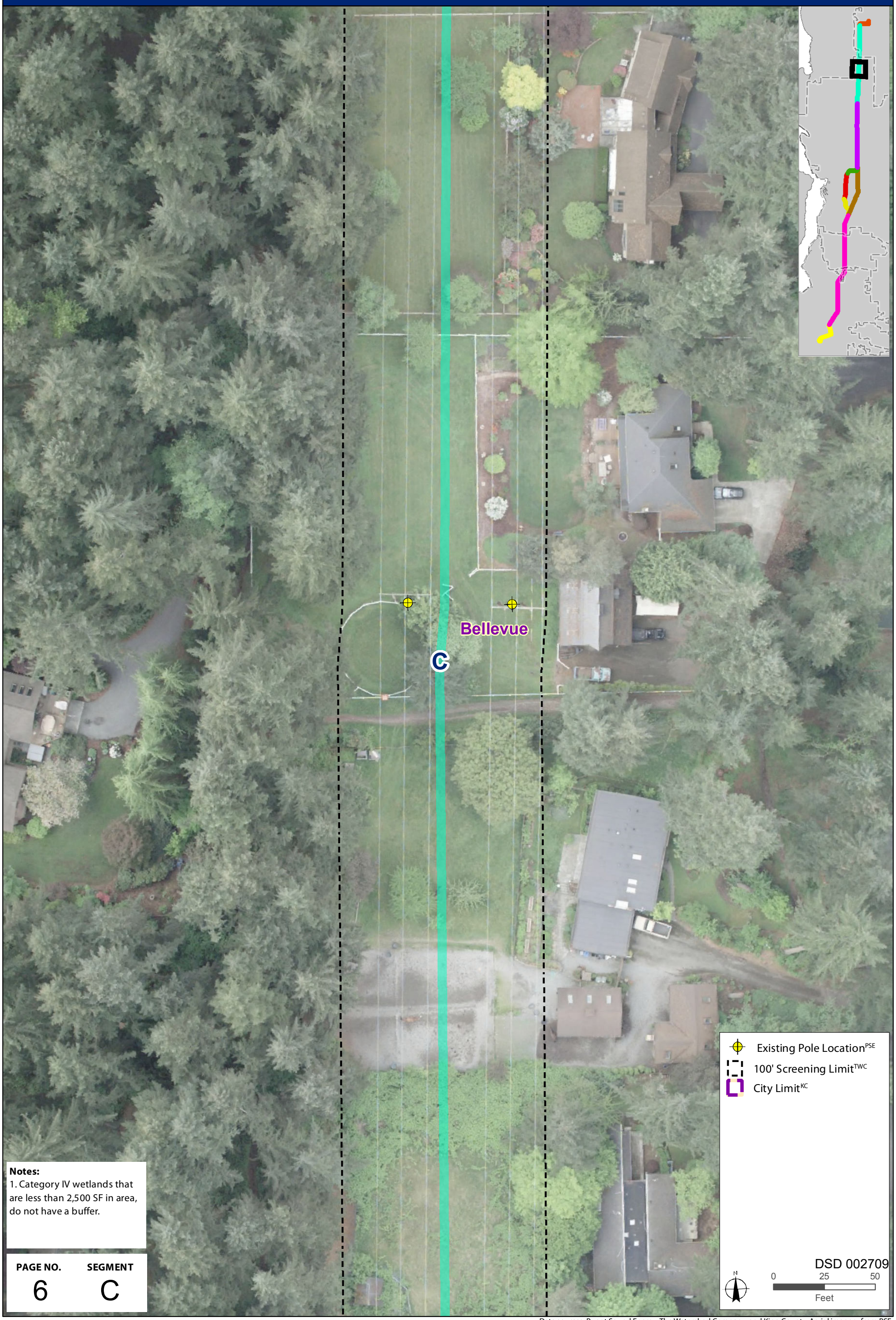
Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

DSD 002708

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

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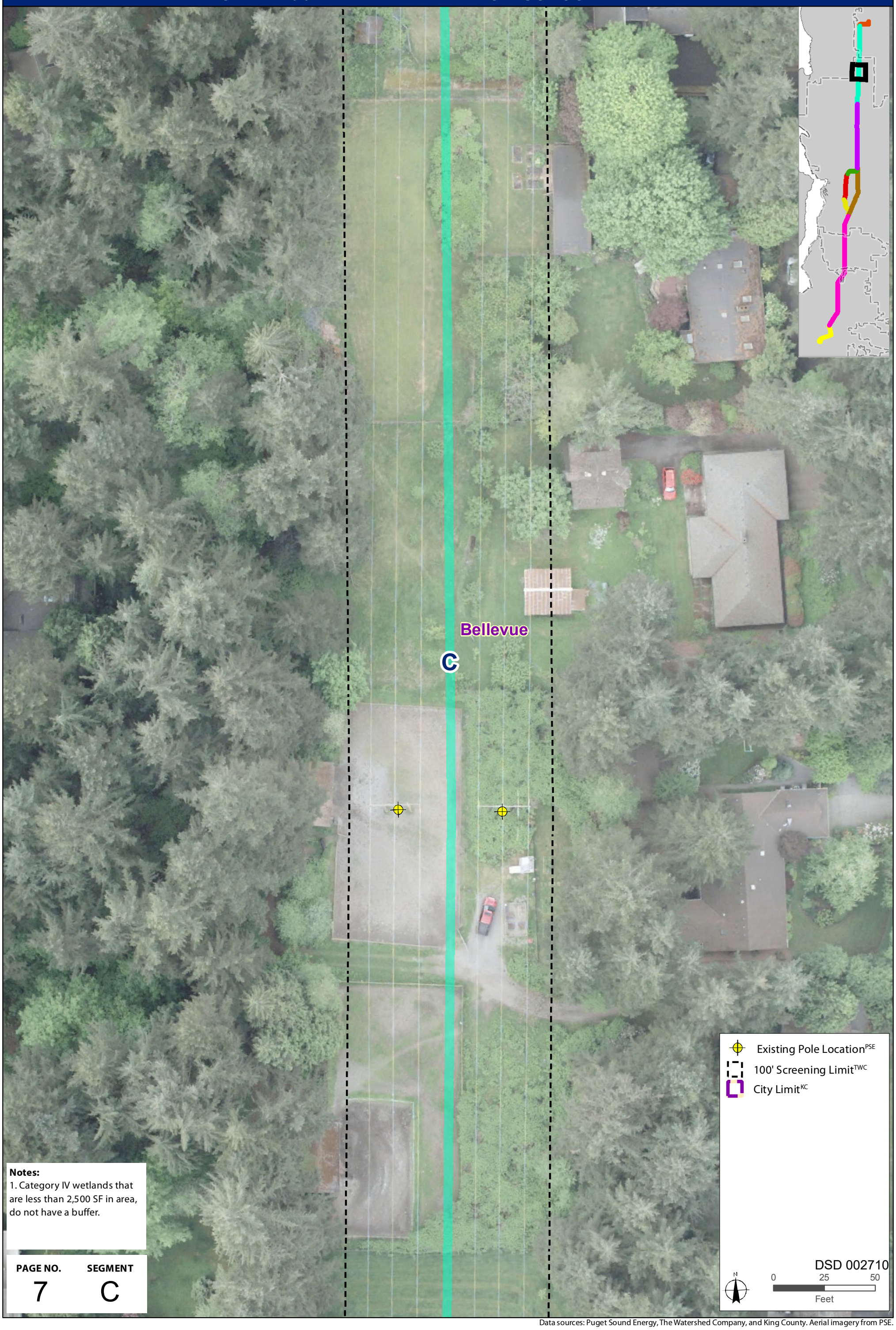
Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

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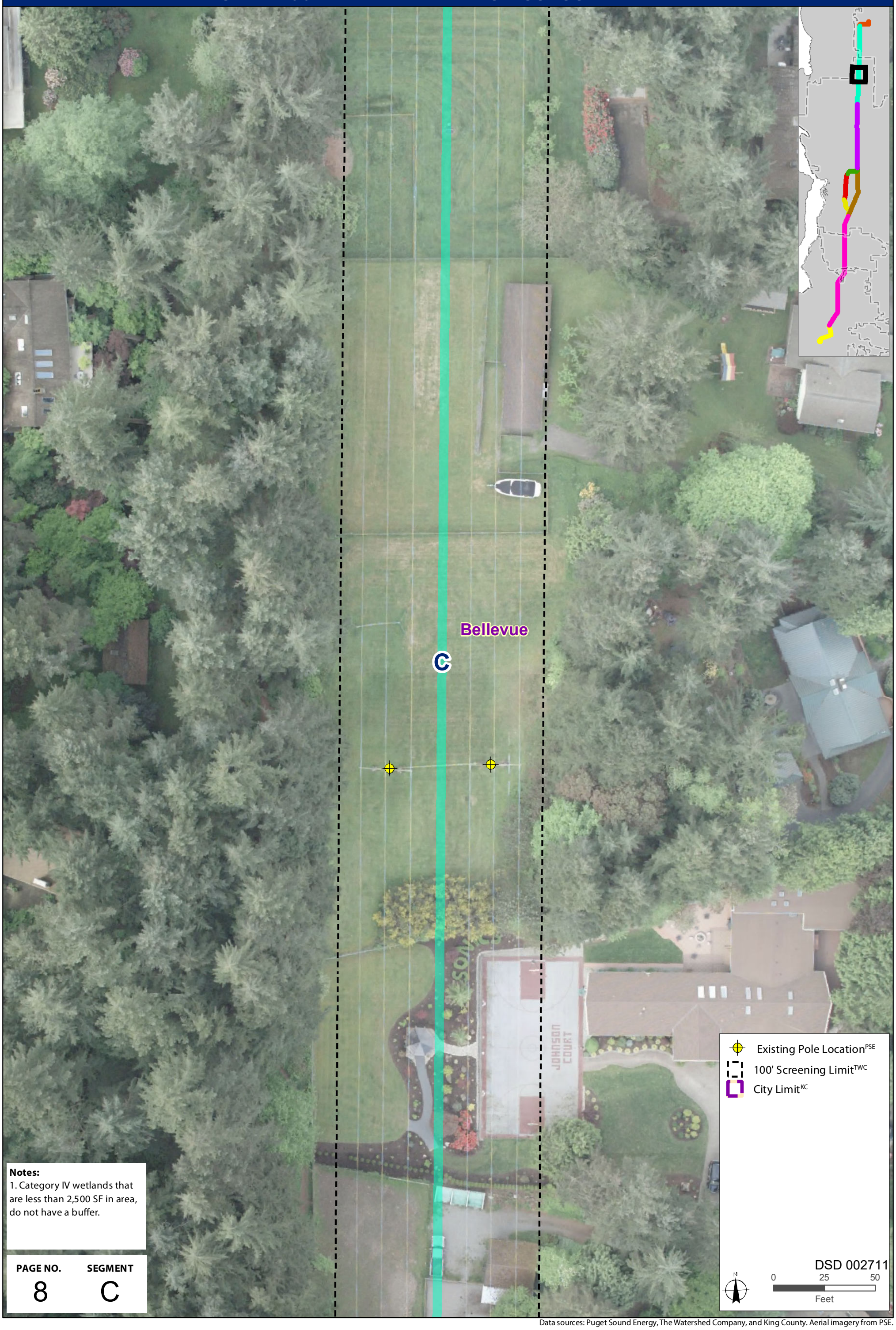
Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
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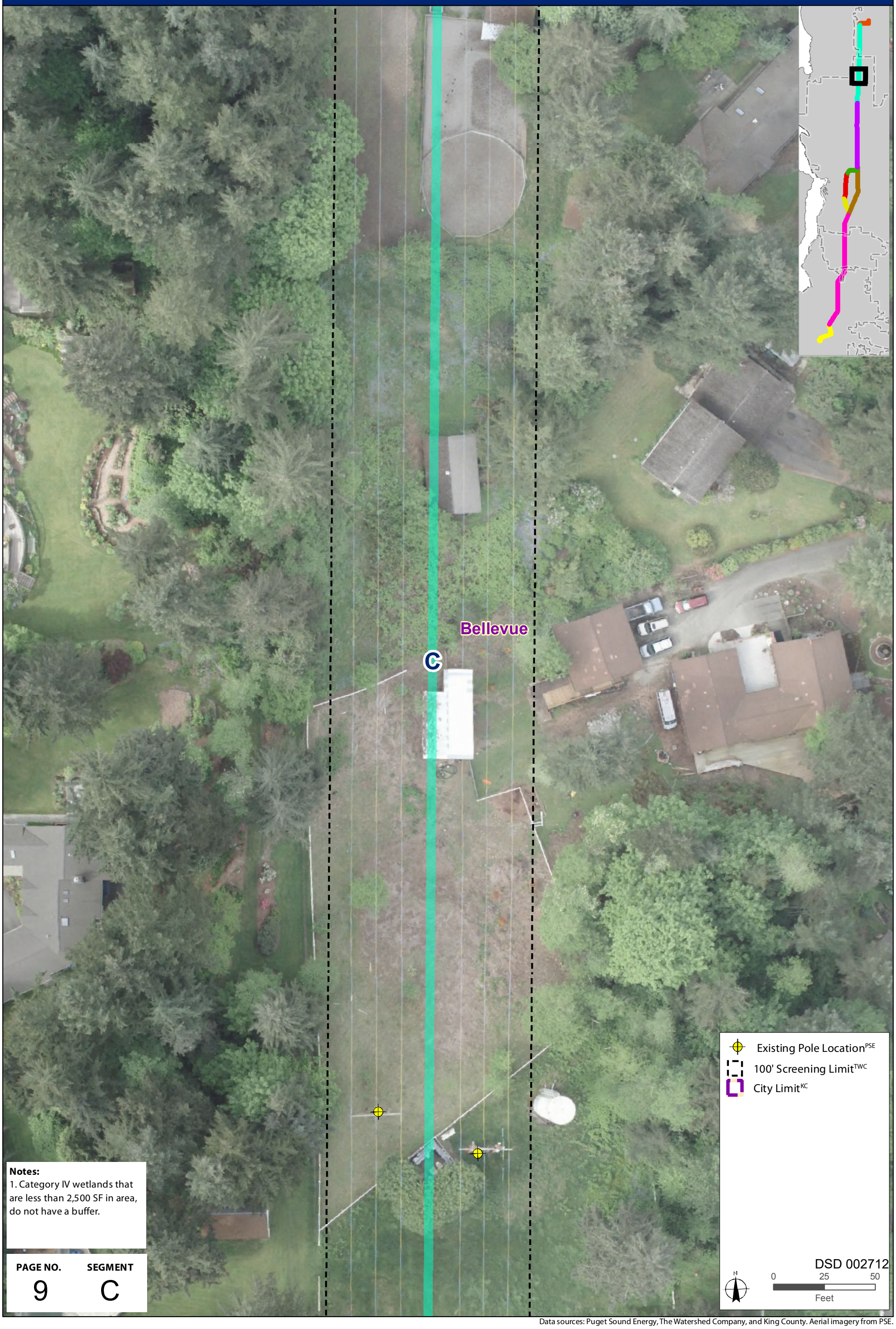

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

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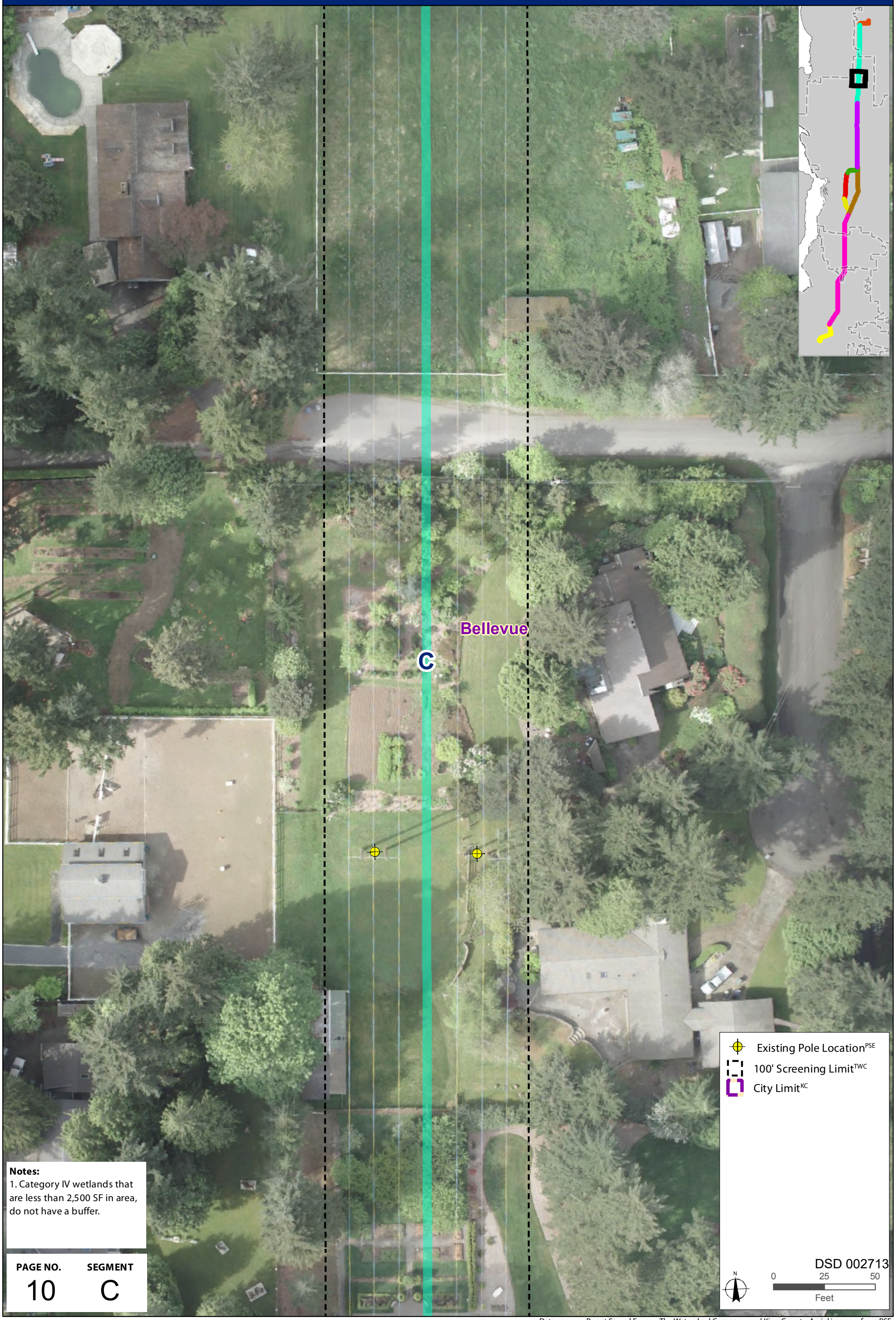
PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

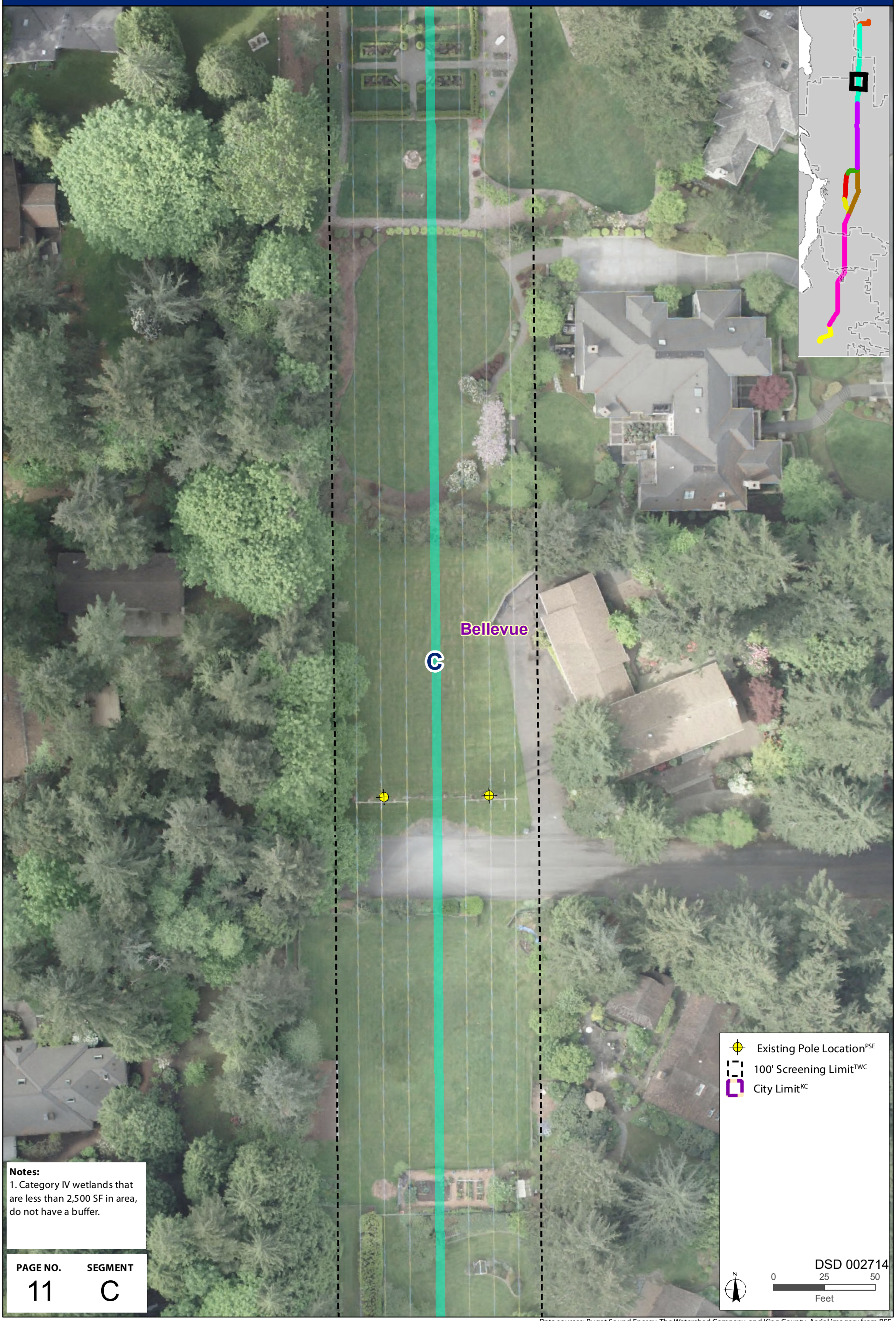


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
10	C

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
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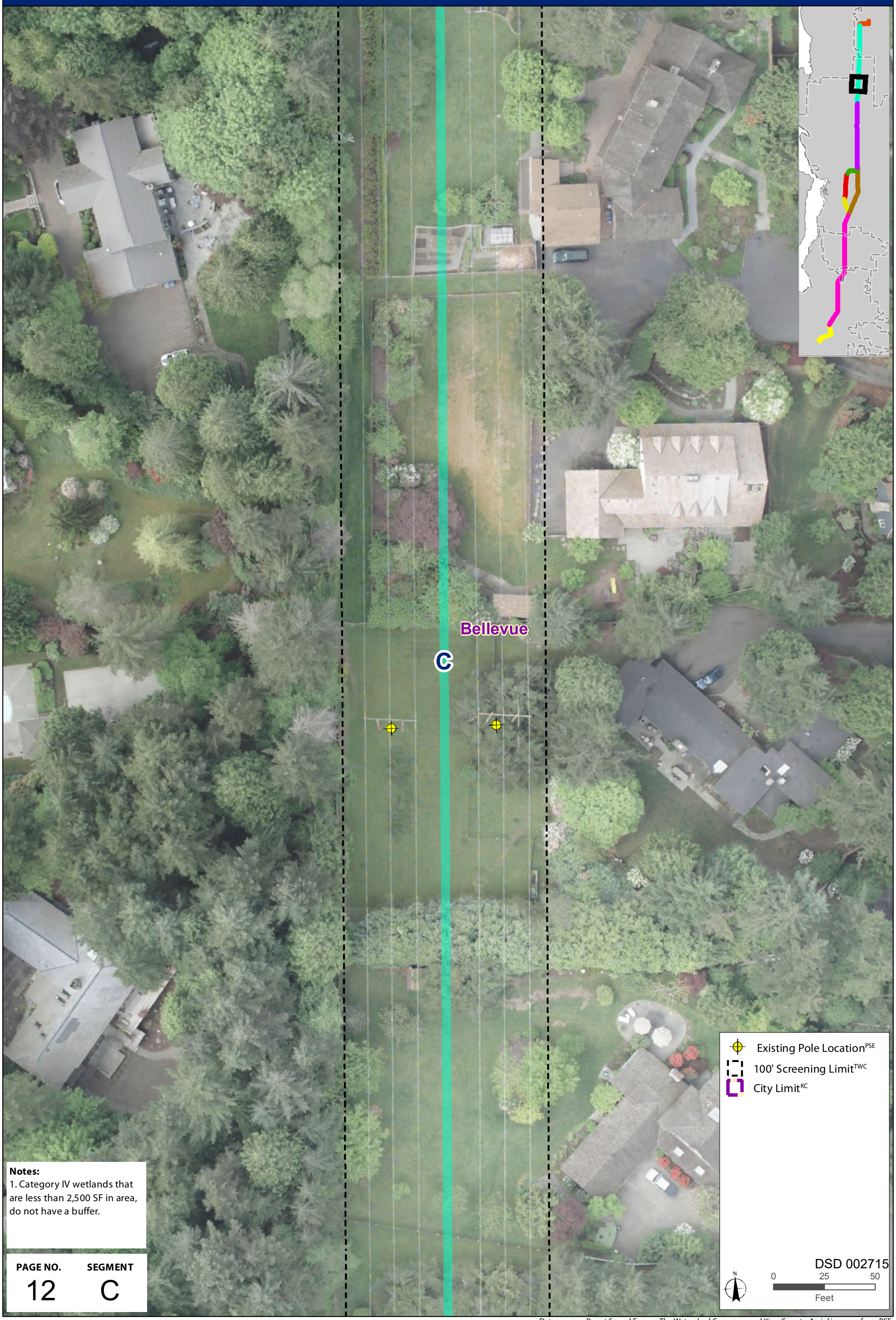

Notes:
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PAGE NO.	SEGMENT
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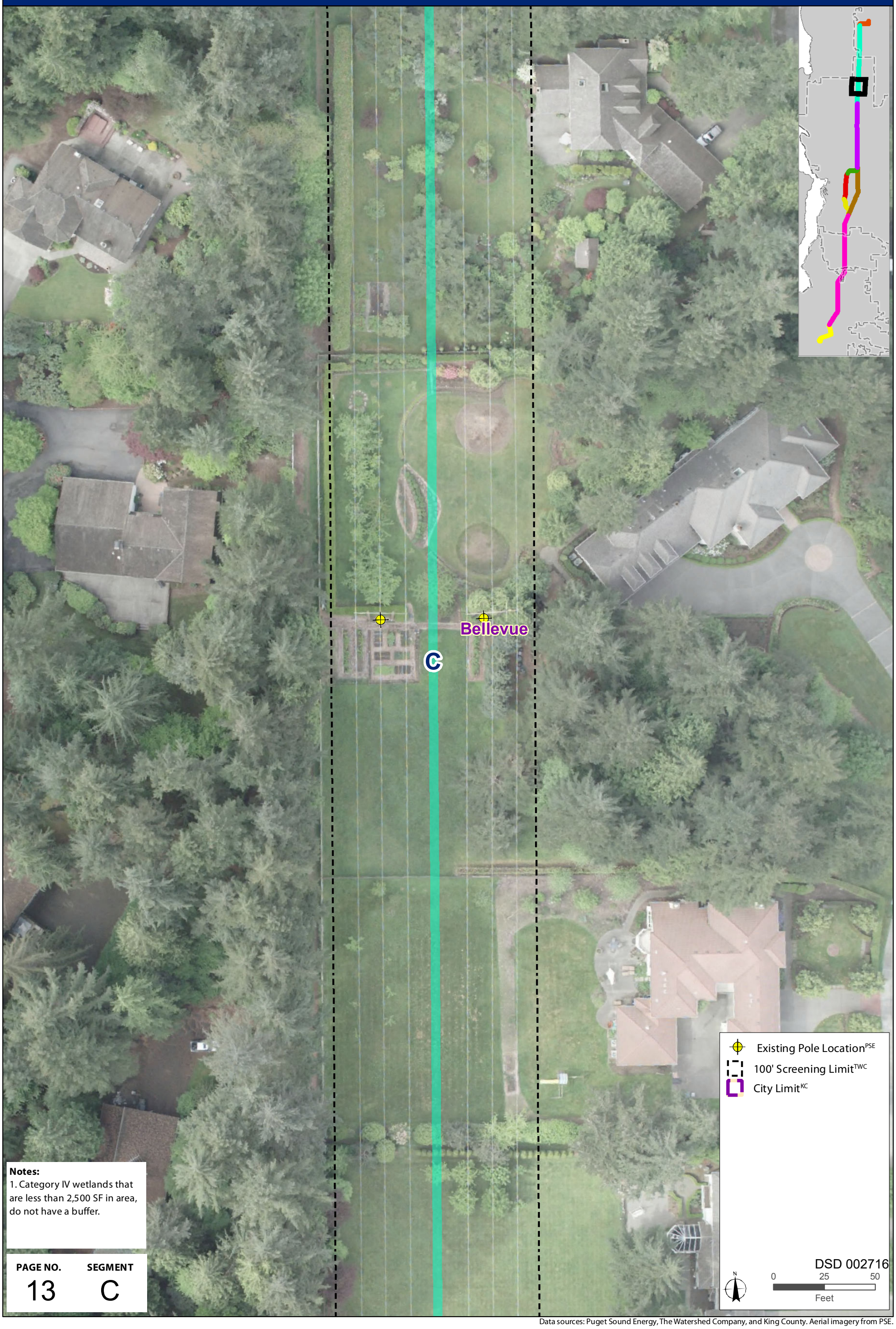
PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

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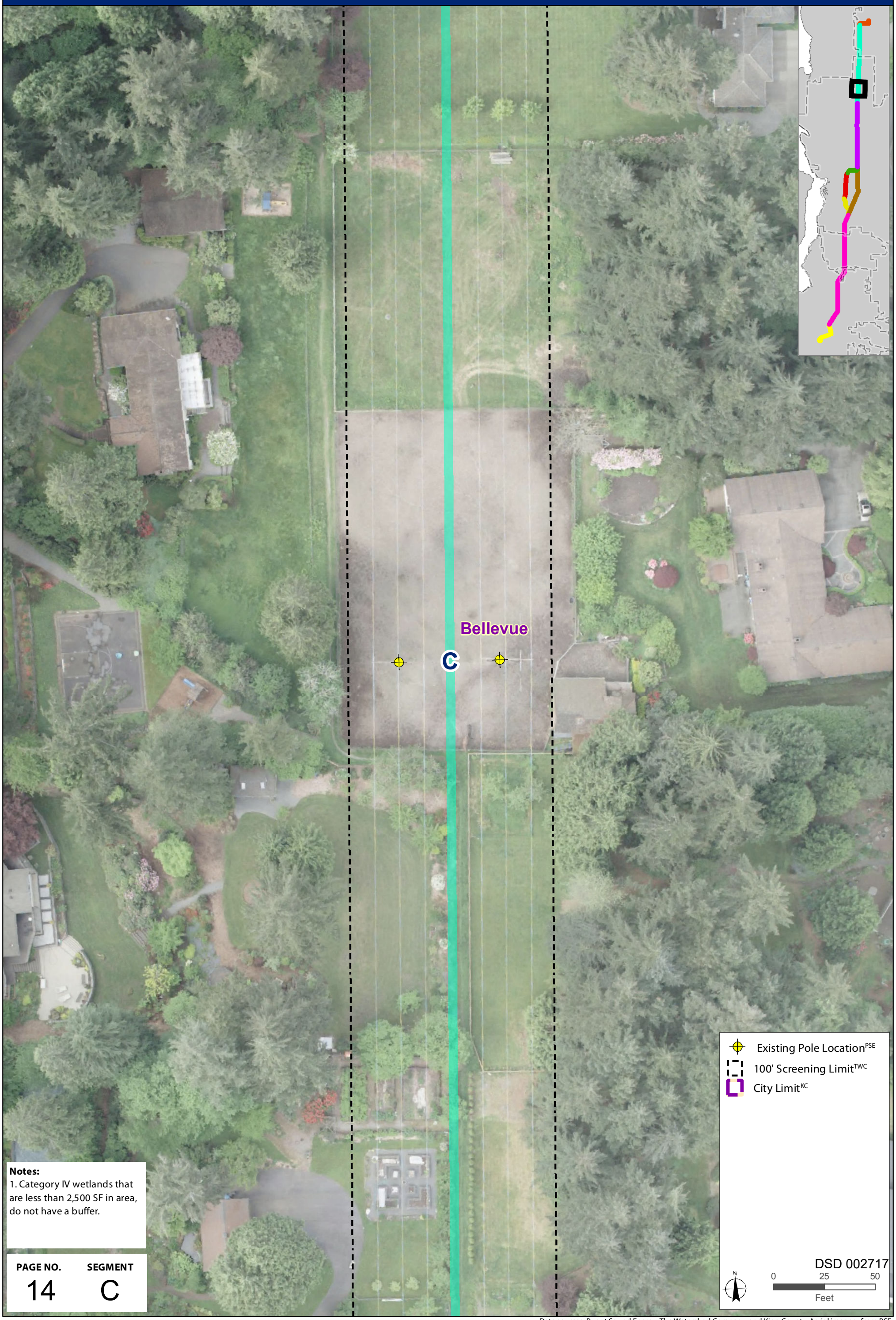
PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
14	C

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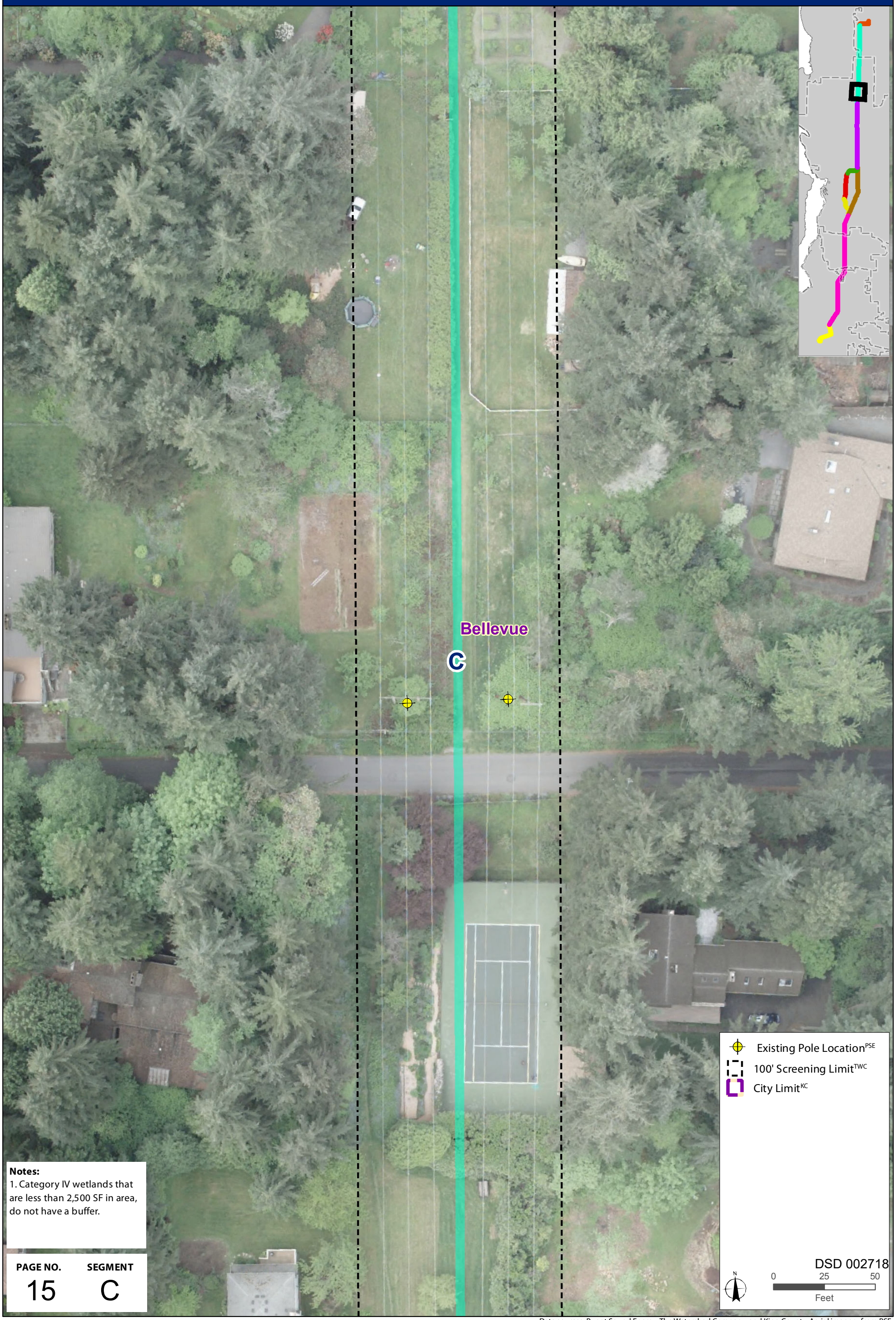
PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

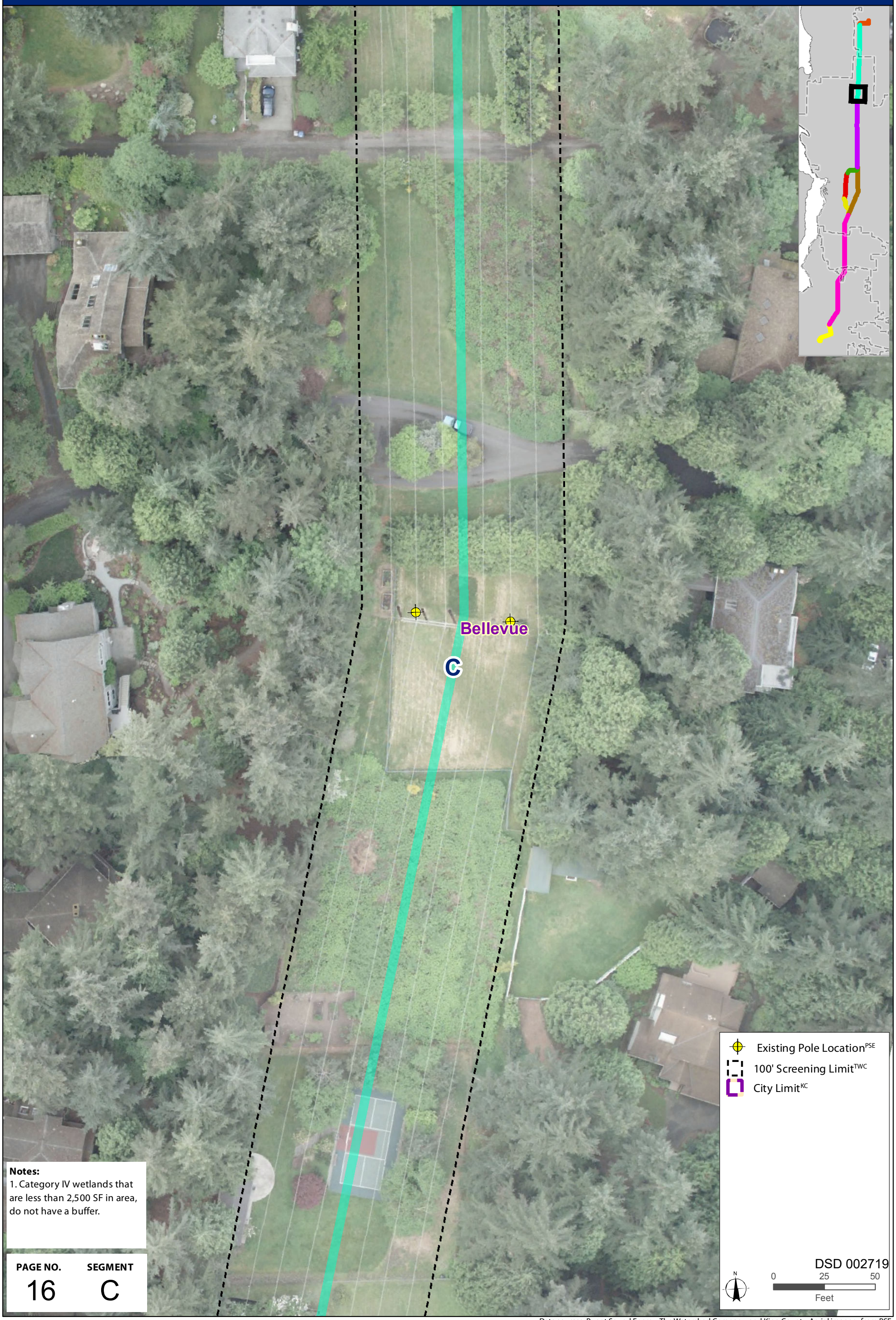


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
15	C

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
16	C

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

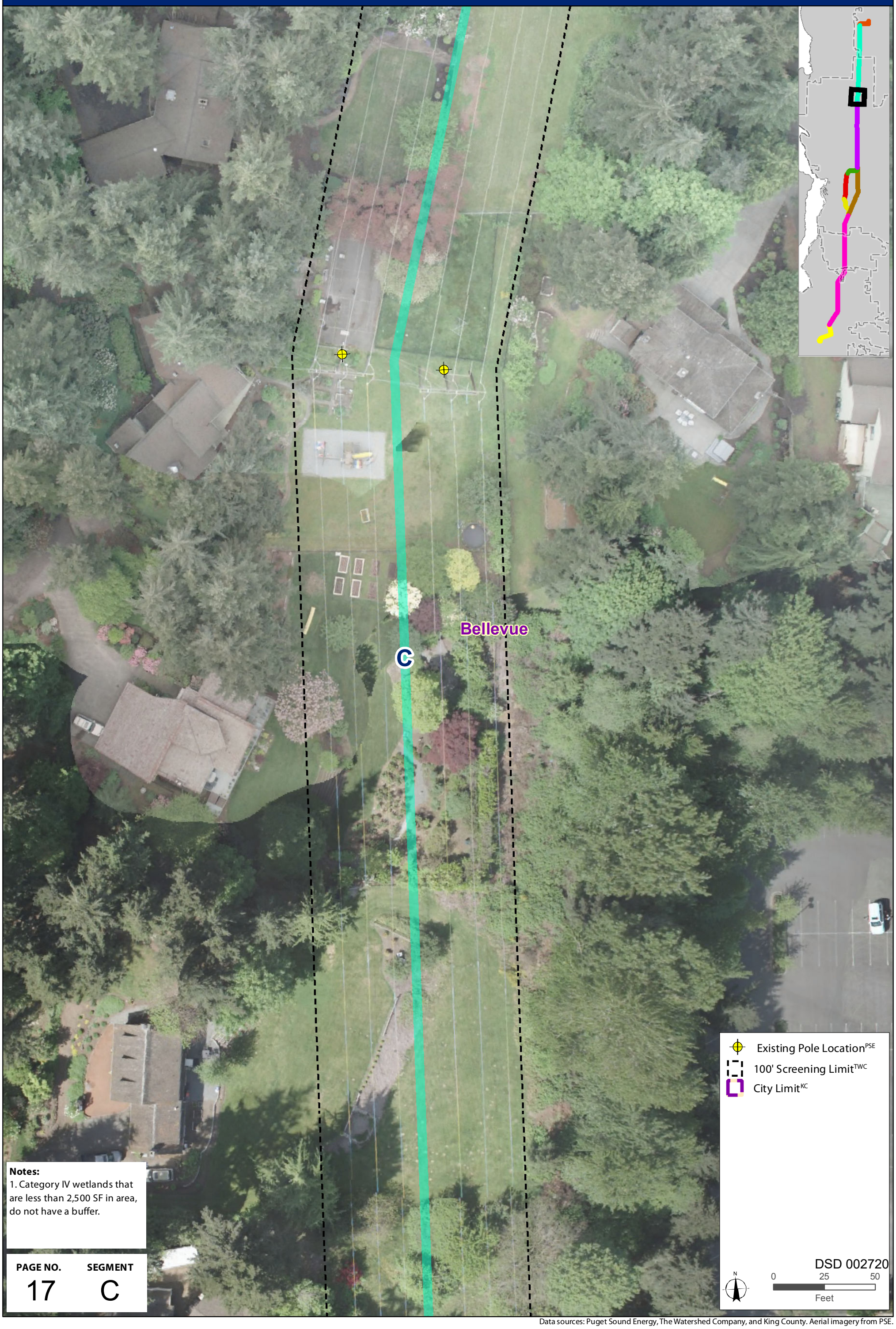
DSD 002719

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

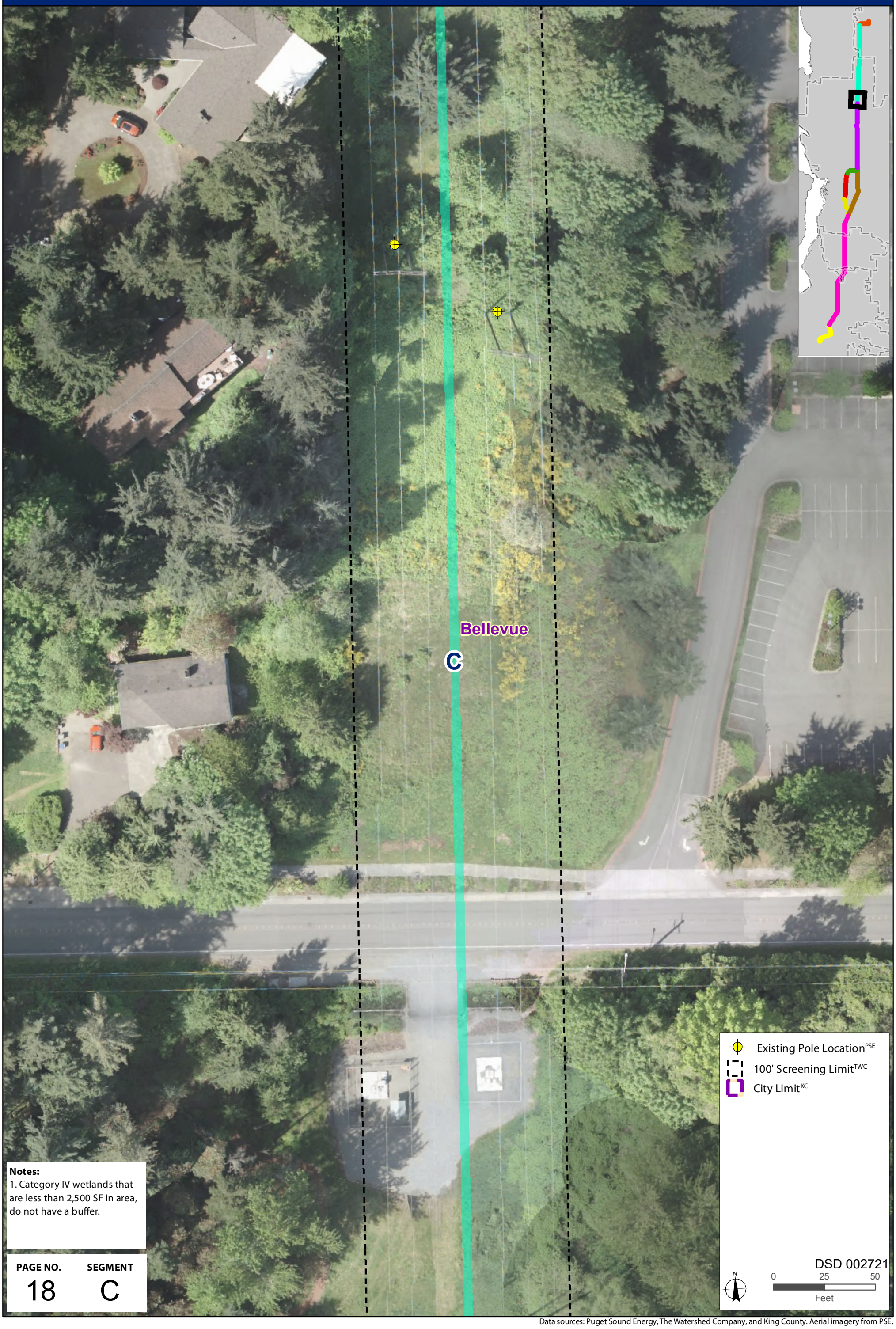


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
17	C

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

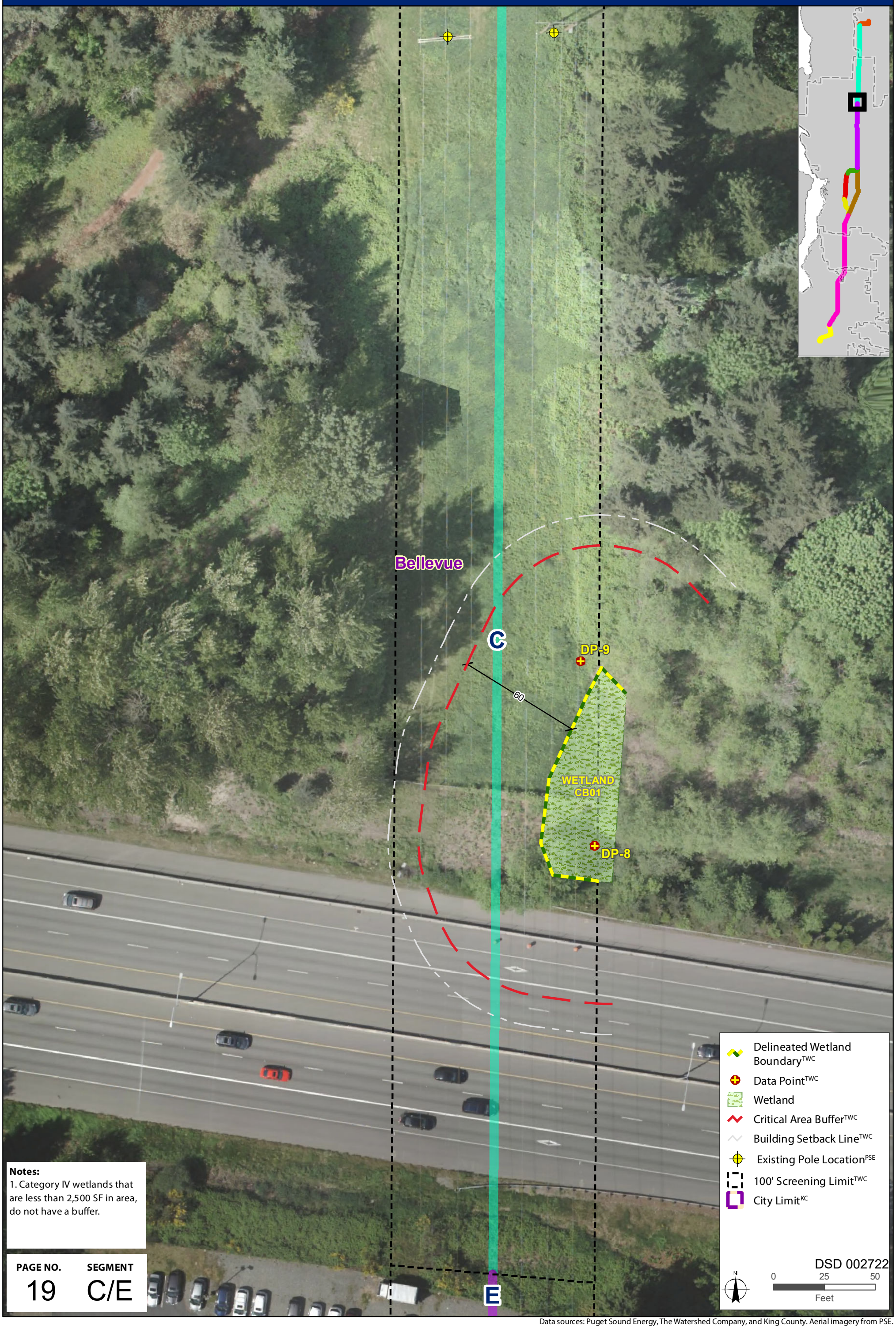


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
18	C

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

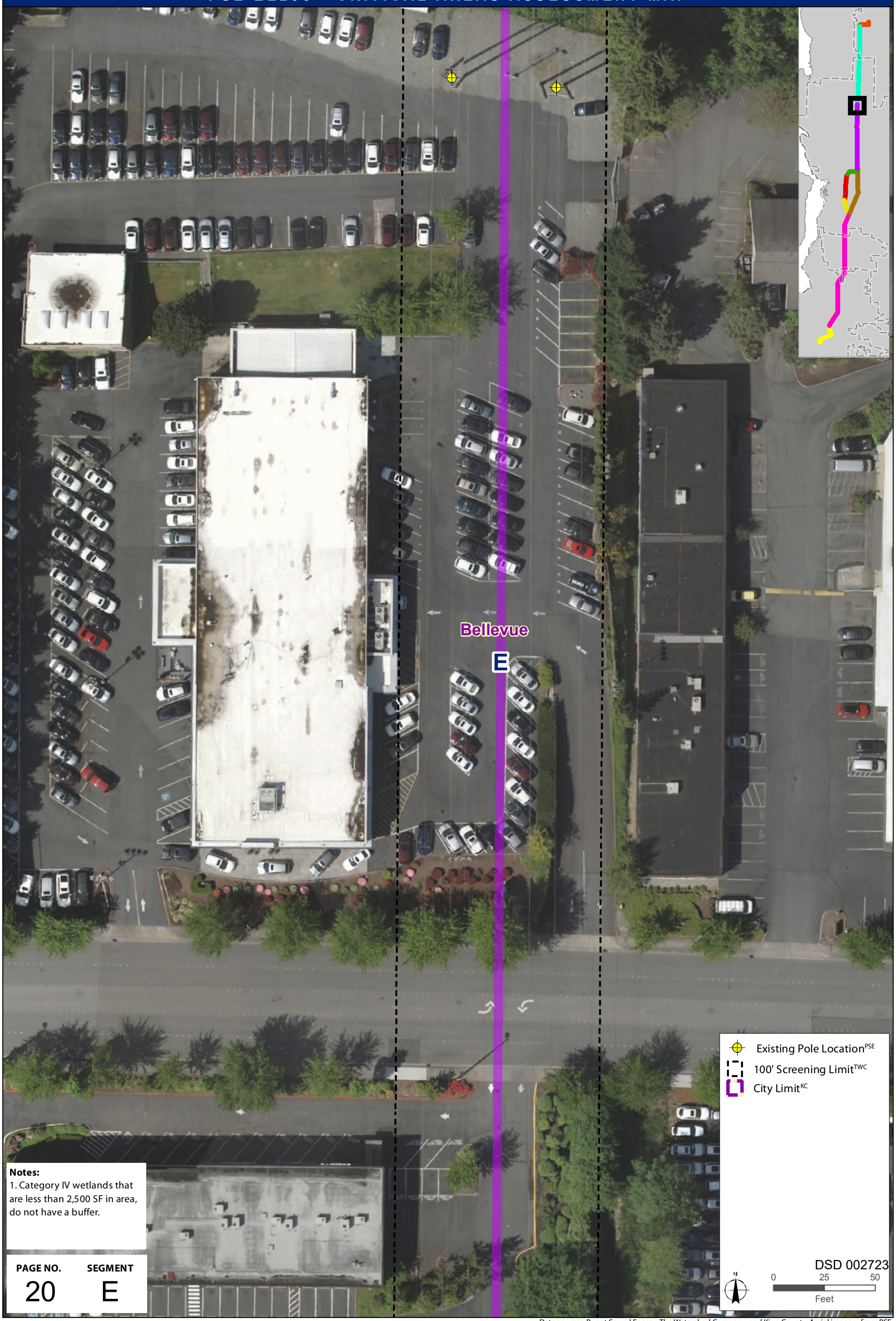


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
19	C/E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

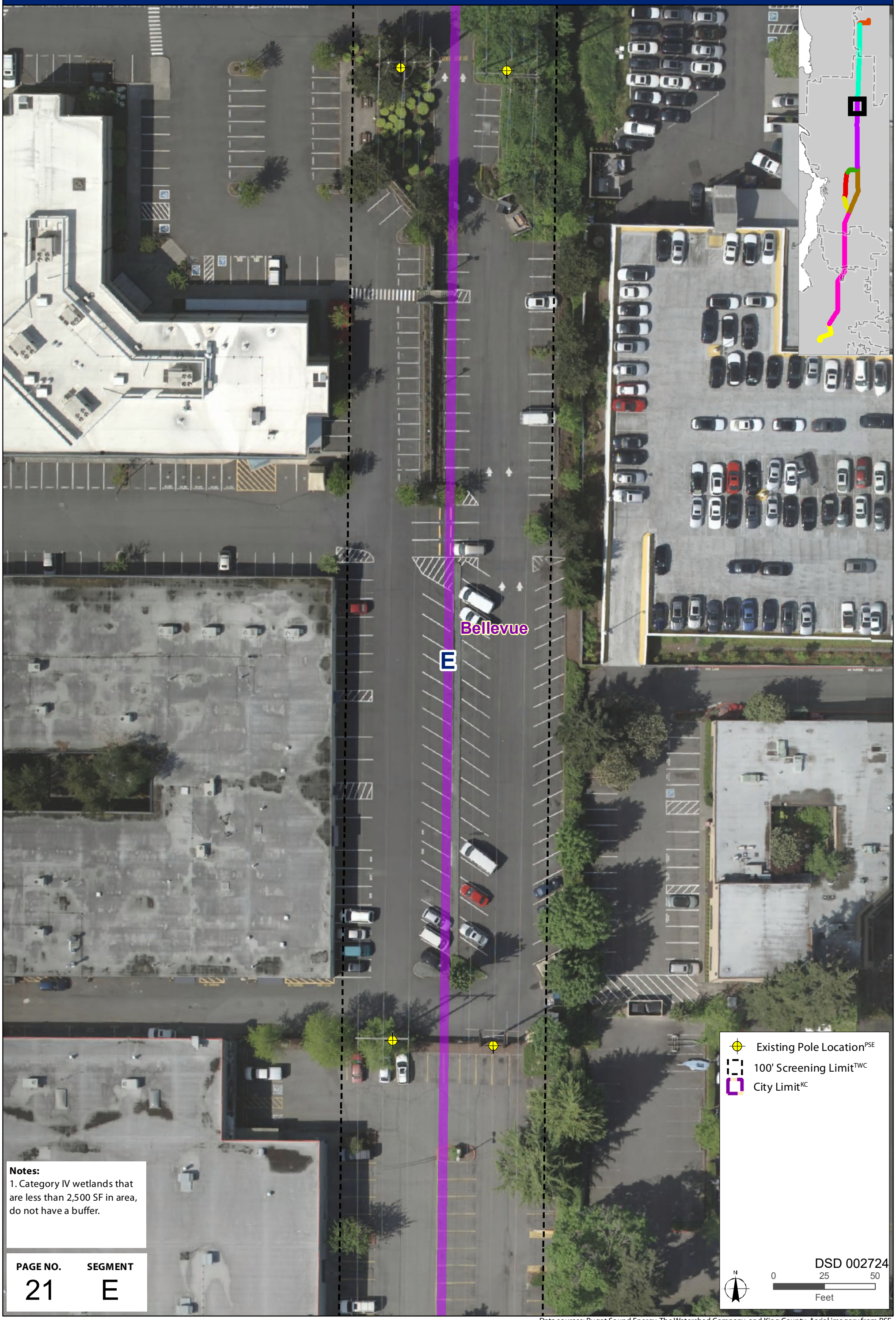


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
20	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

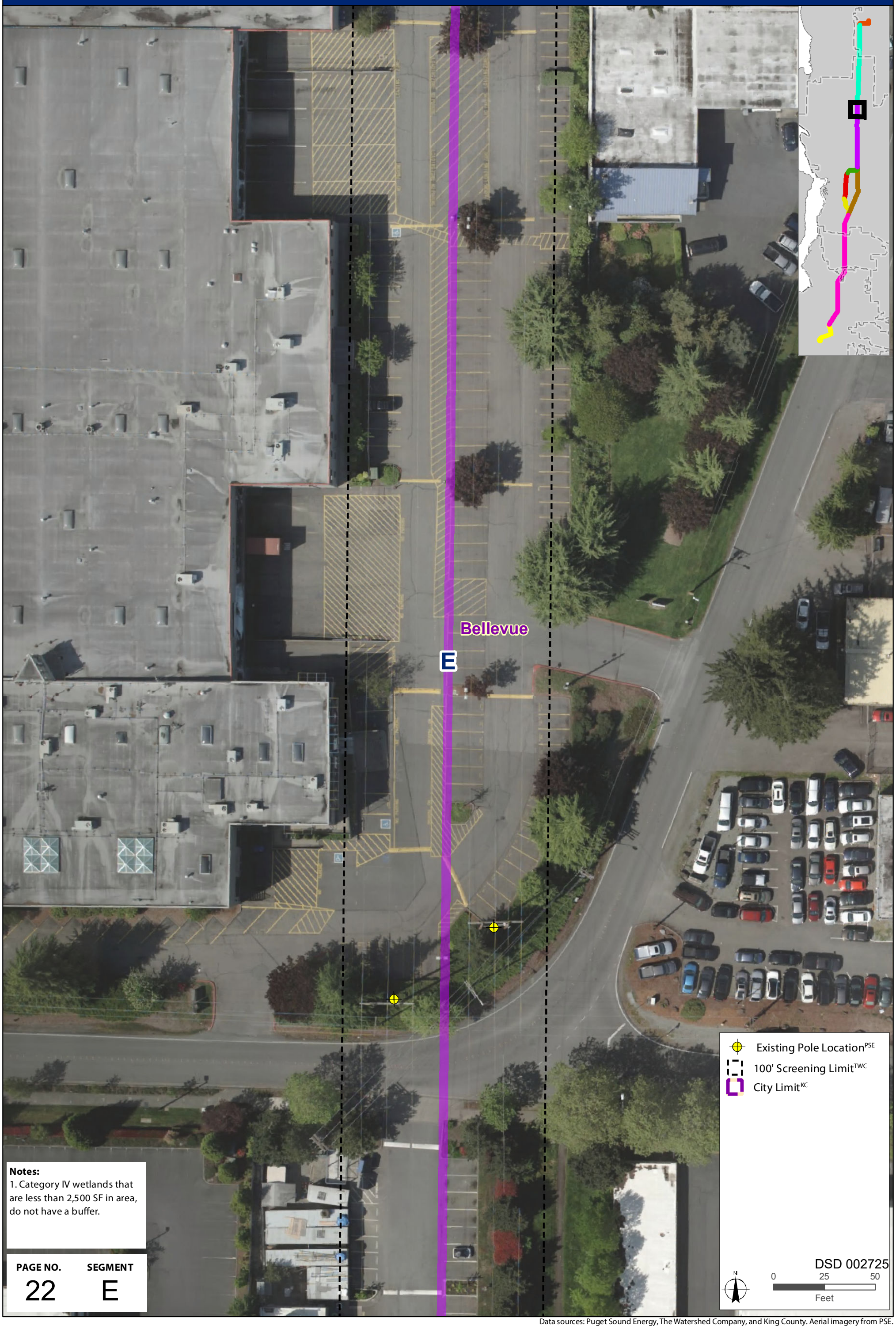


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
21	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

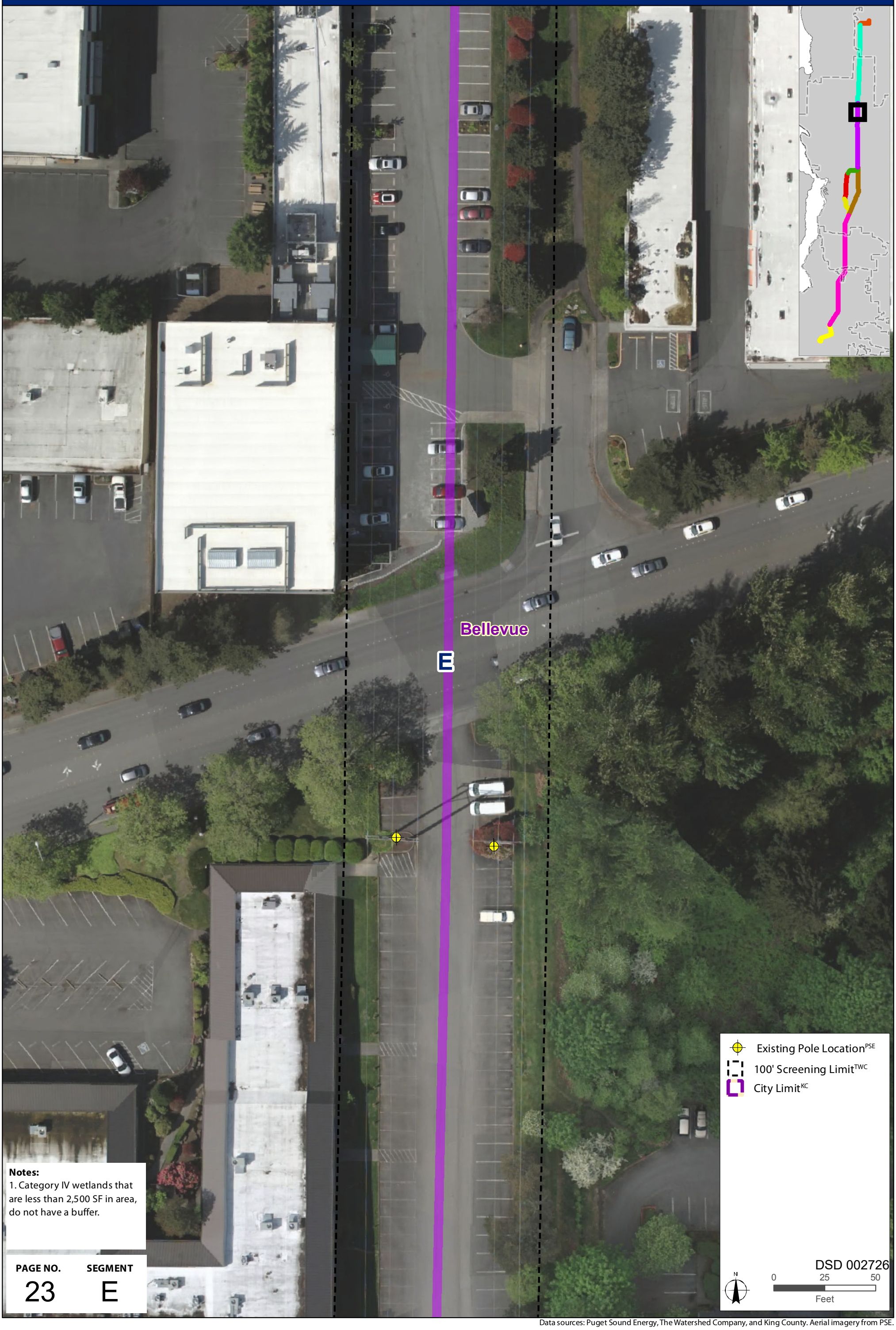


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
22	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

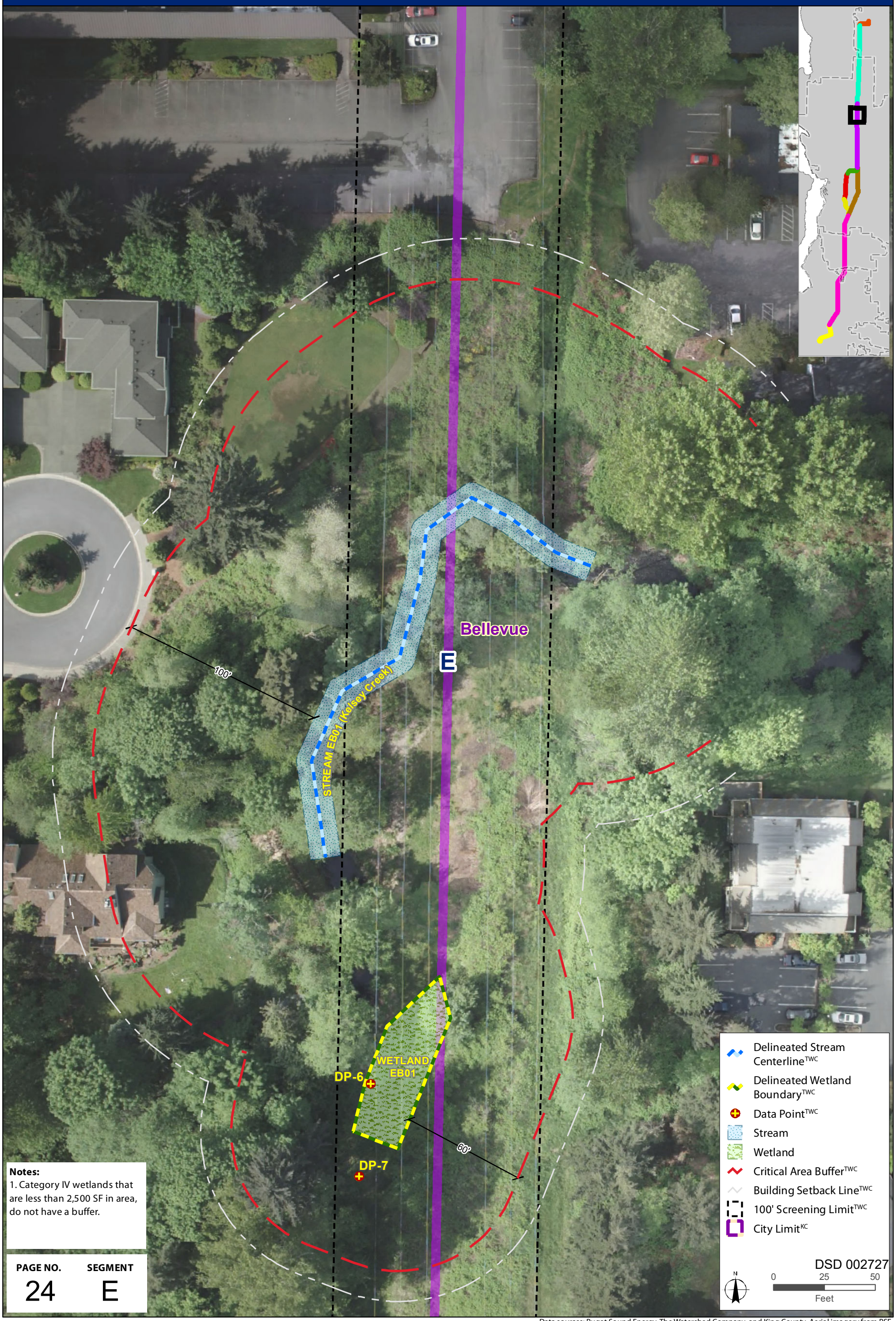


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
23	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

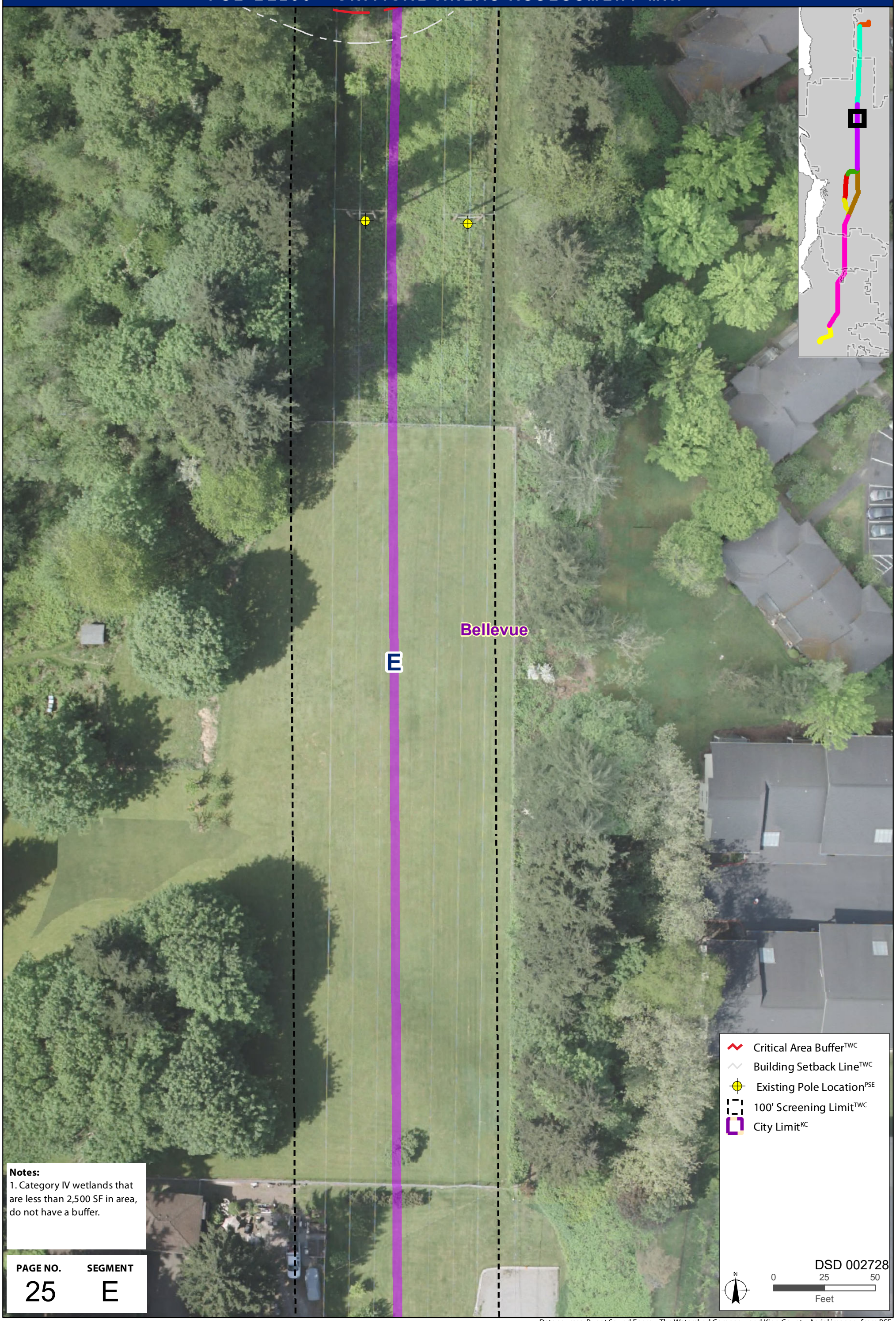


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
24	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

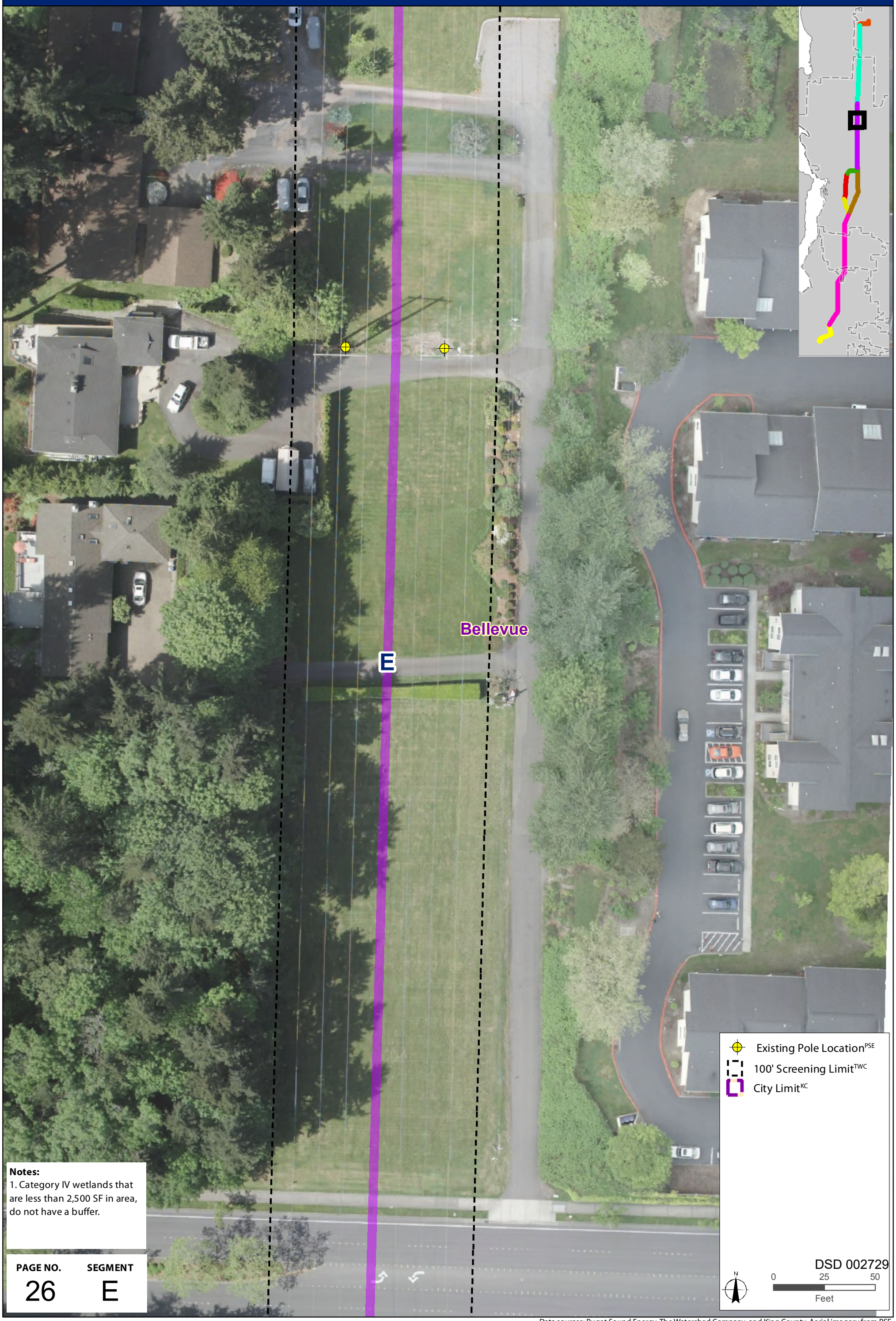


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
25	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

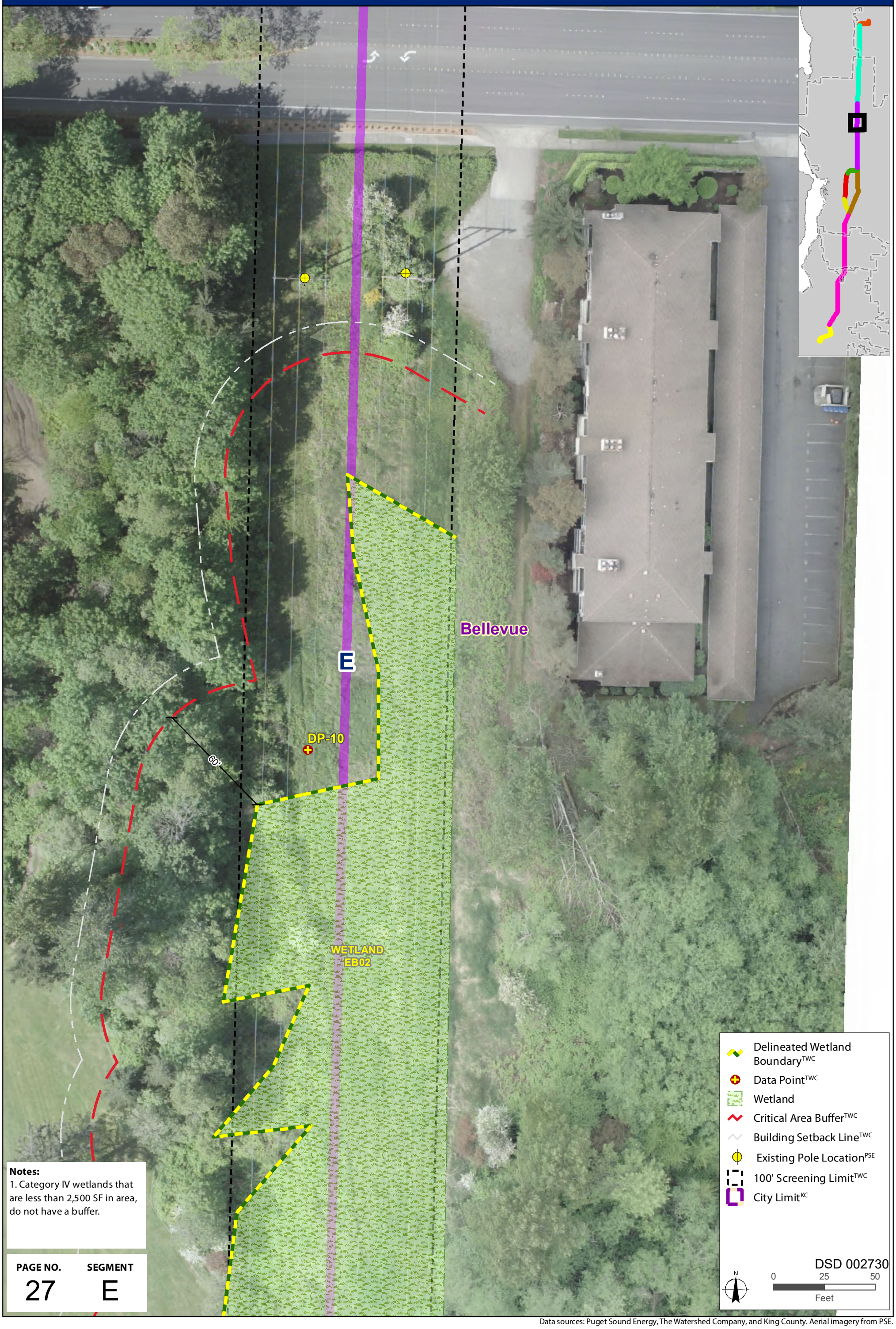


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
26	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

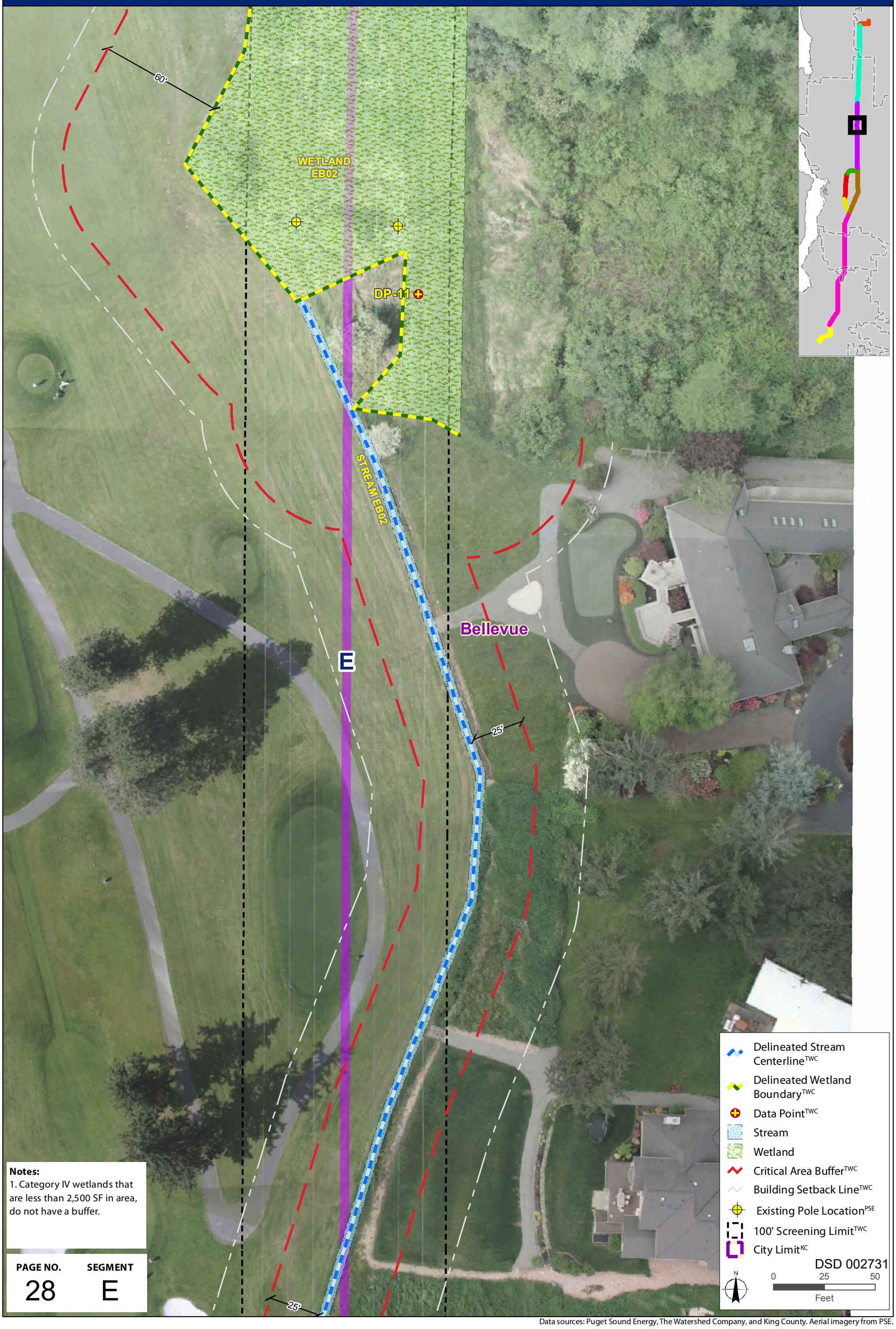


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
27	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
28	E

- Delineated Stream Centerline[TWC]
- Delineated Wetland Boundary[TWC]
- Data Point[TWC]
- Stream
- Wetland
- Critical Area Buffer[TWC]
- Building Setback Line[TWC]
- Existing Pole Location[PSE]
- 100' Screening Limit[TWC]
- City Limit[KC]

DSD 002731

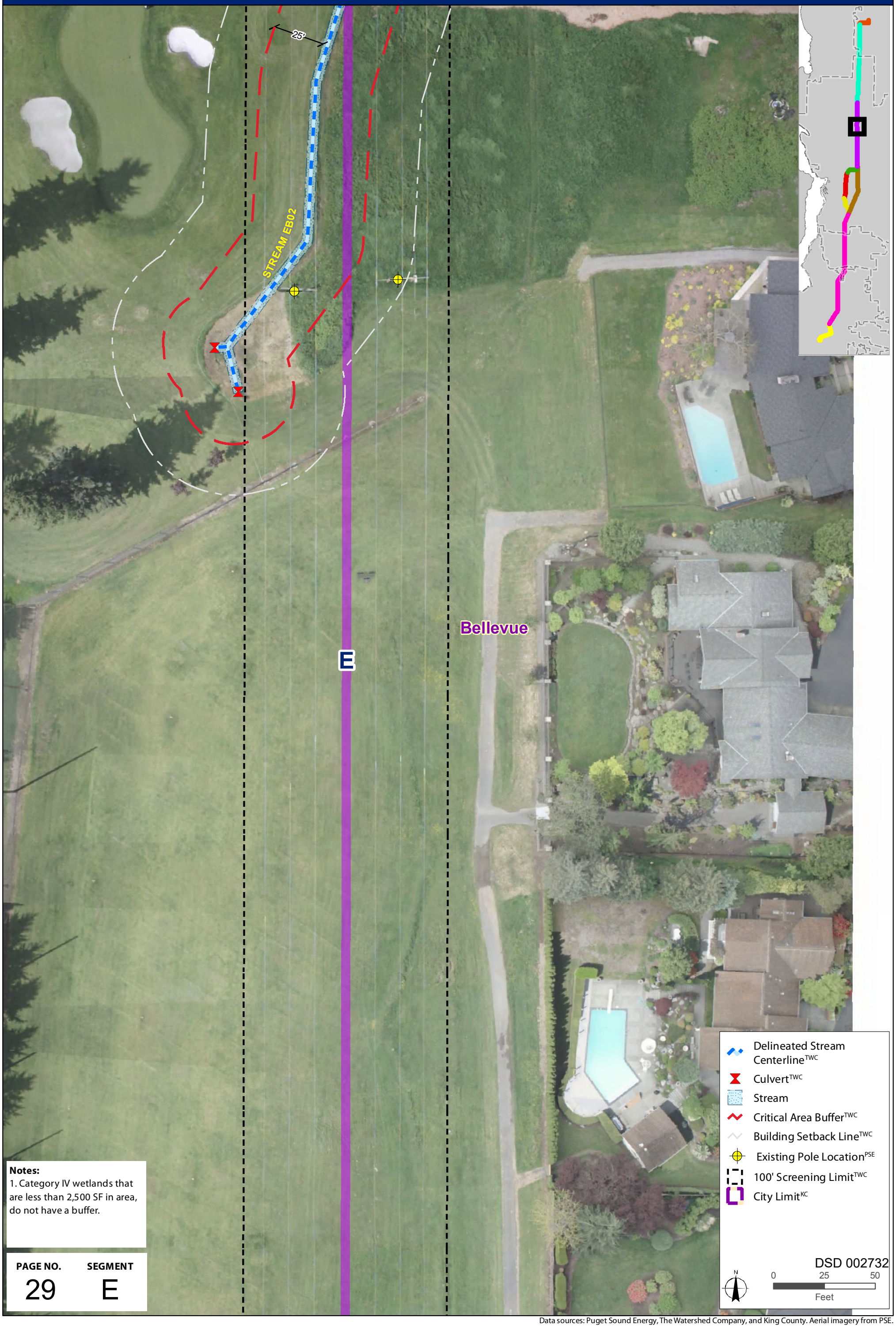
N

0 25 50

Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
29	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
30	E

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

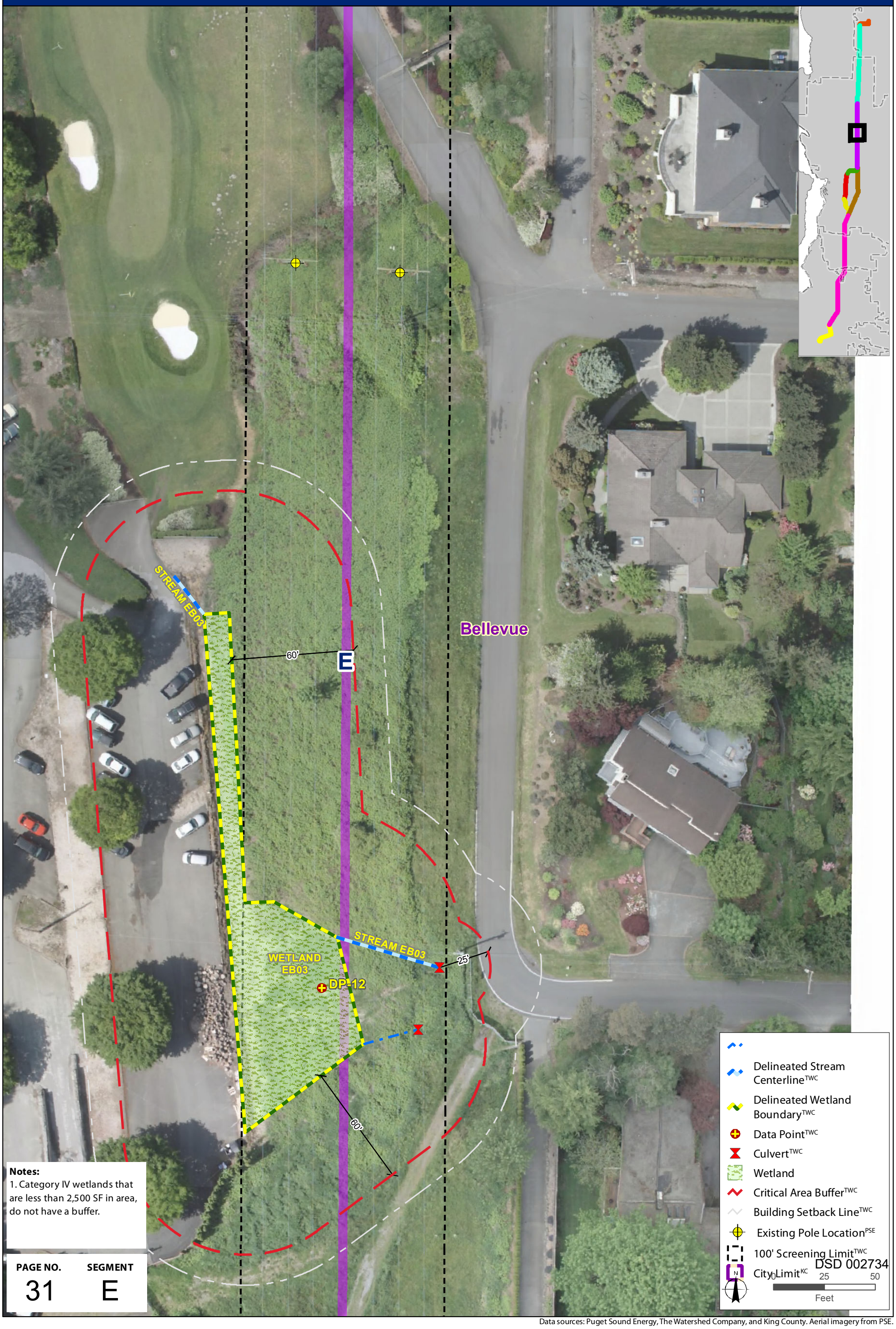
DSD 002733

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



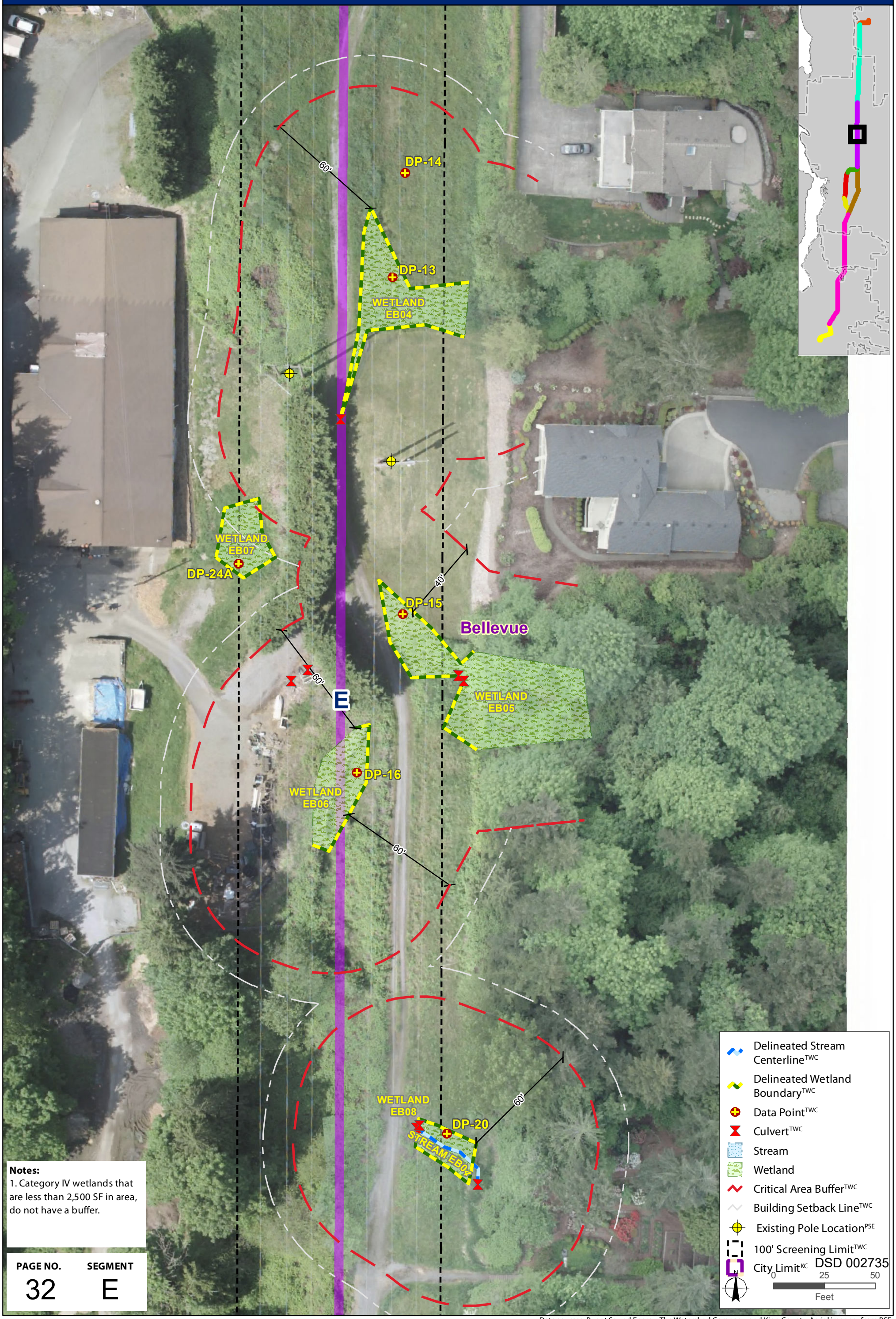
Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
31	E

DSD 002734

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
32	E

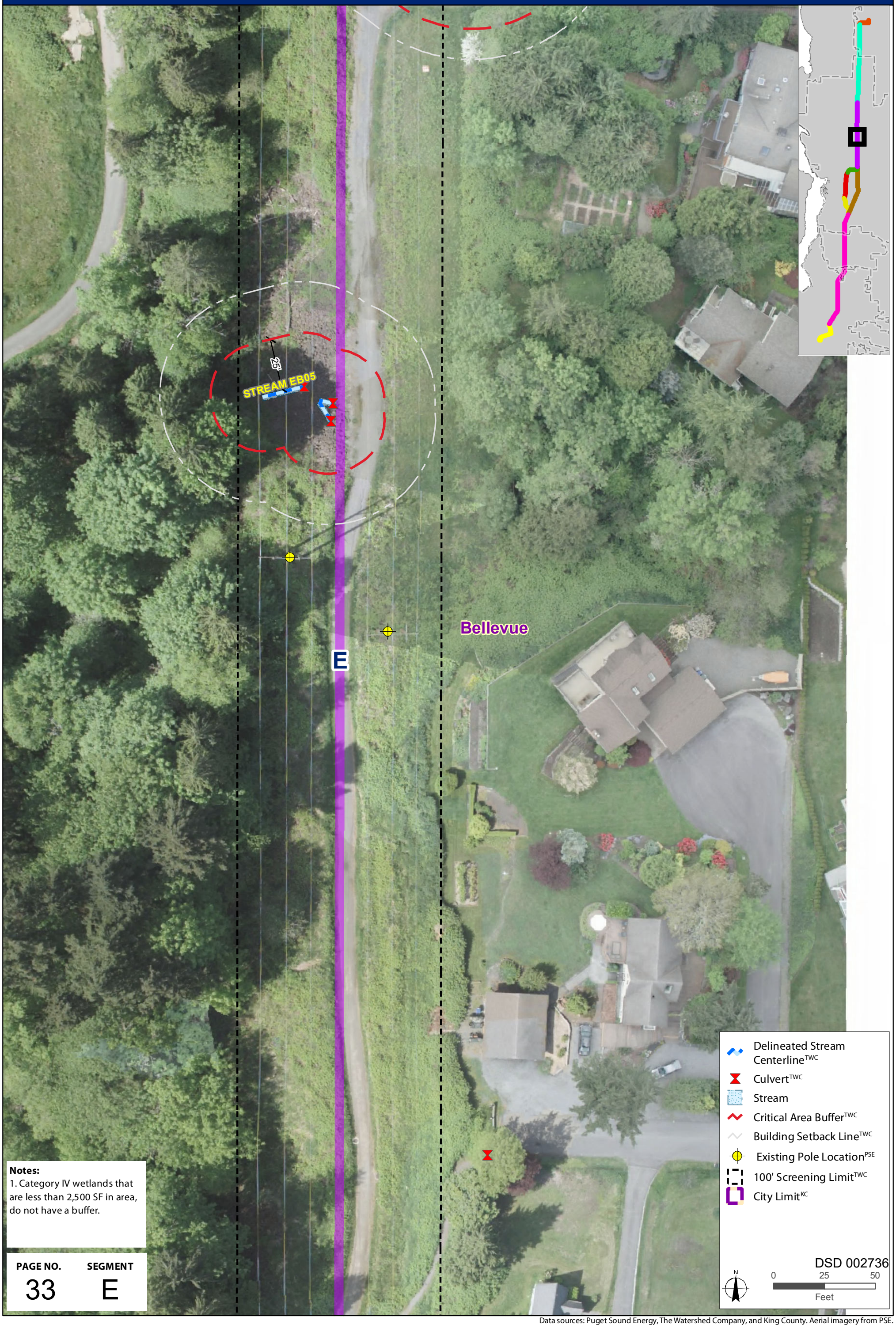
- Delineated Stream Centerline[TWC]
- Delineated Wetland Boundary[TWC]
- Data Point[TWC]
- Culvert[TWC]
- Stream
- Wetland
- Critical Area Buffer[TWC]
- Building Setback Line[TWC]
- Existing Pole Location[PSE]
- 100' Screening Limit[TWC]
- City Limit[KC]

DSD 002735

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

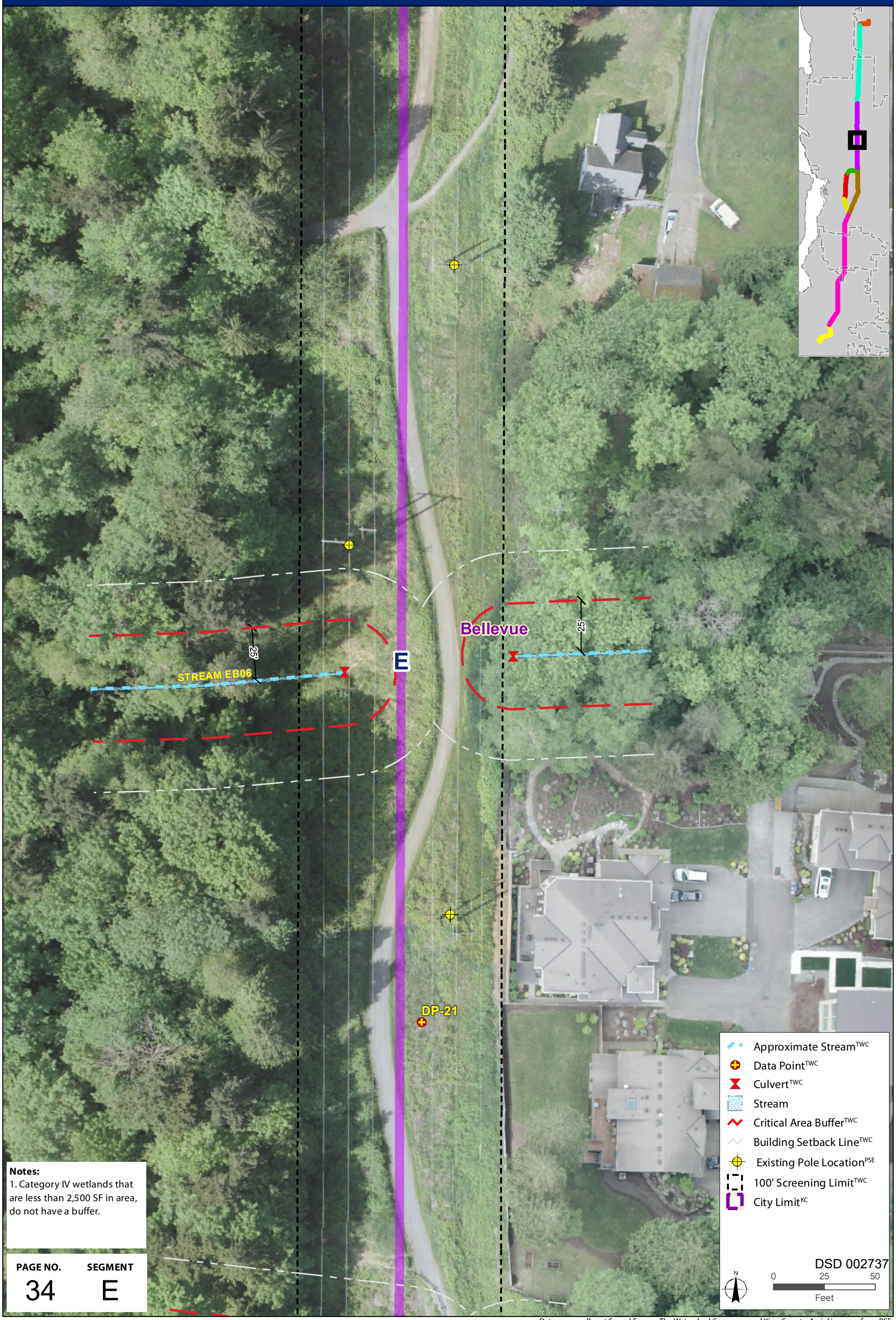


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
33	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
34	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

STREAM EB07
25'
25'
STREAM EB08
25'
DP-22
WETLAND EB09
60'
Bellevue
E
DP-24
DP-23
60'
WETLAND EB10
50'
STREAM EB09
40'
WETLAND EB11

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
35	E

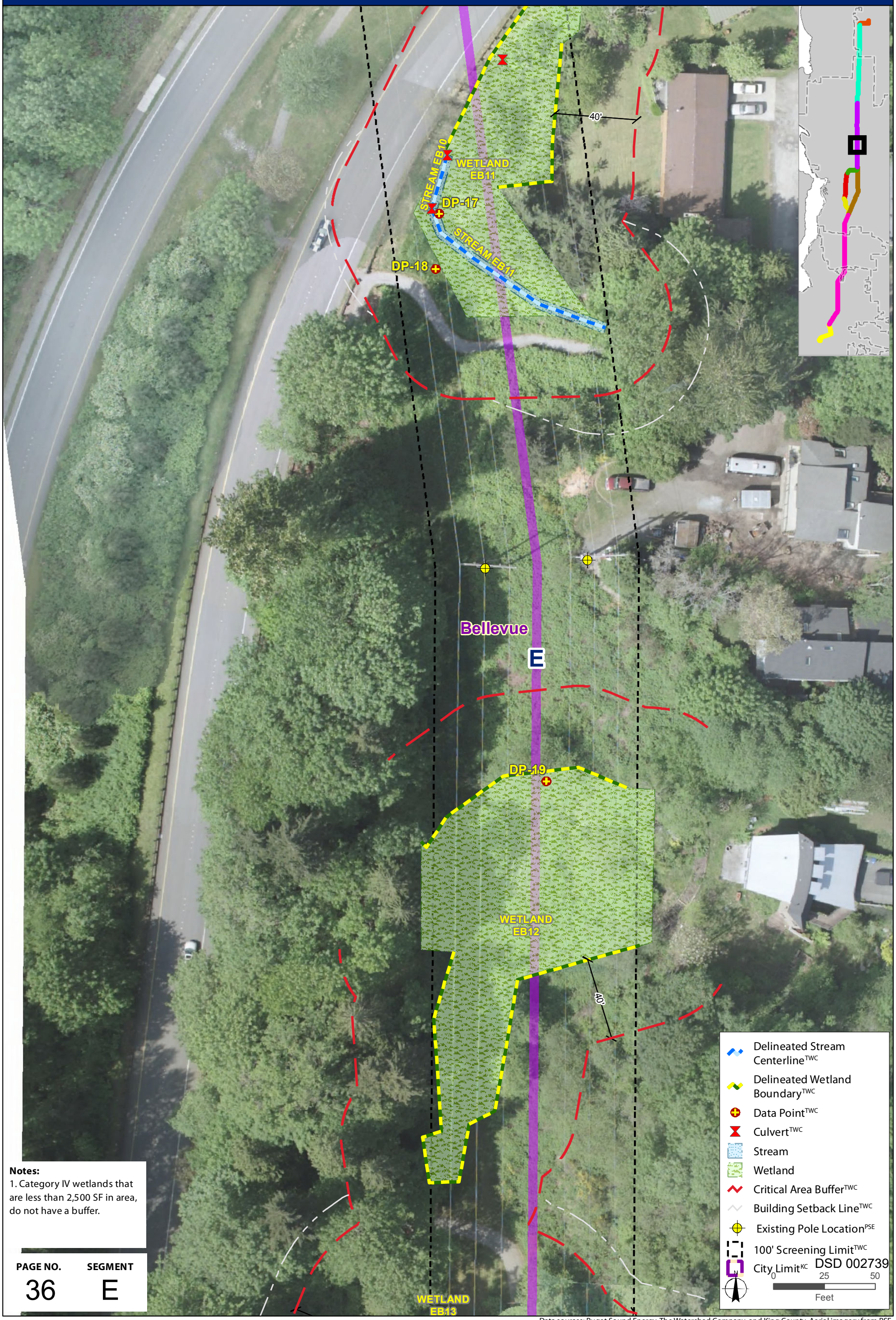
- Delineated Stream Centerline[TWC]
- Delineated Wetland Boundary[TWC]
- Data Point[TWC]
- Culvert[TWC]
- Stream
- Wetland
- Critical Area Buffer[TWC]
- Building Setback Line[TWC]
- Existing Pole Location[PSE]
- 100' Screening Limit[TWC]
- City Limit[KC]

DSD 002738

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

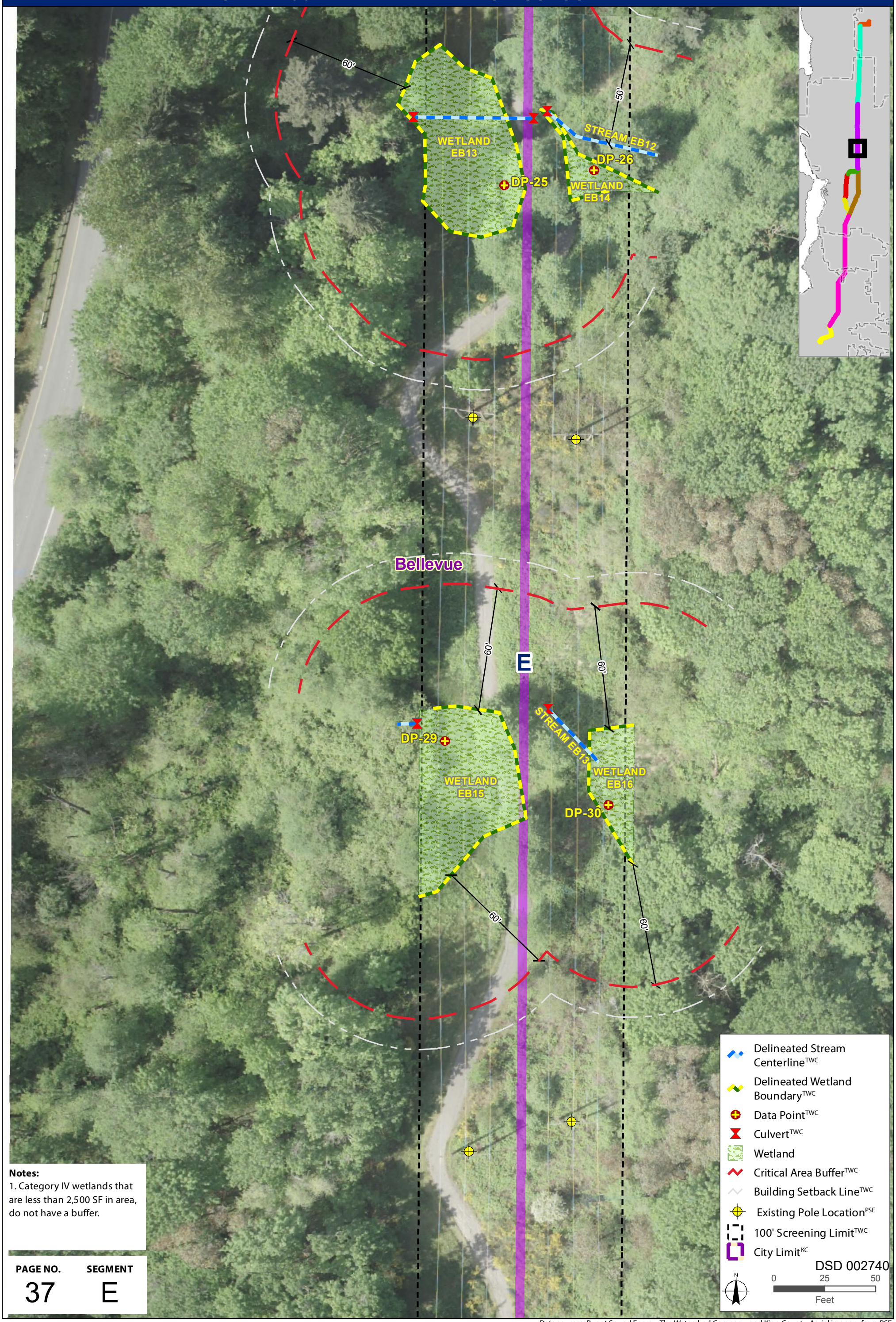


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
36	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
37	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Bellevue

DP-32

DP-31

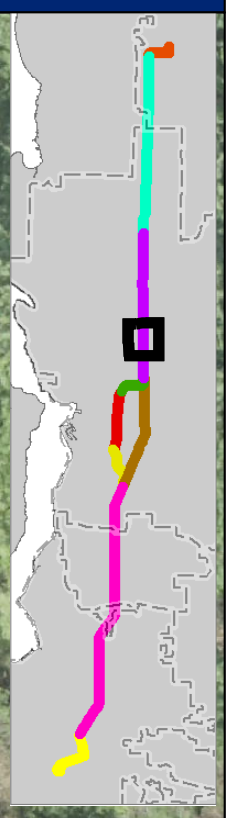
WETLAND EB17

STREAM EB14

E

110'

110'



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
38	E

- Delineated Stream Centerline[TWC]
- Delineated Wetland Boundary[TWC]
- Data Point[TWC]
- Culvert[TWC]
- Wetland
- Critical Area Buffer[TWC]
- Building Setback Line[TWC]
- Existing Pole Location[PSE]
- 100' Screening Limit[TWC]
- City Limit[KC]

DSD 002741

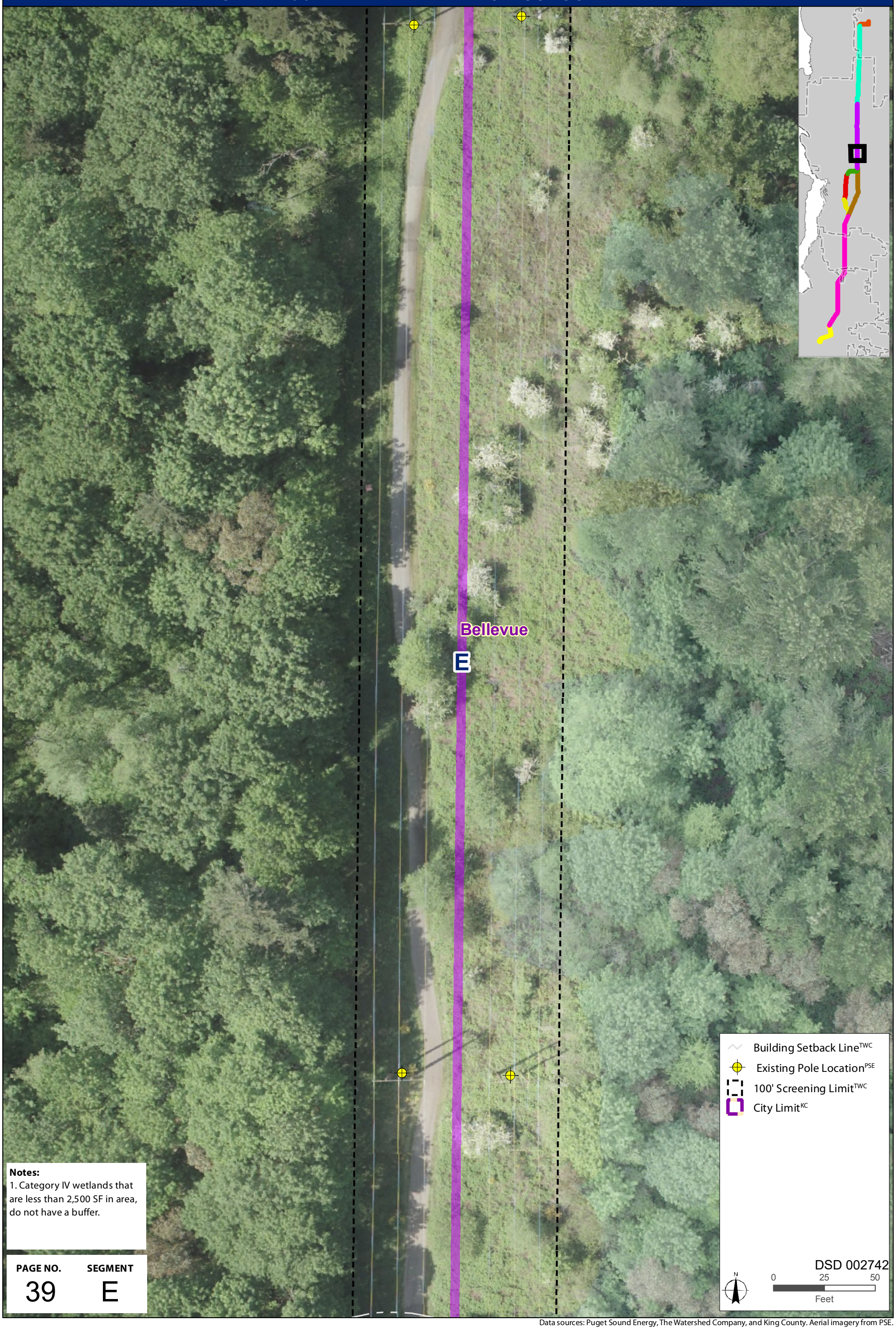
N

0 25 50

Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

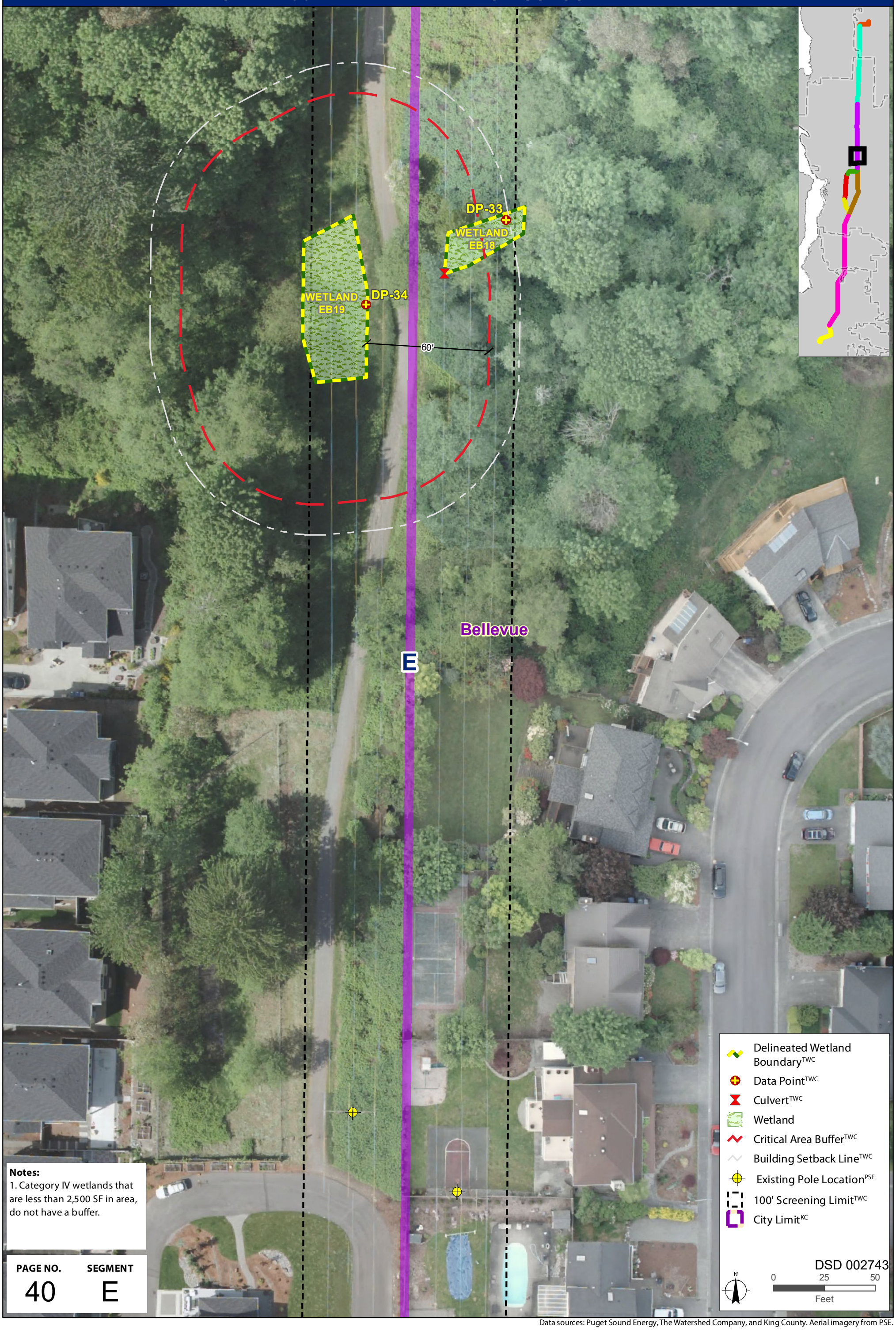


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
39	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

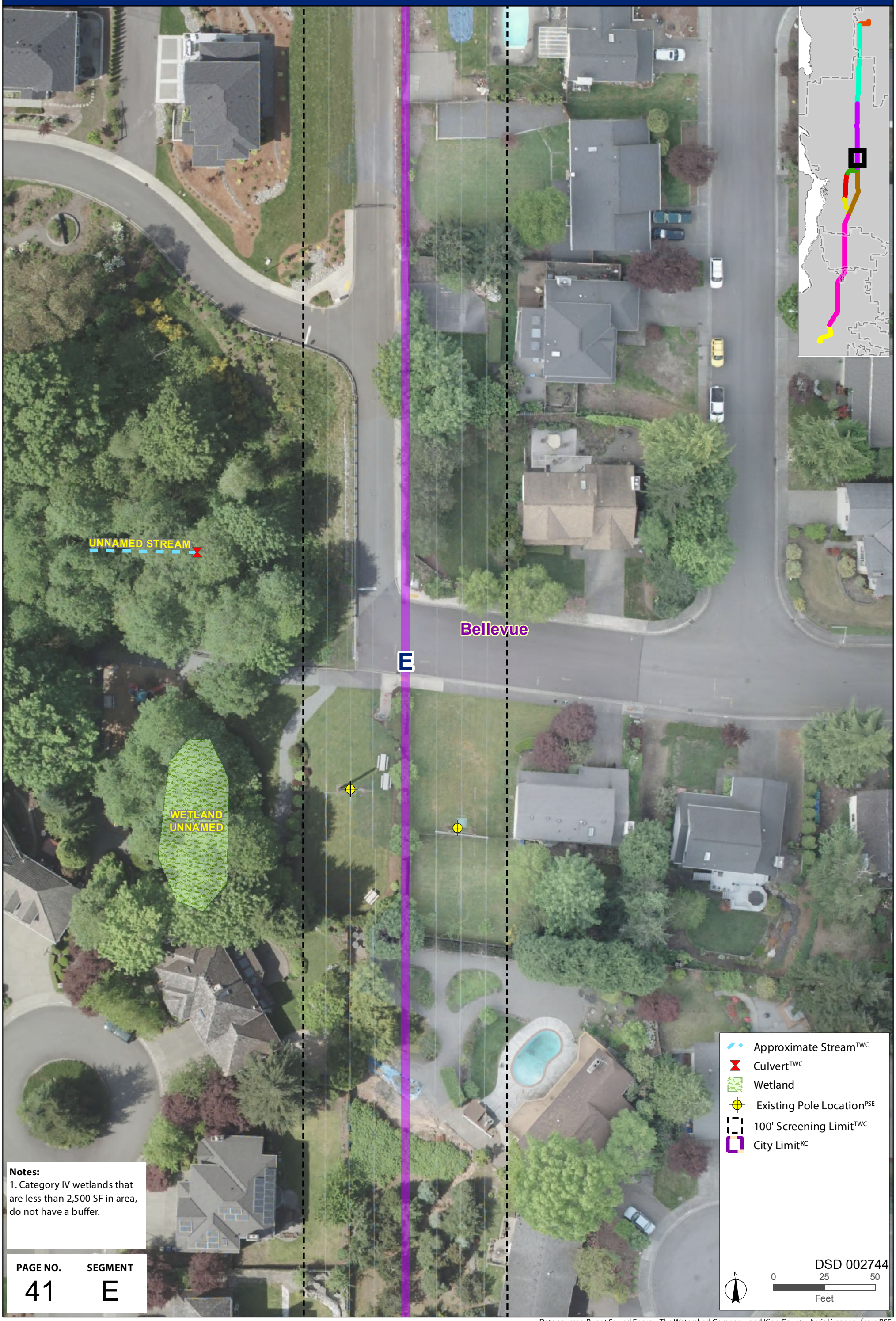


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
40	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
41	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
42	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
43	E

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

DP-28

DP-27

60'

WETLAND
EB20

Bellevue

E

WETLAND EE

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
44	E

Delineated Wetland Boundary[TWC]
Data Point[TWC]
Wetland
Critical Area Buffer[TWC]
Building Setback Line[TWC]
Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

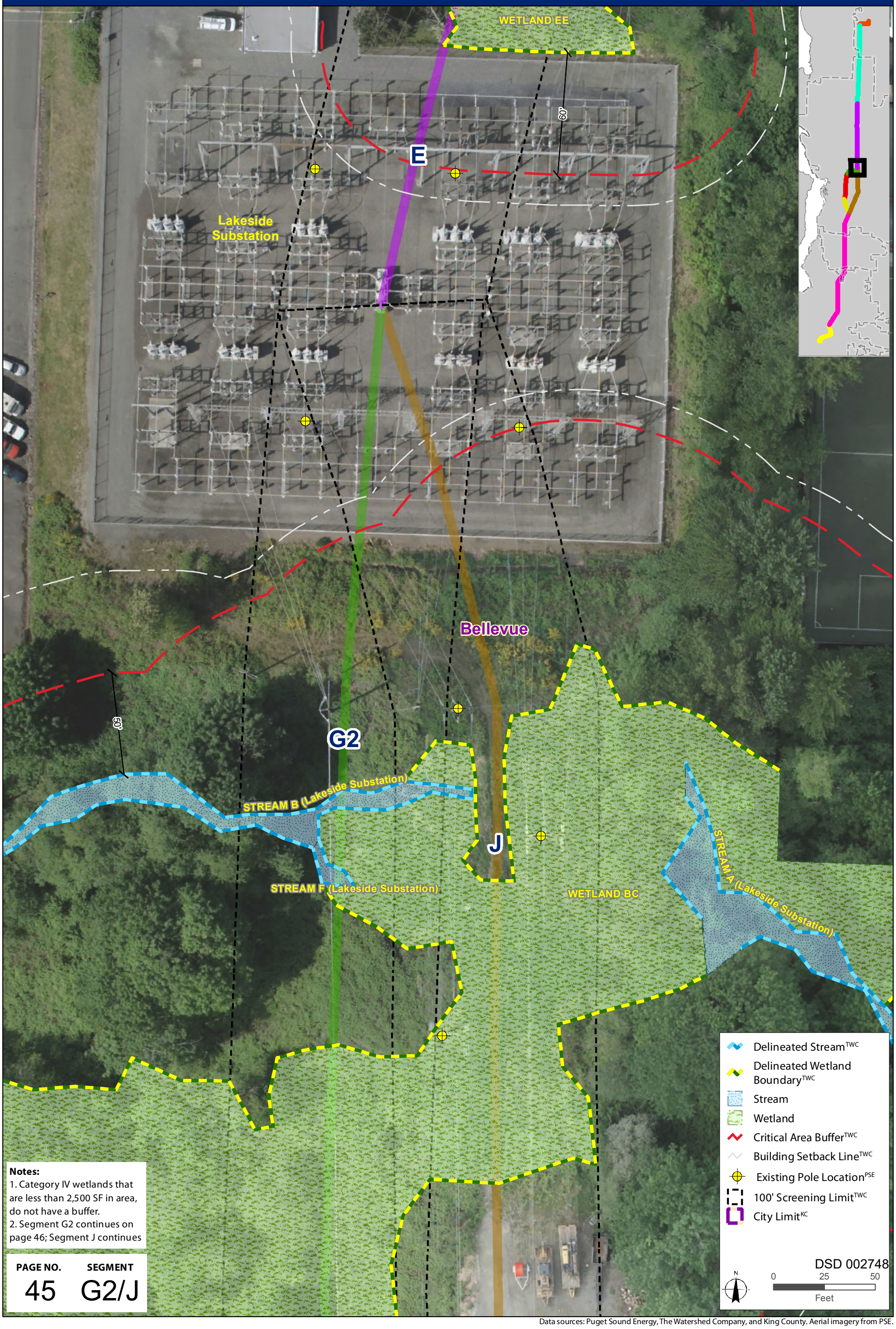
DSD 002747

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

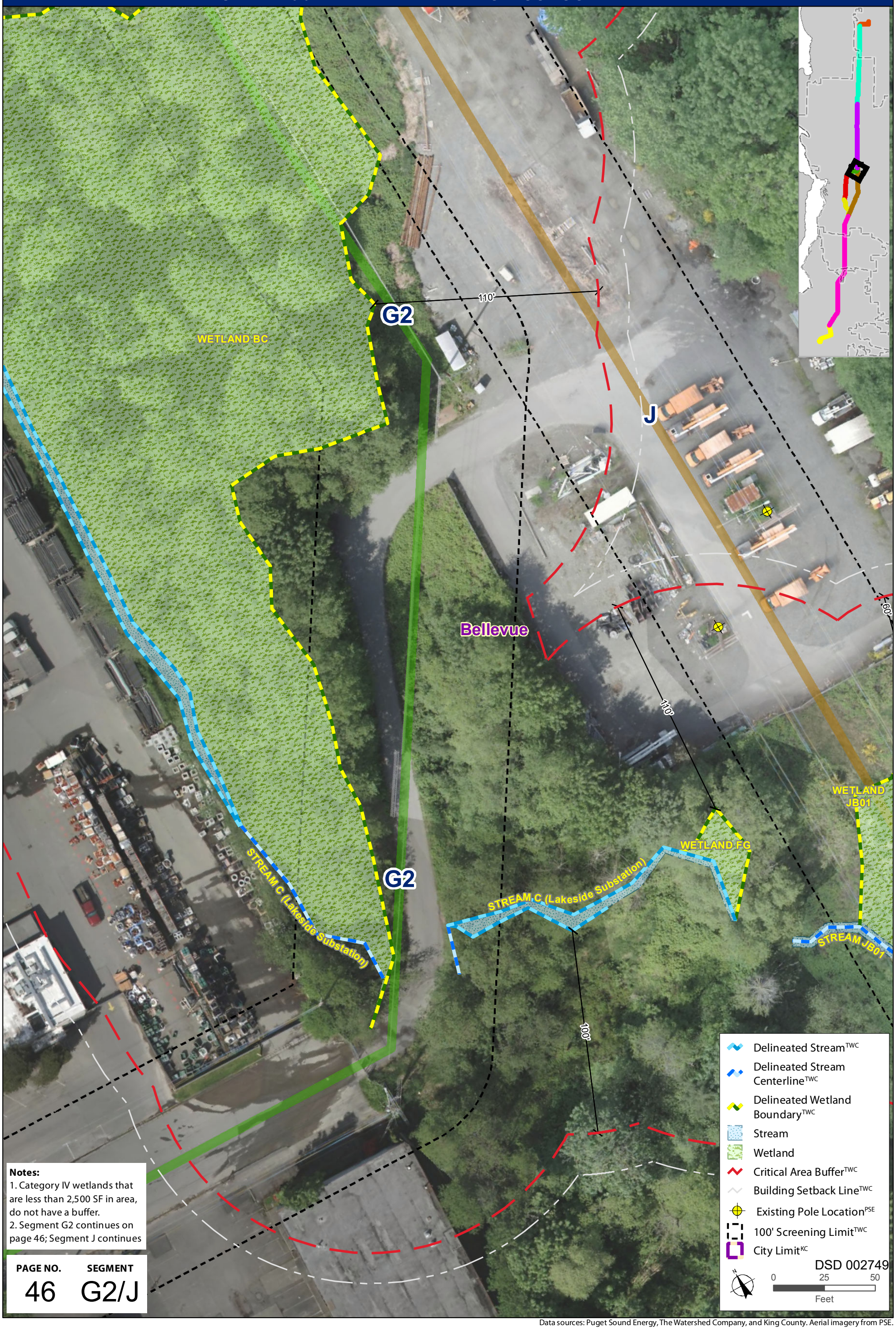


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.
2. Segment G2 continues on page 46; Segment J continues

PAGE NO.	SEGMENT
45	G2/J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

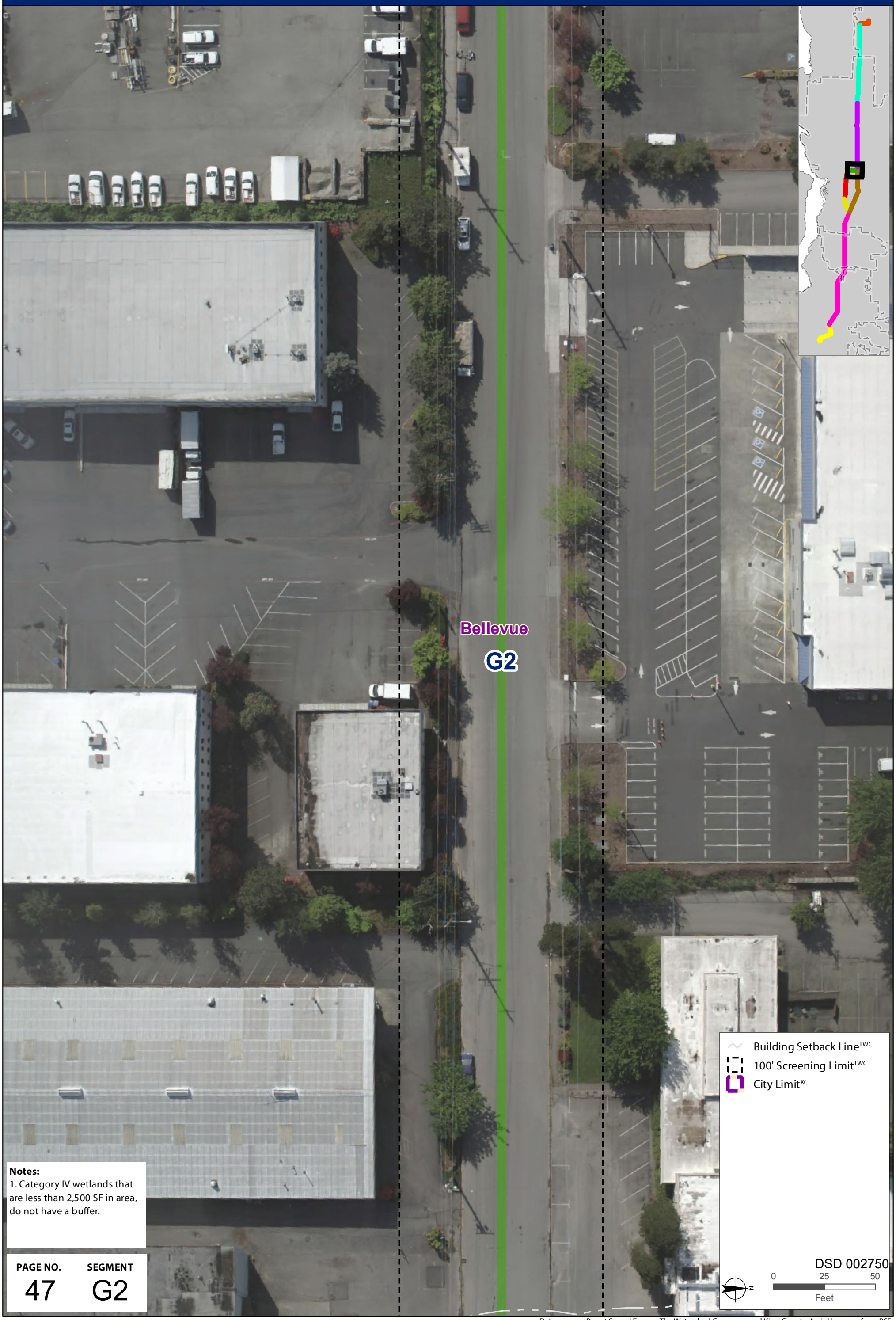


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.
2. Segment G2 continues on page 46; Segment J continues

PAGE NO.	SEGMENT
46	G2/J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

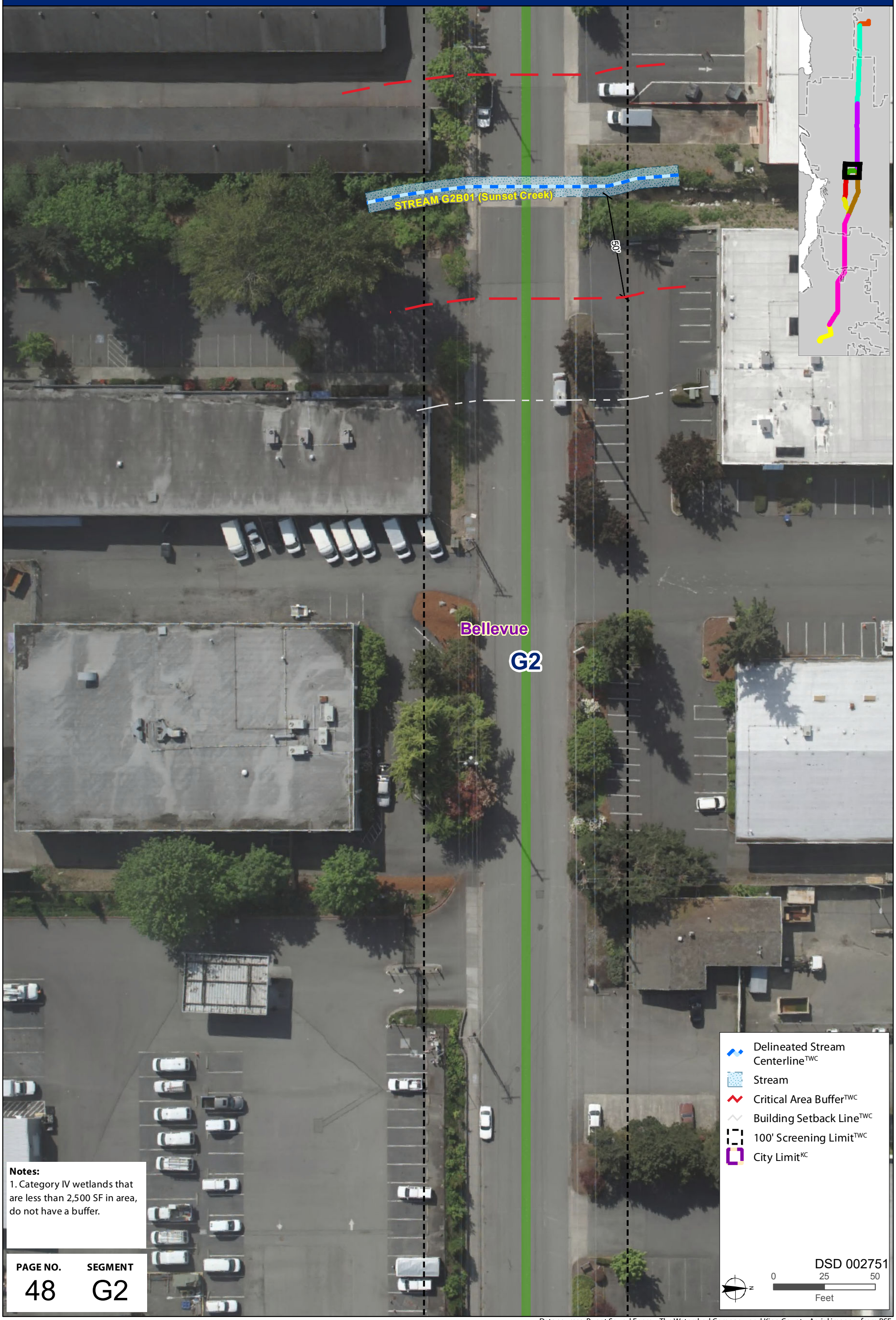


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
47	G2

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
48	G2

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

STREAM G2B03

75'

75'

DP-47

STREAM G2B02 (Richards Creek)

WETLAND G2B01

G2

Bellevue

DP-48

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
49	G2

- Delineated Stream Centerline[TWC]
- Delineated Wetland Boundary[TWC]
- Approximate Stream[TWC]
- Data Point[TWC]
- Culvert[TWC]
- Stream
- Wetland
- Critical Area Buffer[TWC]
- Building Setback Line[TWC]
- 100' Screening Limit[TWC]
- City Limit[KC]

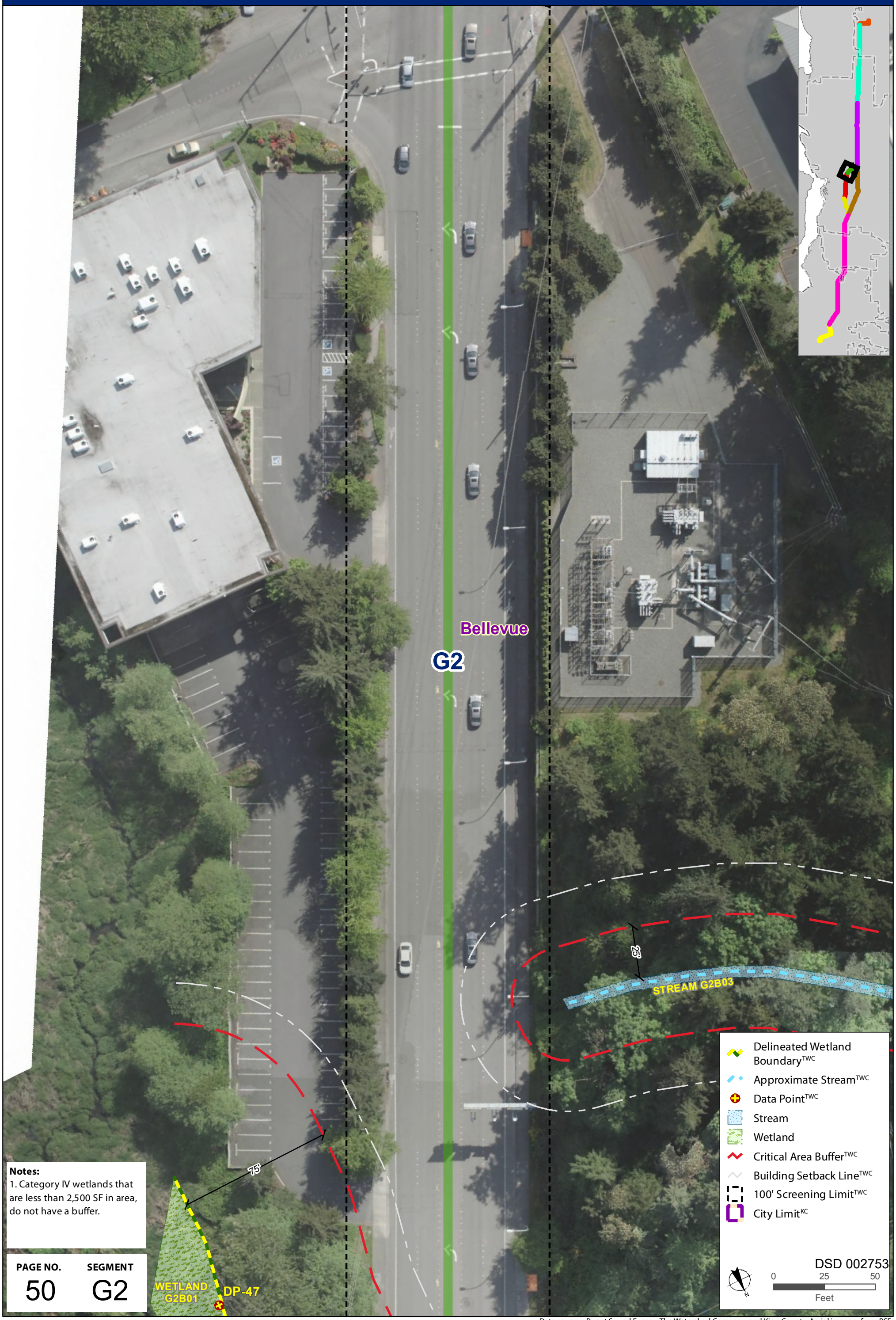
DSD 002752

0 25 50

Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

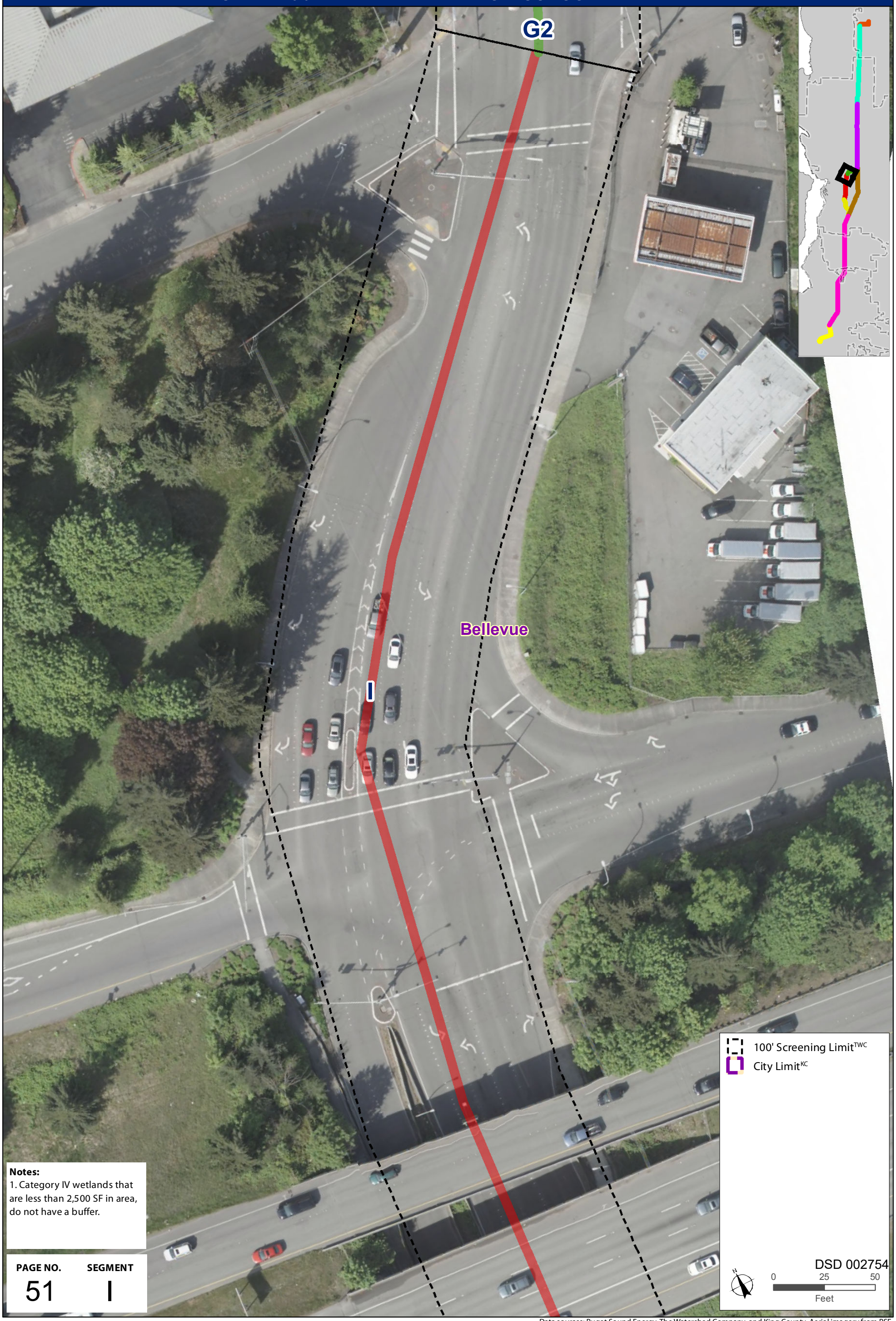


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
50	G2

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
51	I

100' Screening Limit[TWC]
City Limit[KC]

DSD 002754

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Bellevue

I

25'

STREAM IB01 (Richards Creek)

Approximate Stream[TWC]
Culvert[TWC]
Stream
Critical Area Buffer[TWC]
Building Setback Line[TWC]
100' Screening Limit[TWC]
City Limit[KC]

DSD 002755

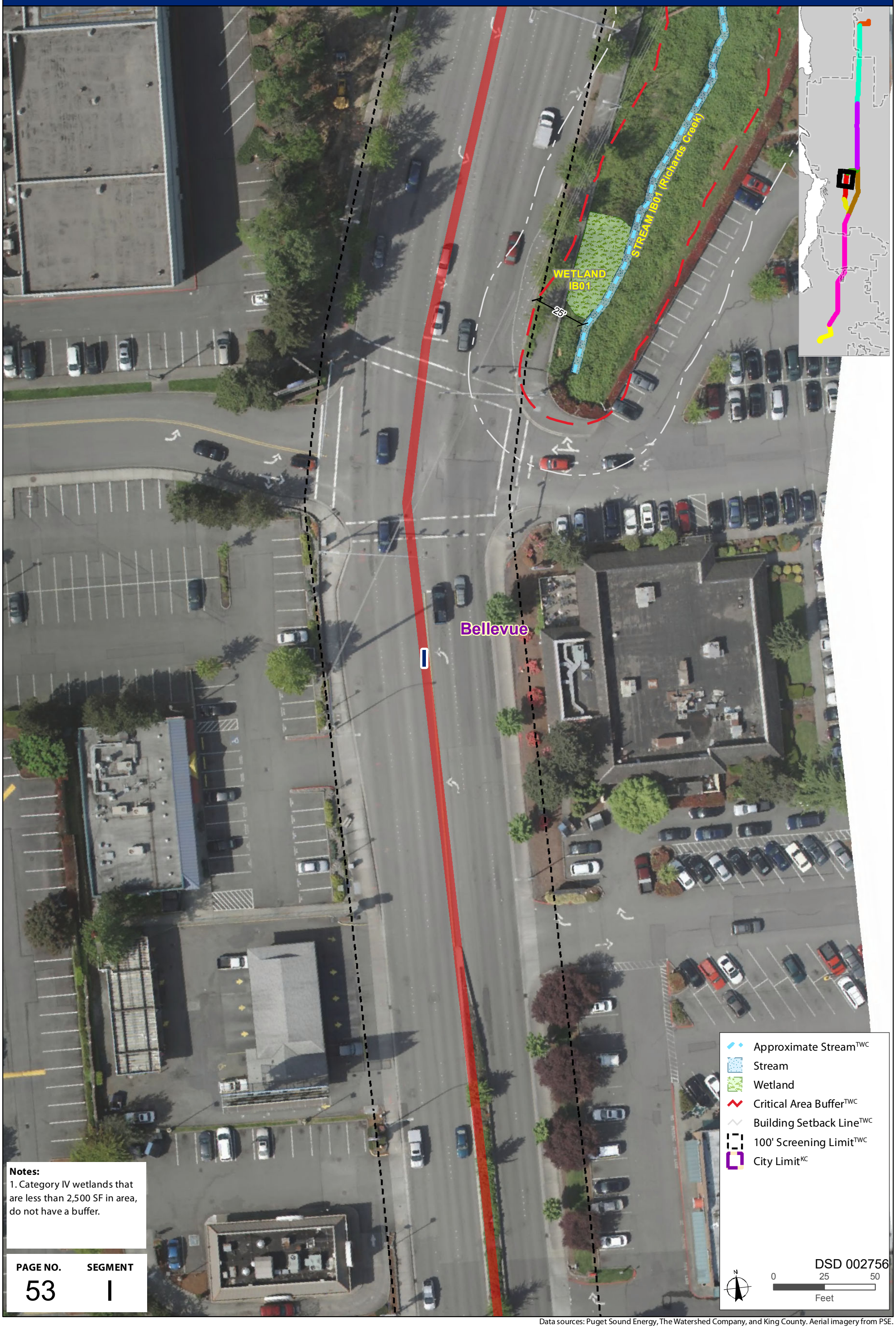
0 25 50
Feet

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
52	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

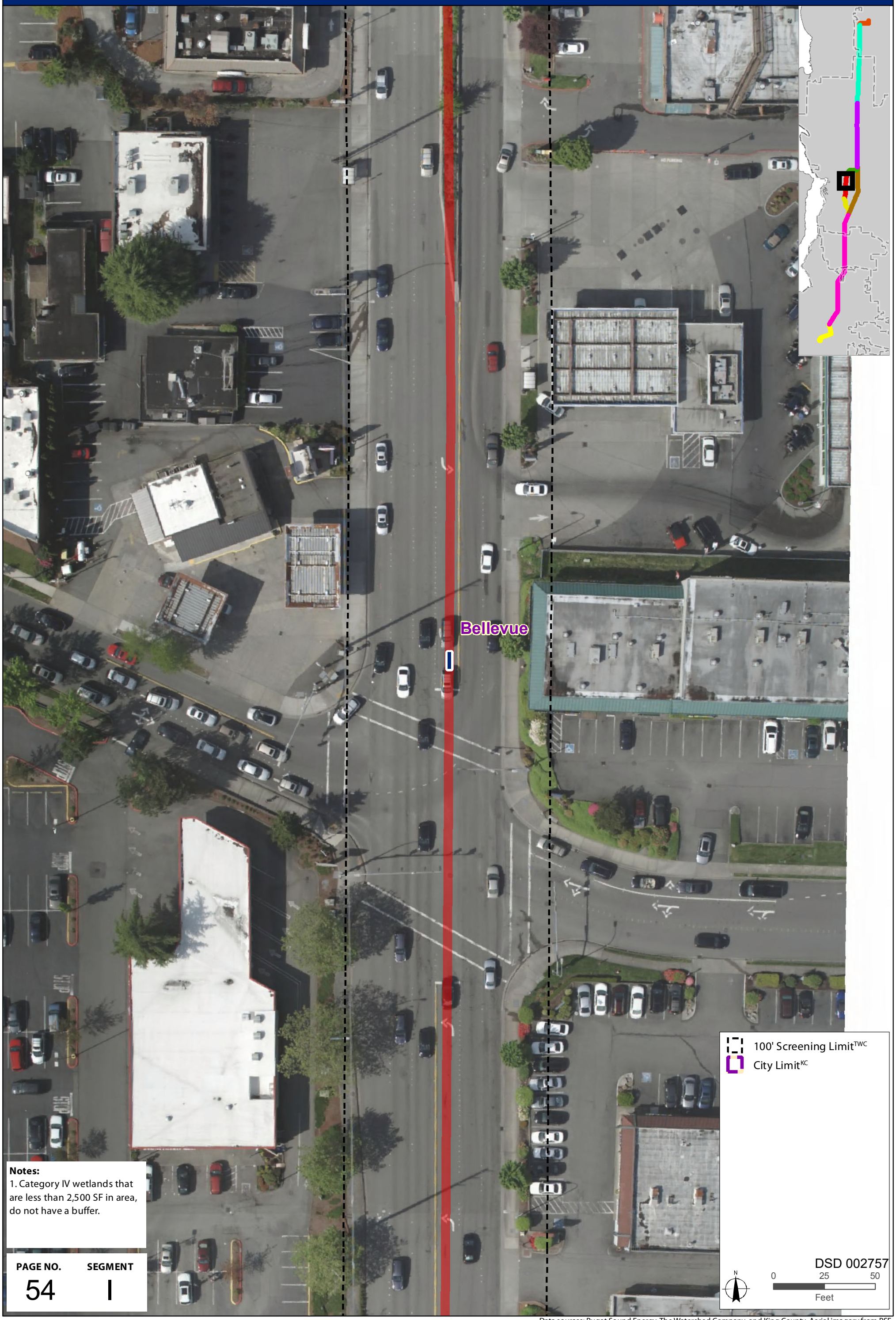


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
53	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

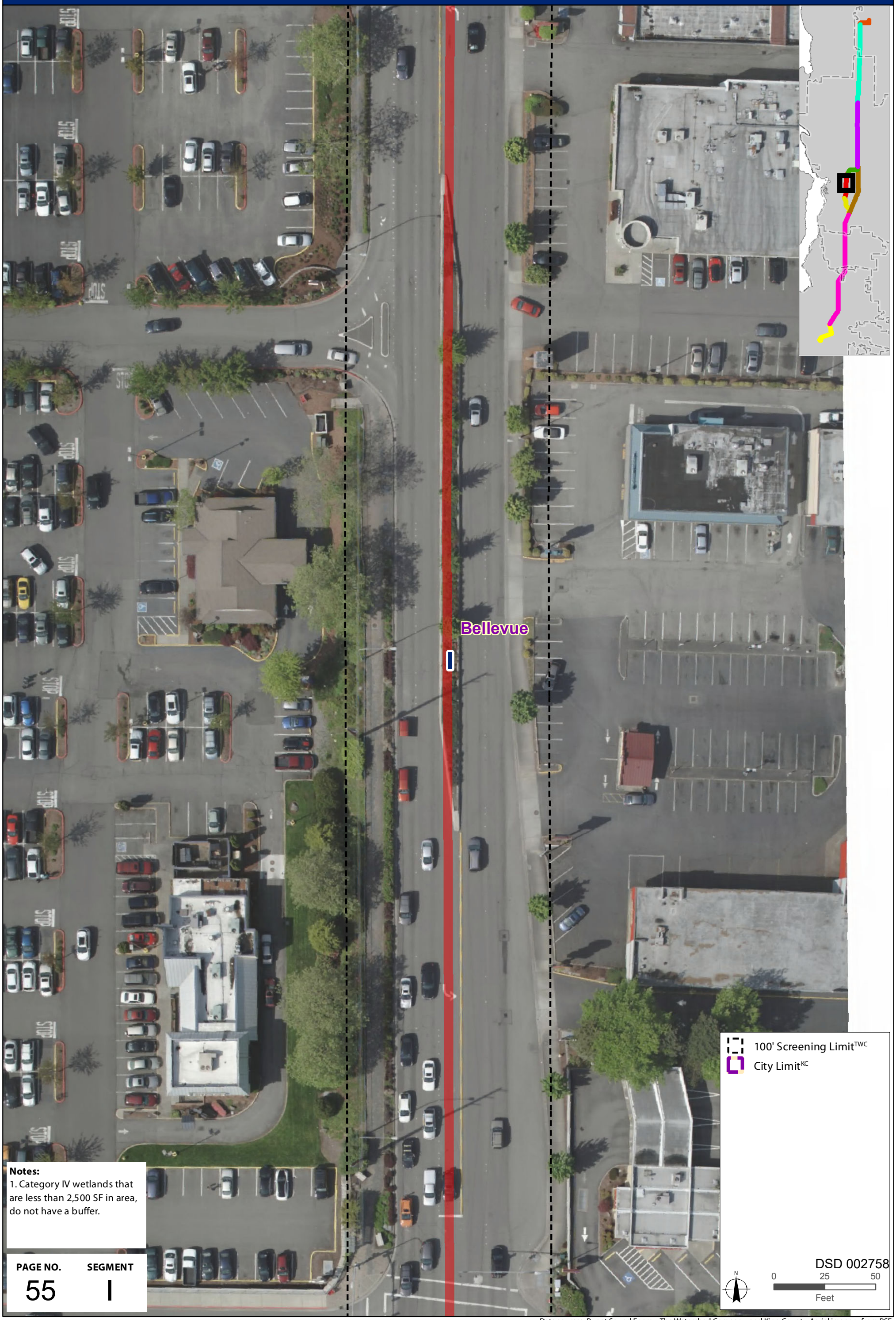


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
54	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

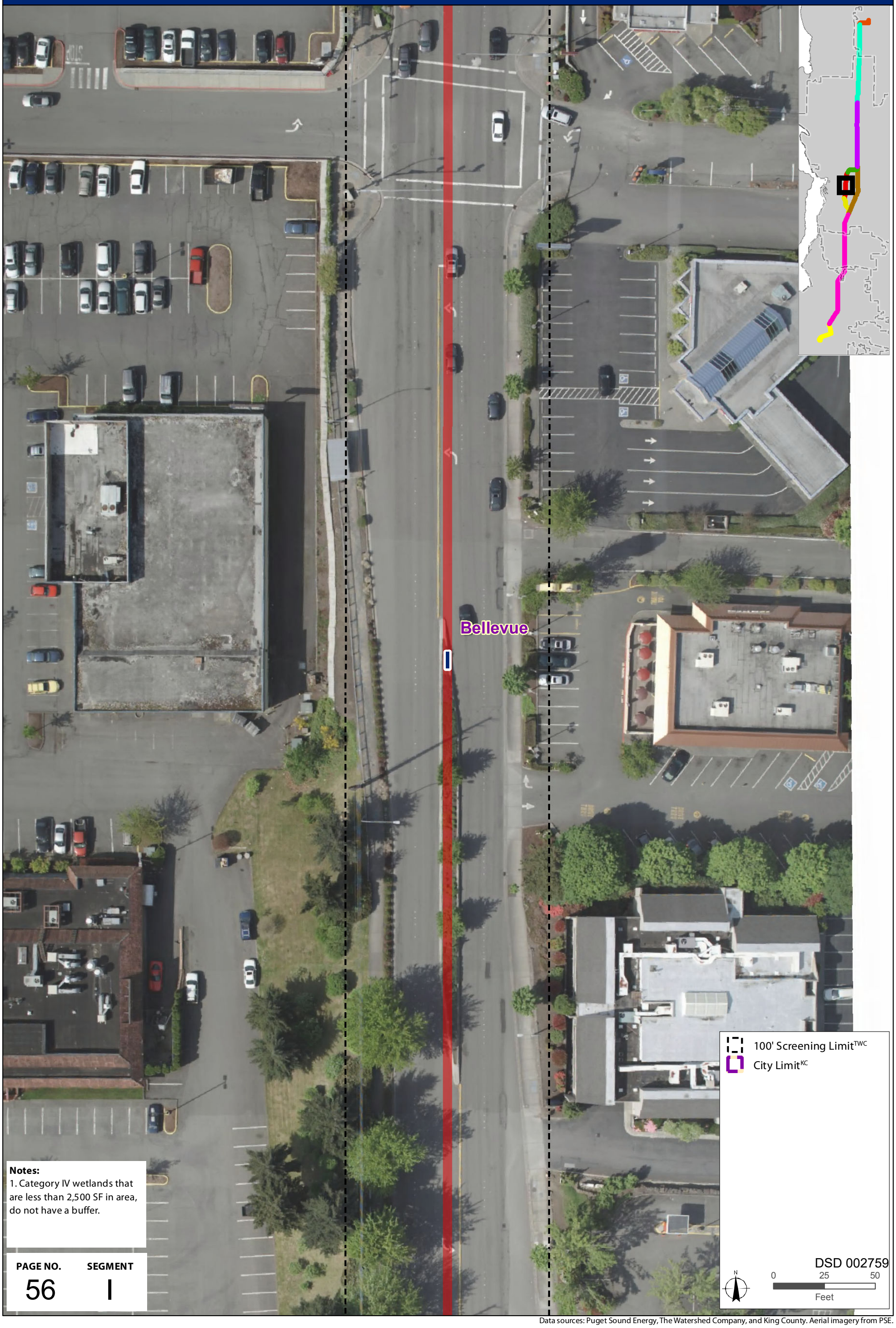


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
55	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

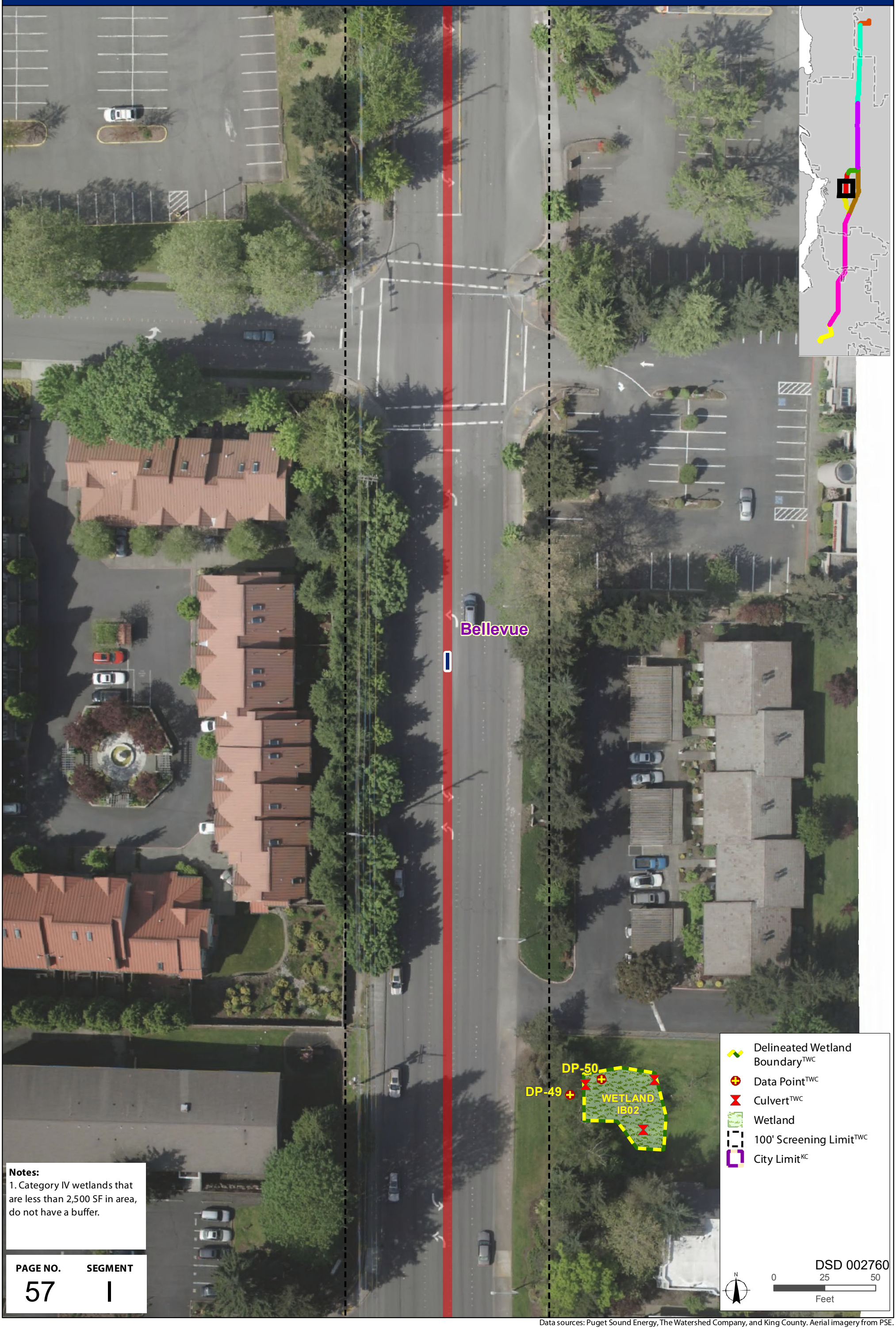


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
56	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

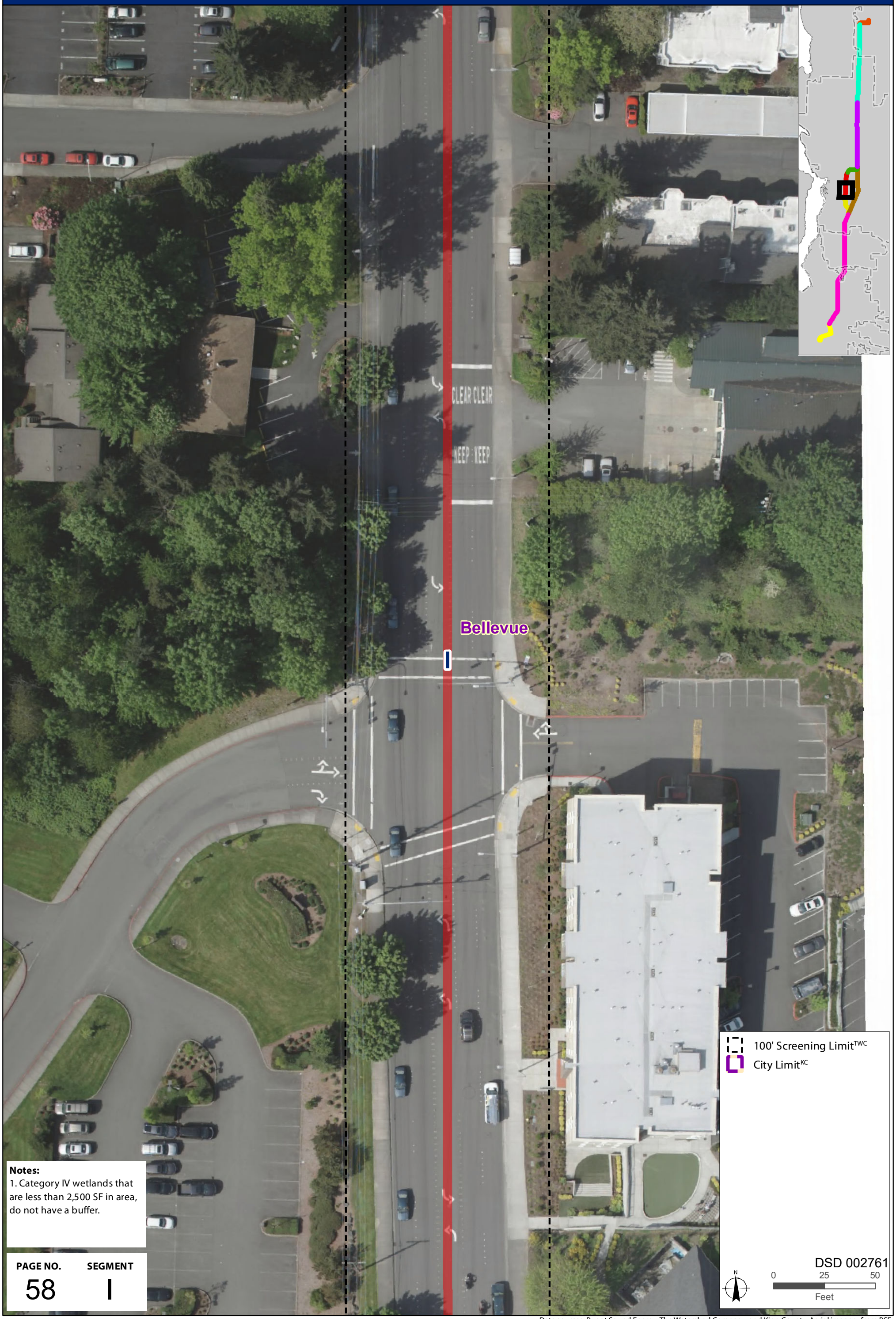


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
57	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

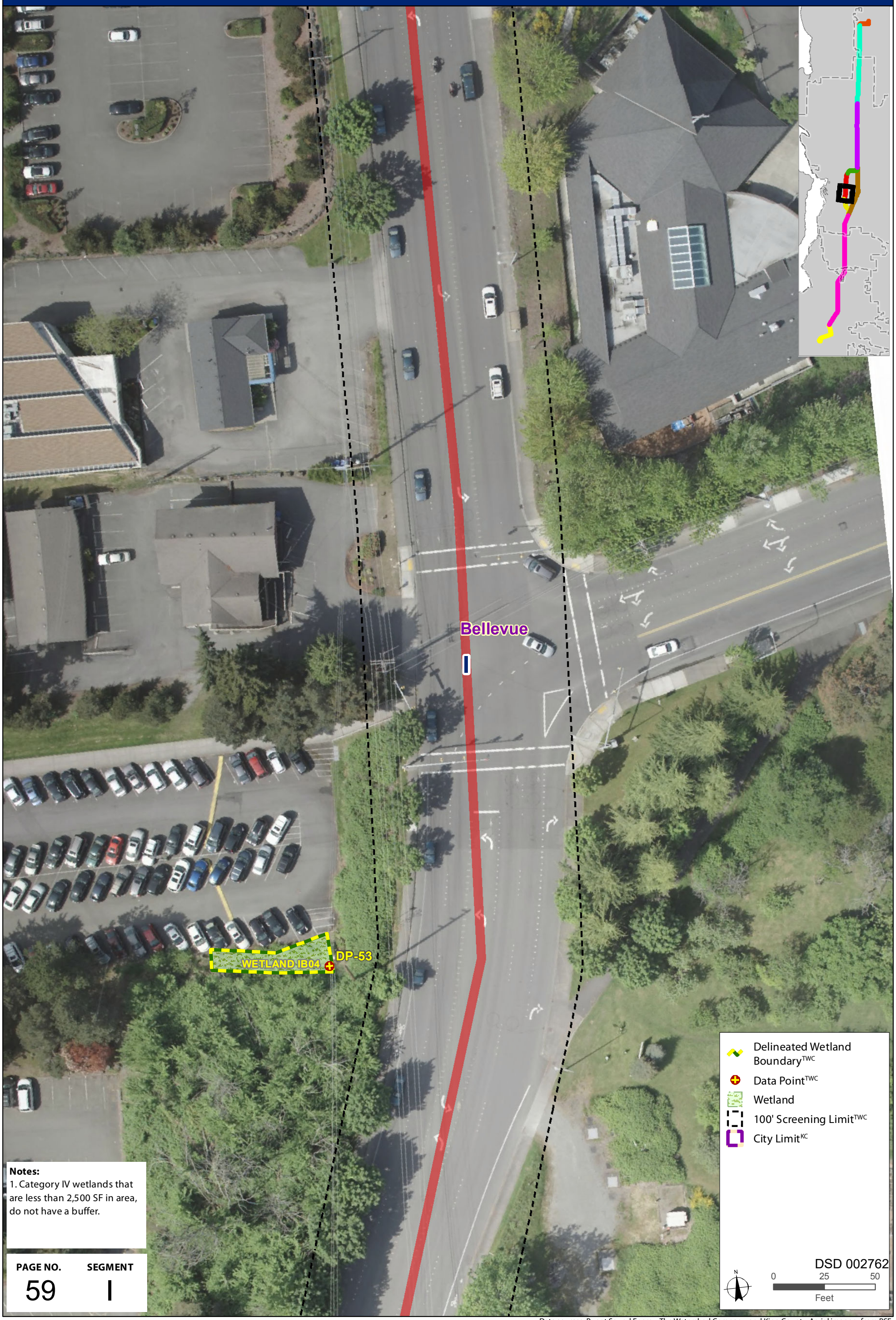


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
58	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

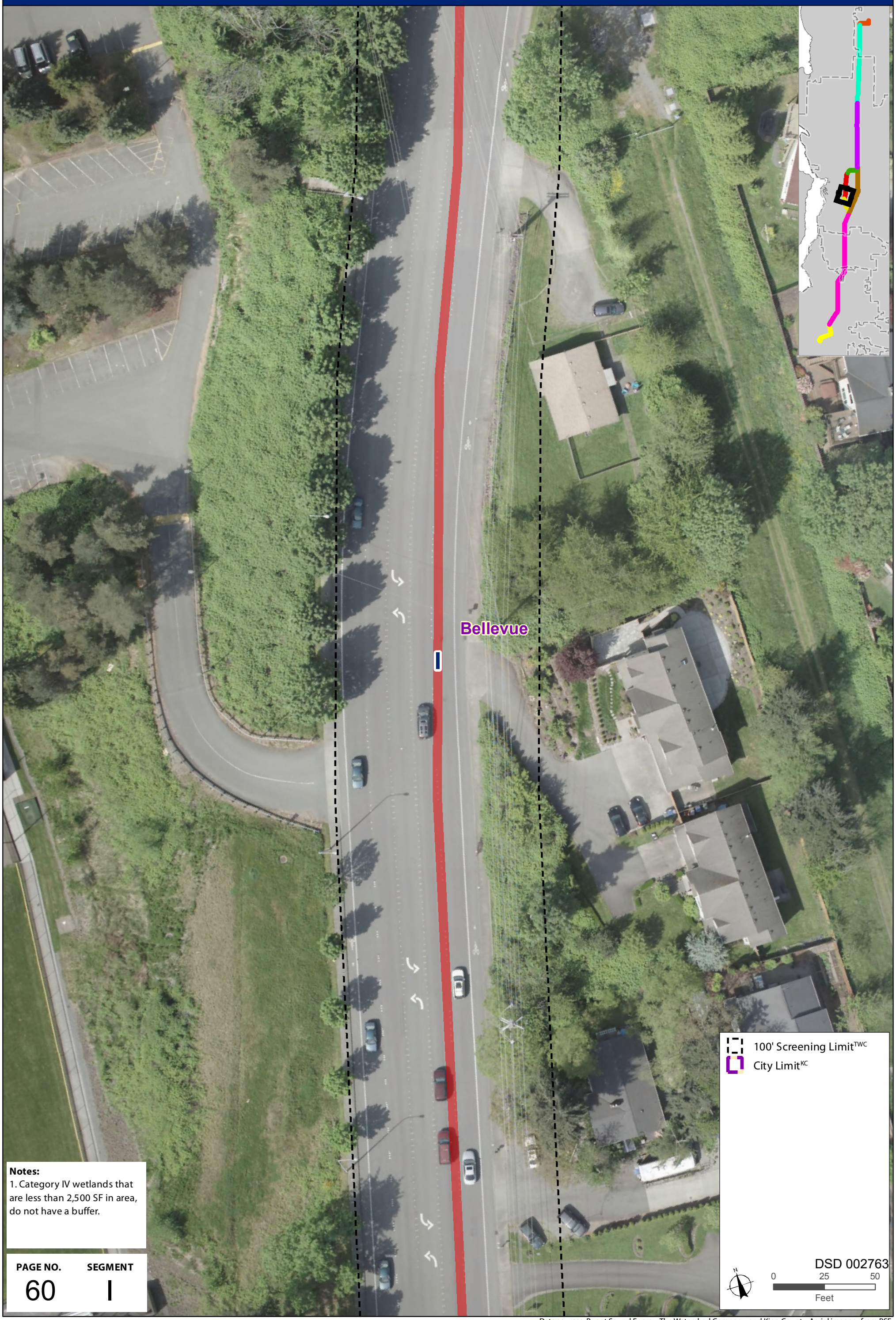


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
59	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

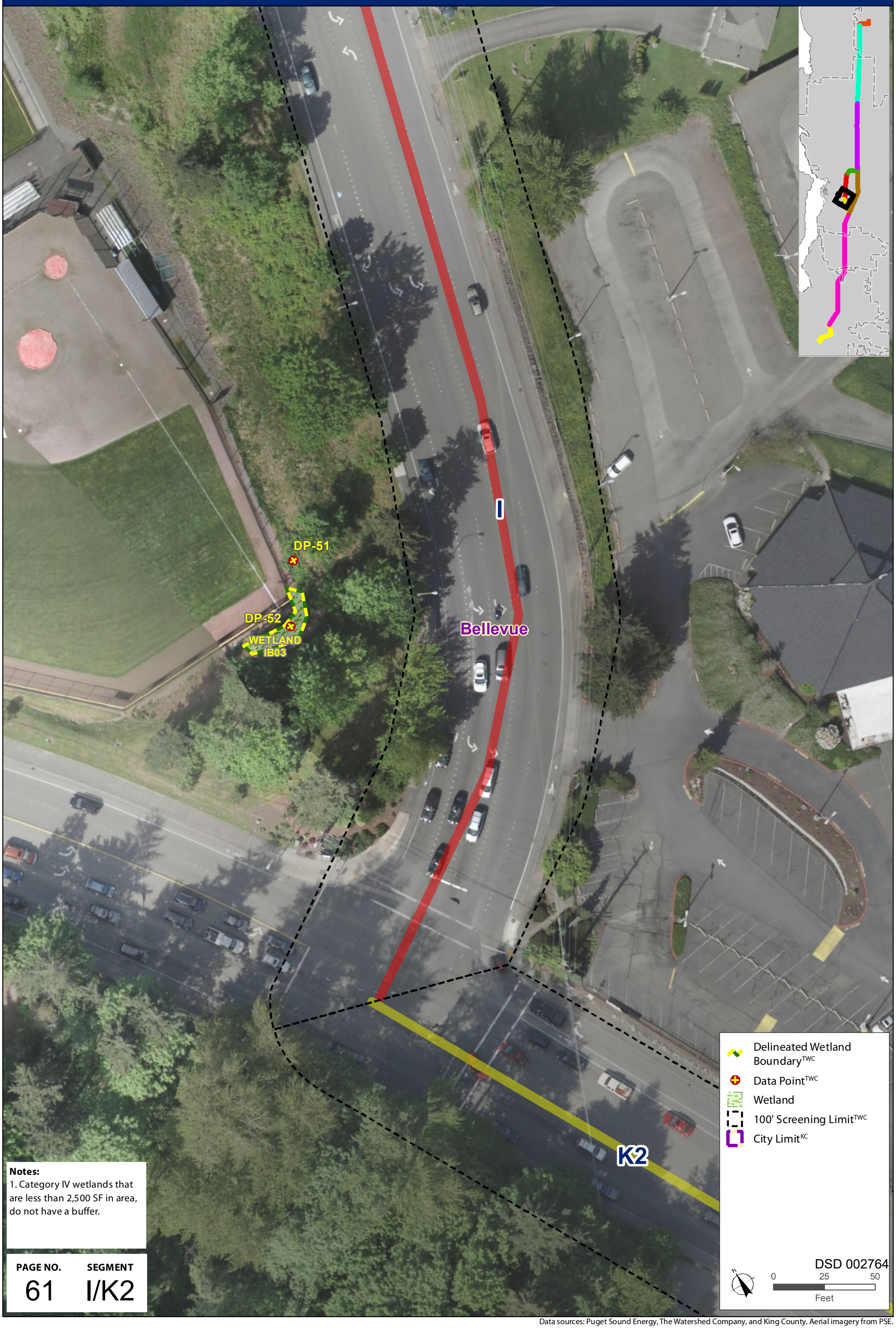


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
60	I

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

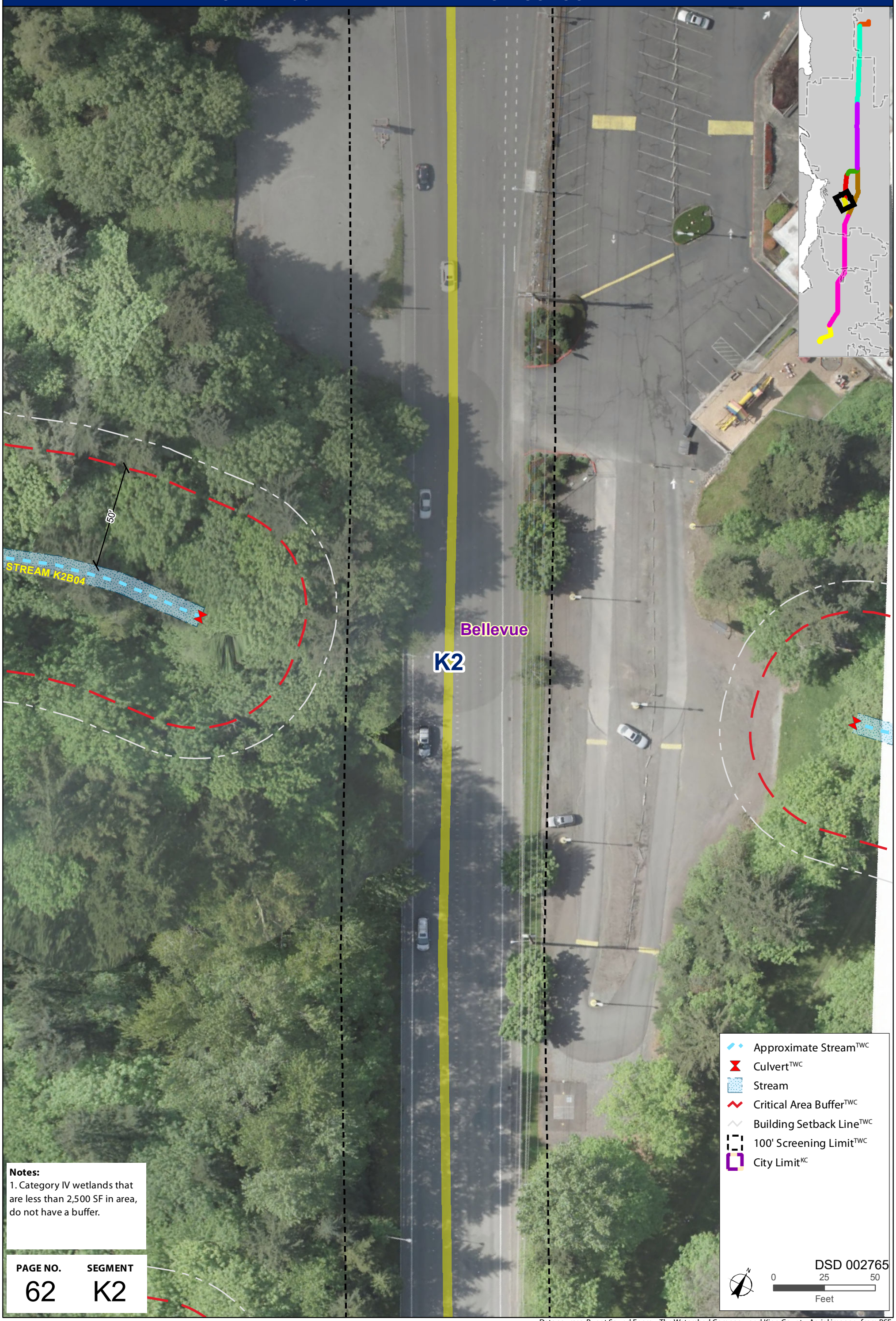


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
61	I/K2

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

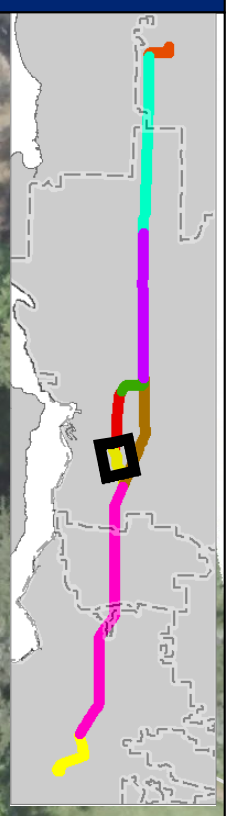


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
62	K2

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



STREAM K2B03

25'

Bellevue

K2

25'

STREAM K2B02

Approximate Stream[TWC]

Culvert[TWC]

Critical Area Buffer[TWC]

Building Setback Line[TWC]

100' Screening Limit[TWC]

City Limit[KC]

DSD 002766

0 25 50

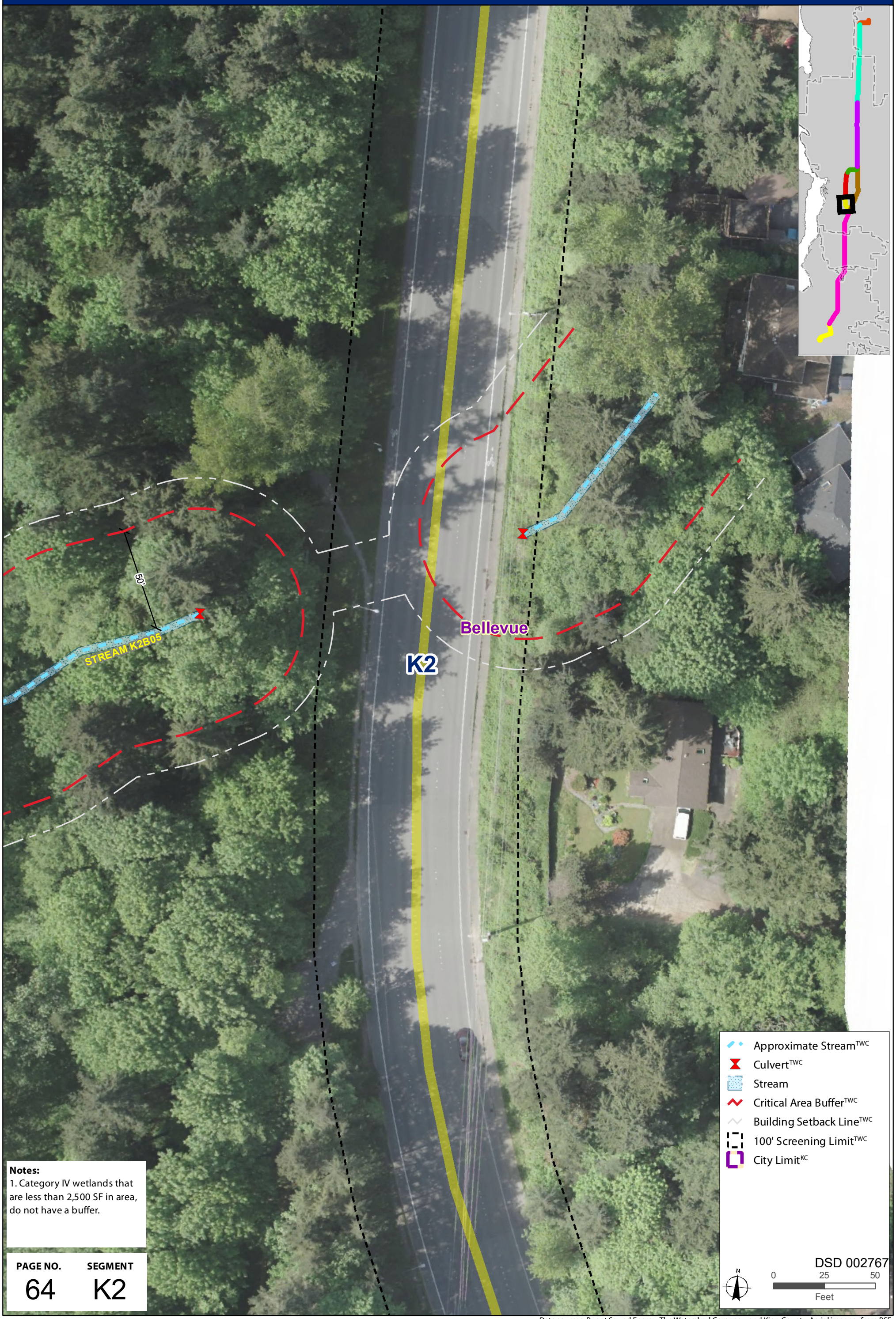
Feet

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
63	K2

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

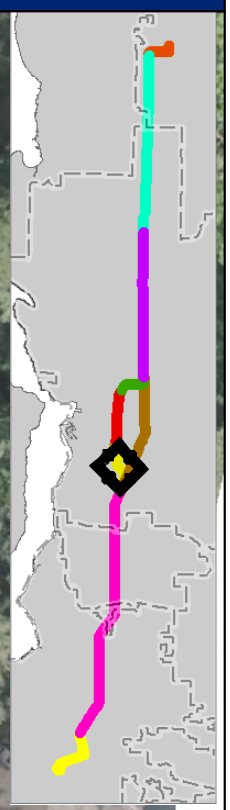


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
64	K2

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Bellevue

K2

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
65	K2

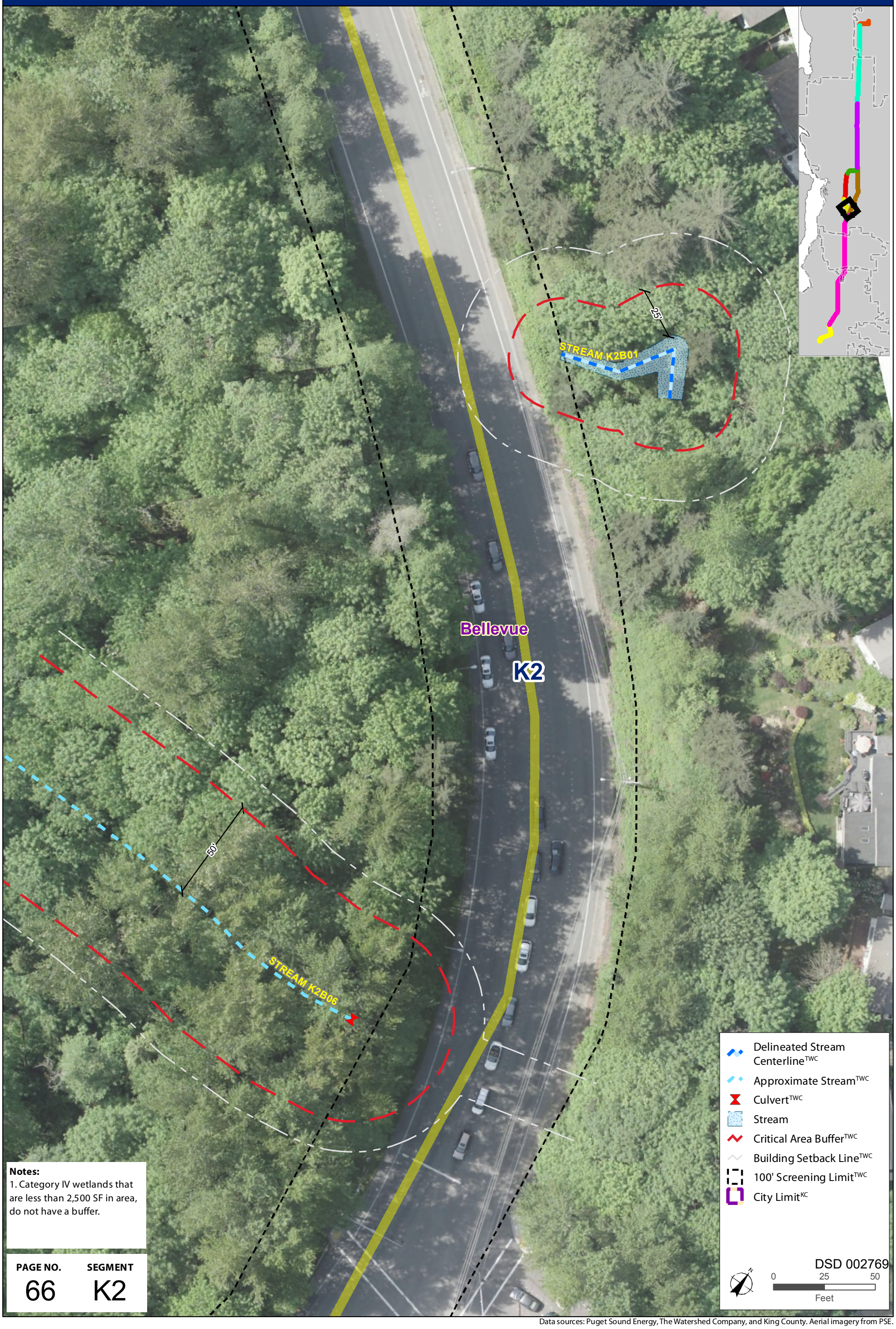
100' Screening Limit[TWC]
City Limit[KC]

DSD 002768

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
66	K2

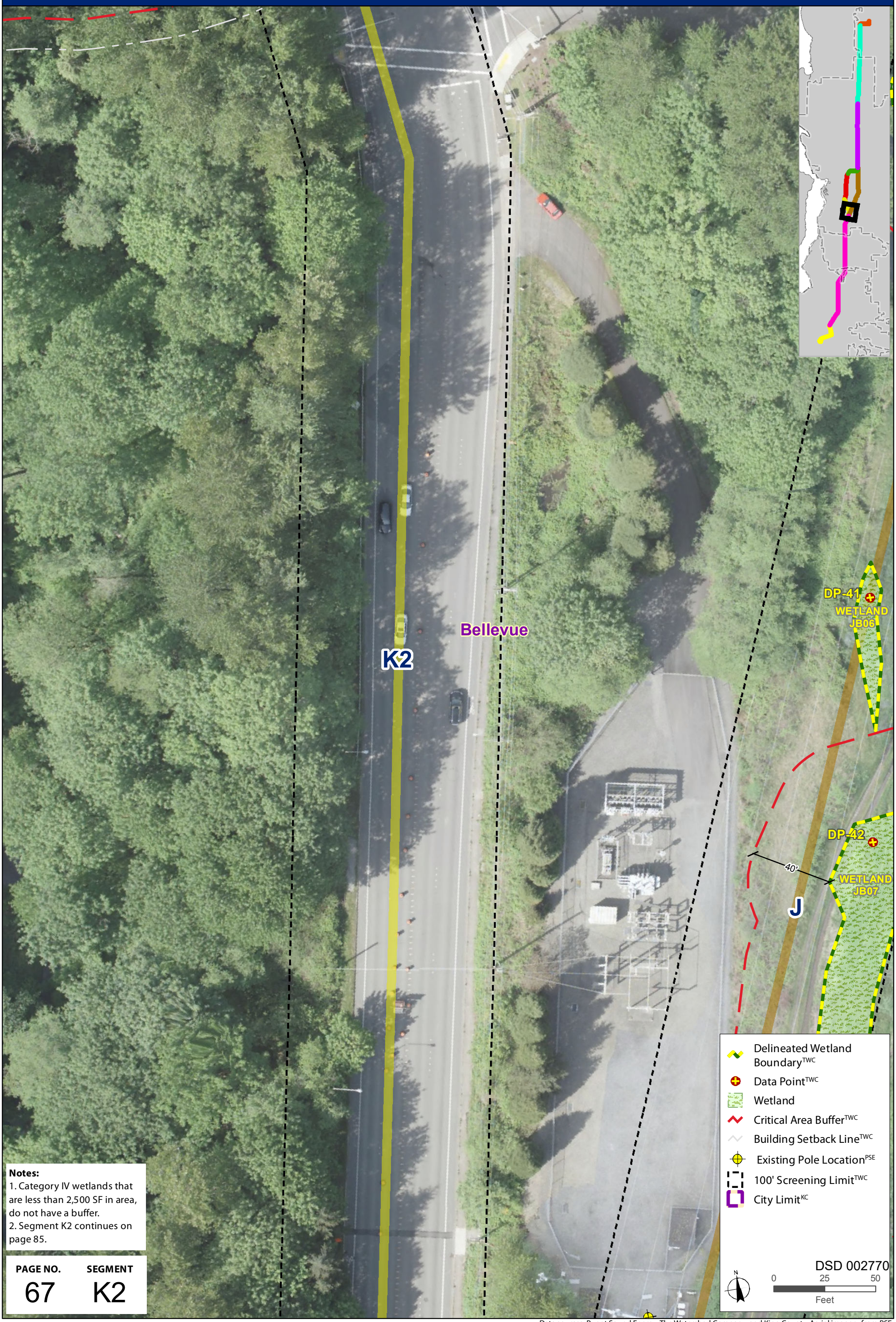
- Delineated Stream Centerline[TWC]
- Approximate Stream[TWC]
- Culvert[TWC]
- Stream
- Critical Area Buffer[TWC]
- Building Setback Line[TWC]
- 100' Screening Limit[TWC]
- City Limit[KC]

DSD 002769

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

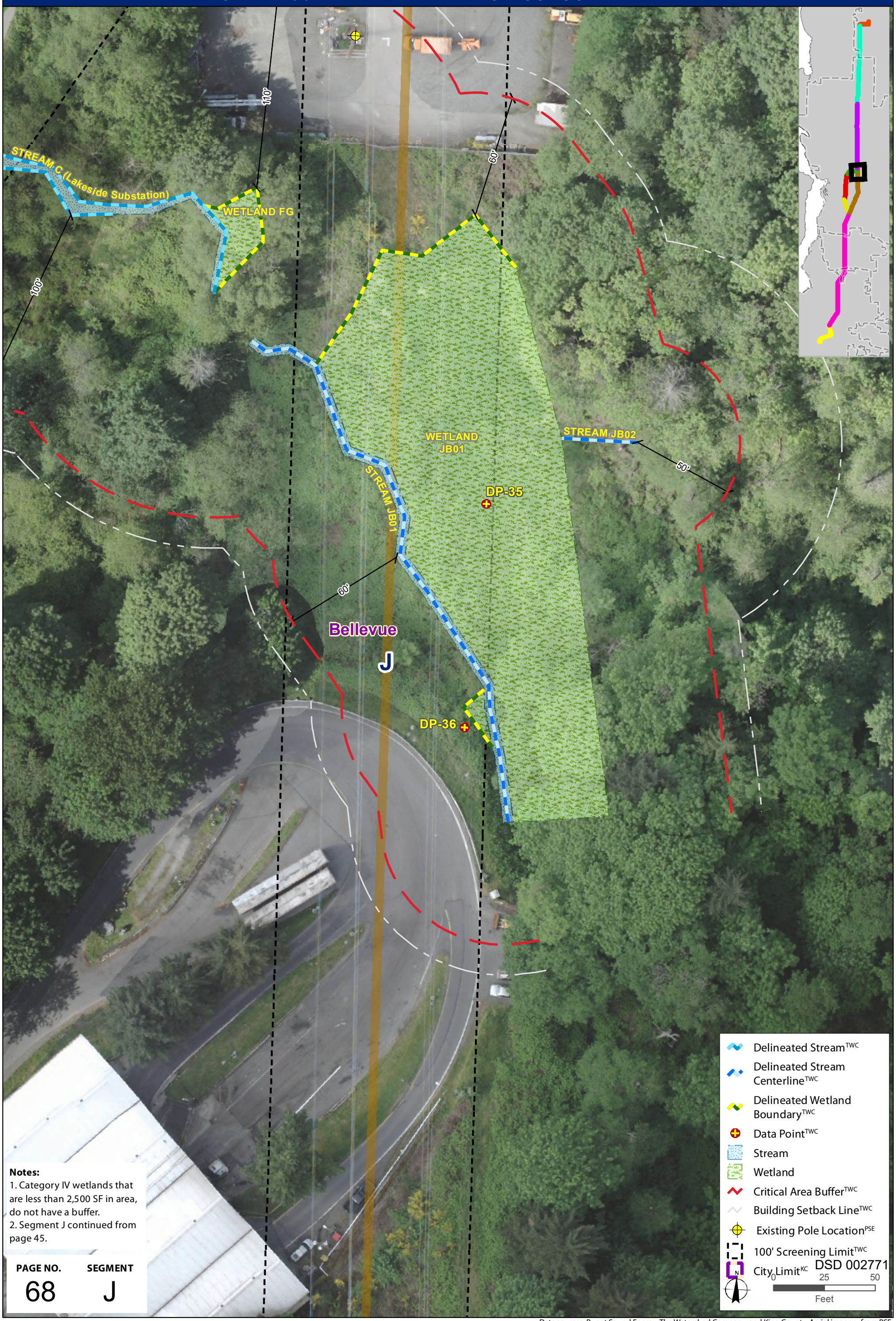


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.
2. Segment K2 continues on page 85.

PAGE NO.	SEGMENT
67	K2

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

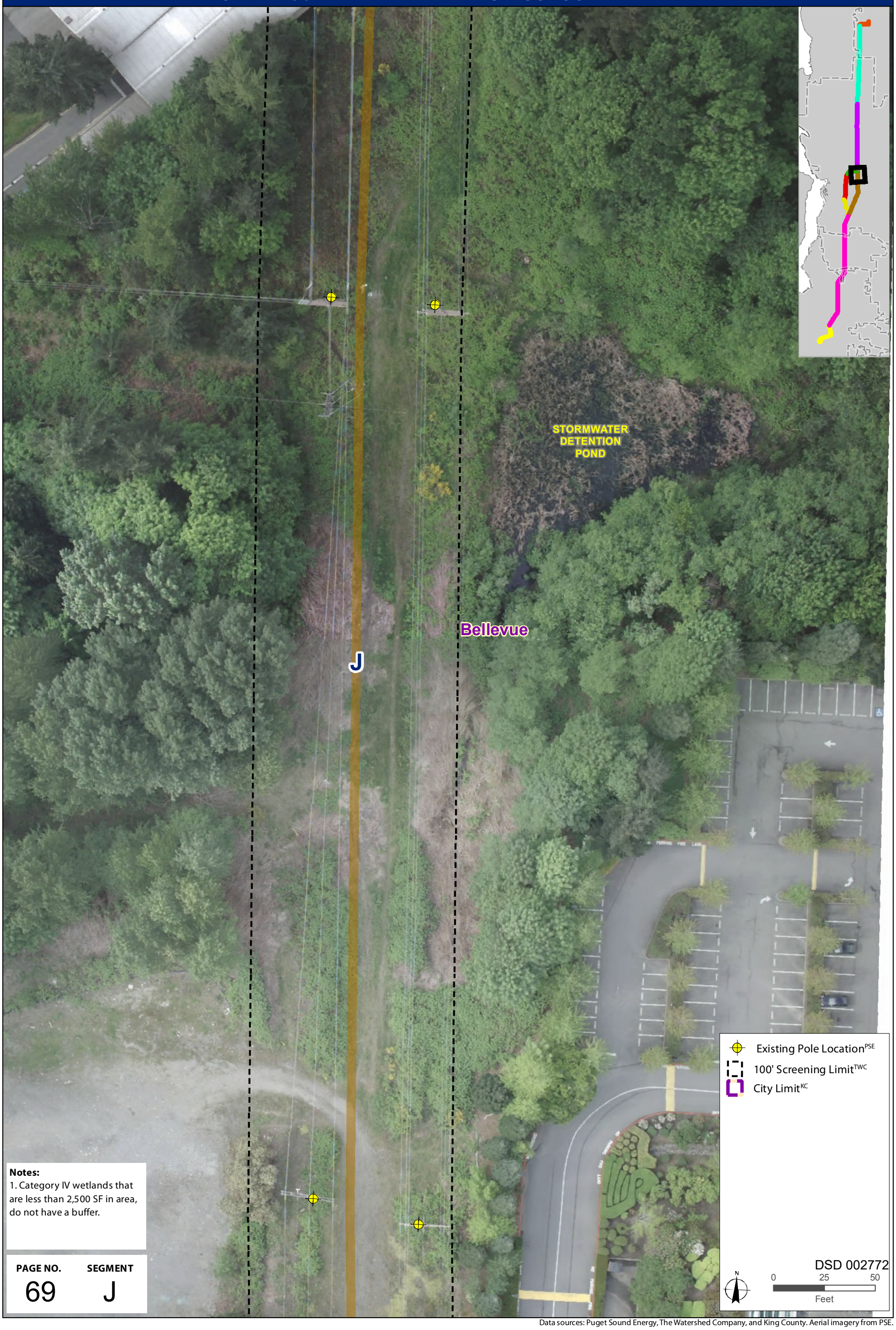


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.
2. Segment J continued from page 45.

PAGE NO.	SEGMENT
68	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

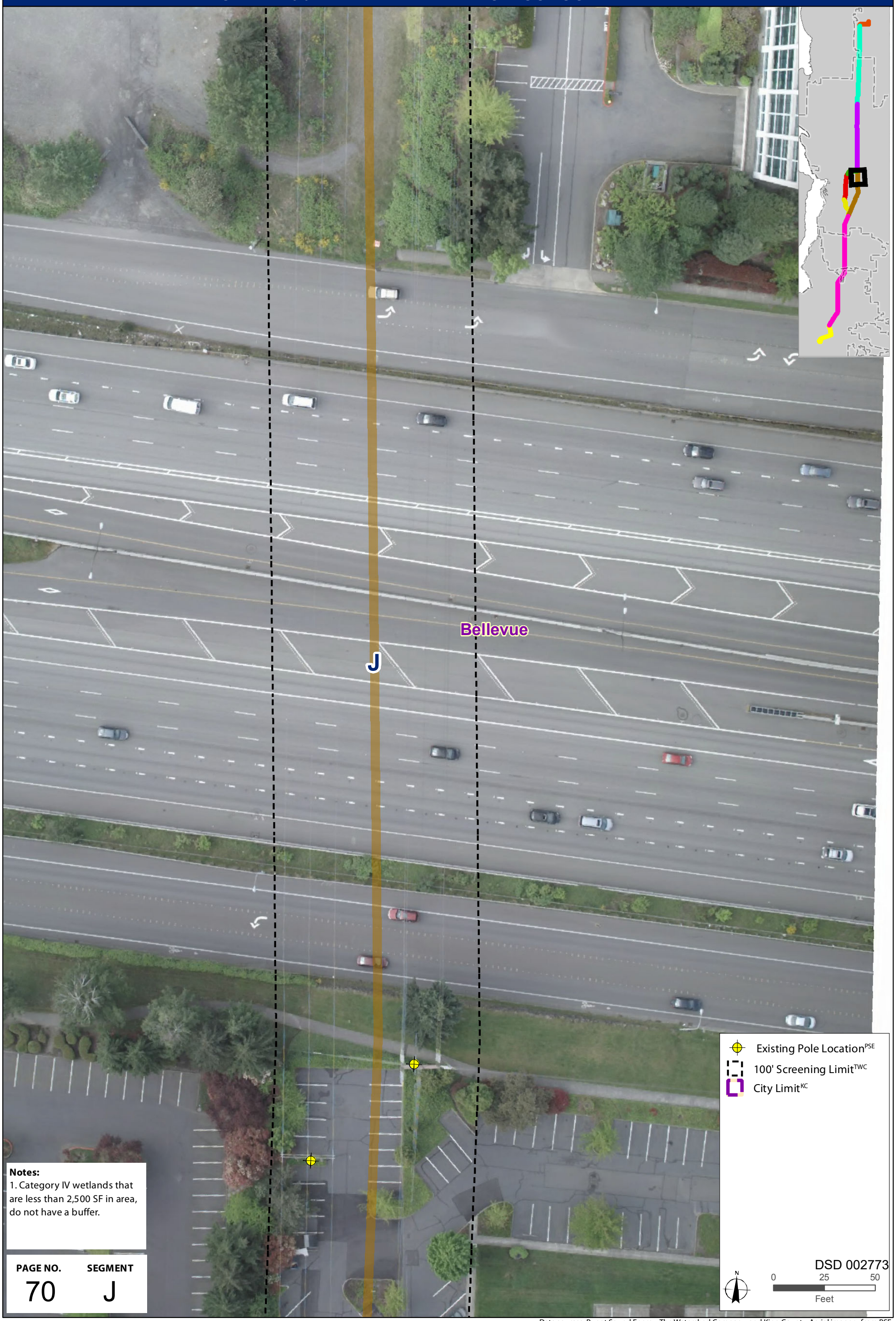


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
69	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

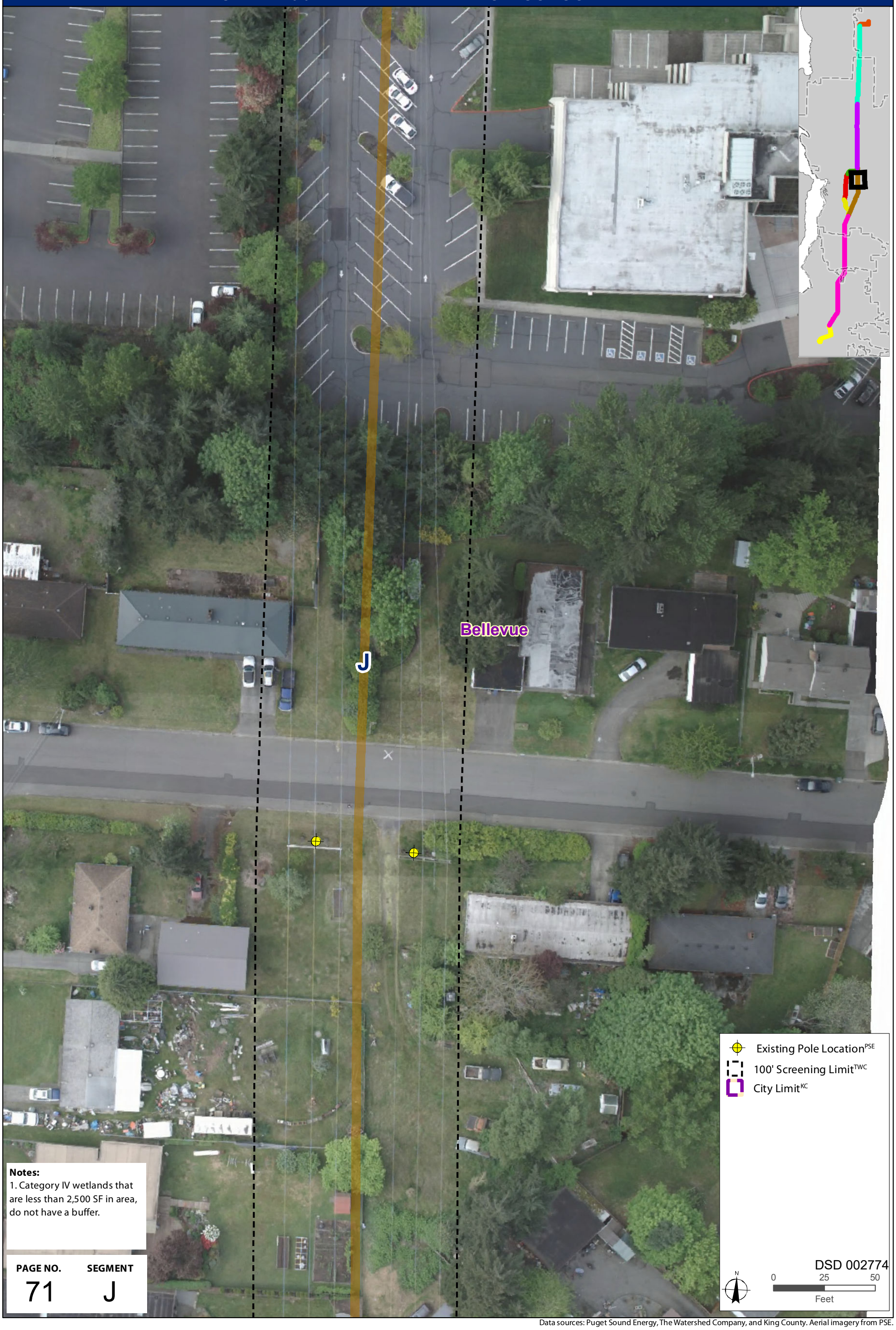


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
70	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
71	J

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

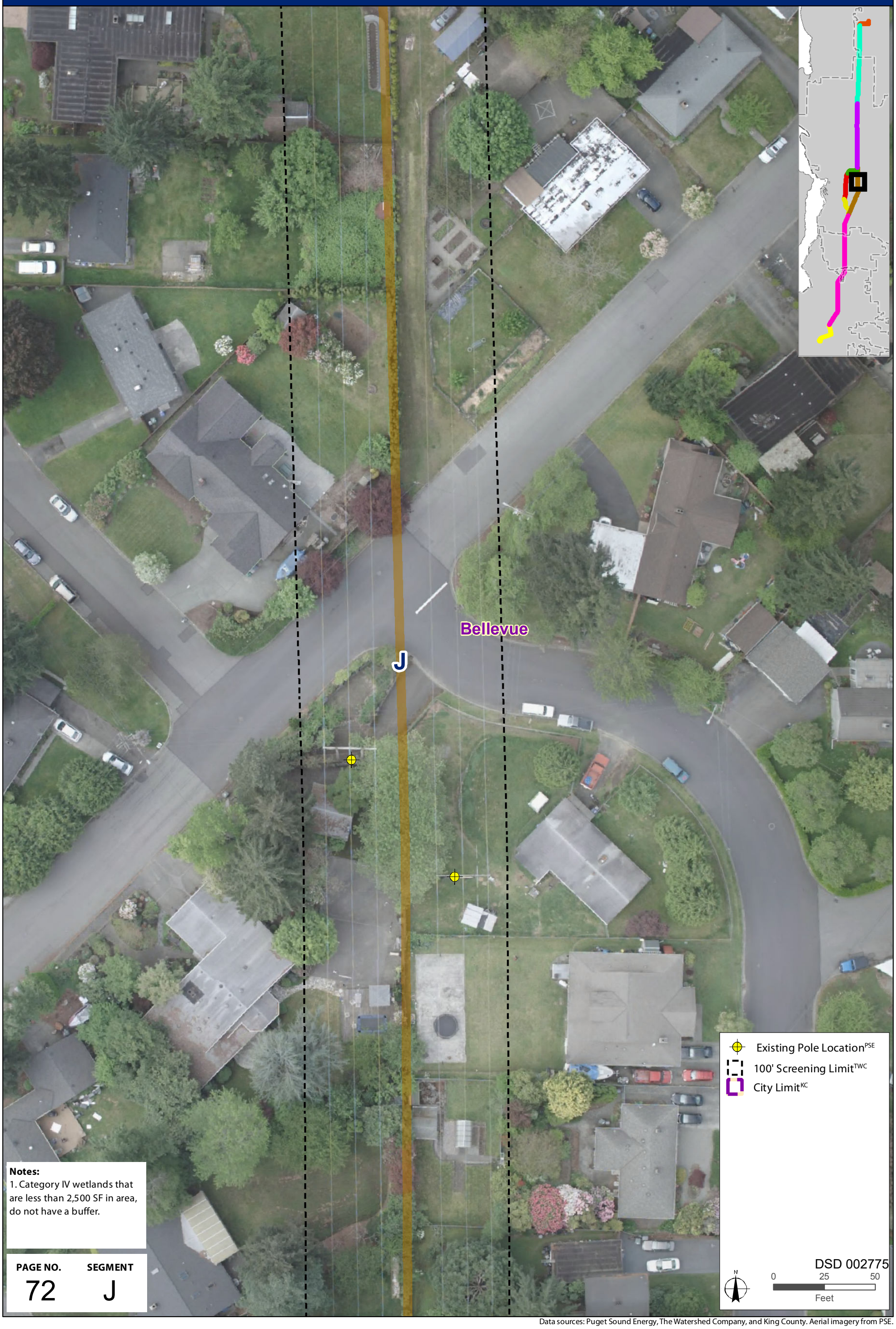
DSD 002774

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

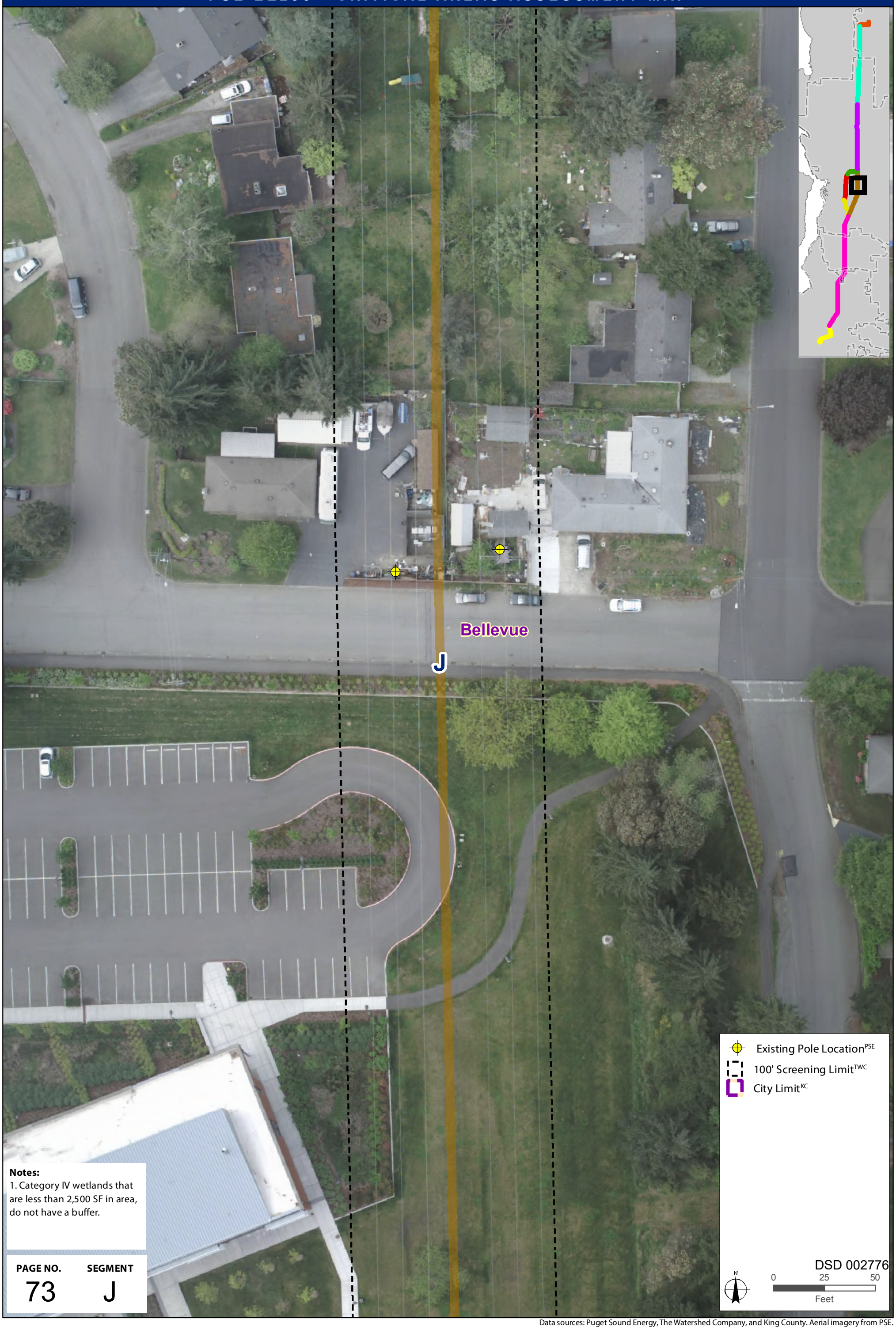


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
72	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

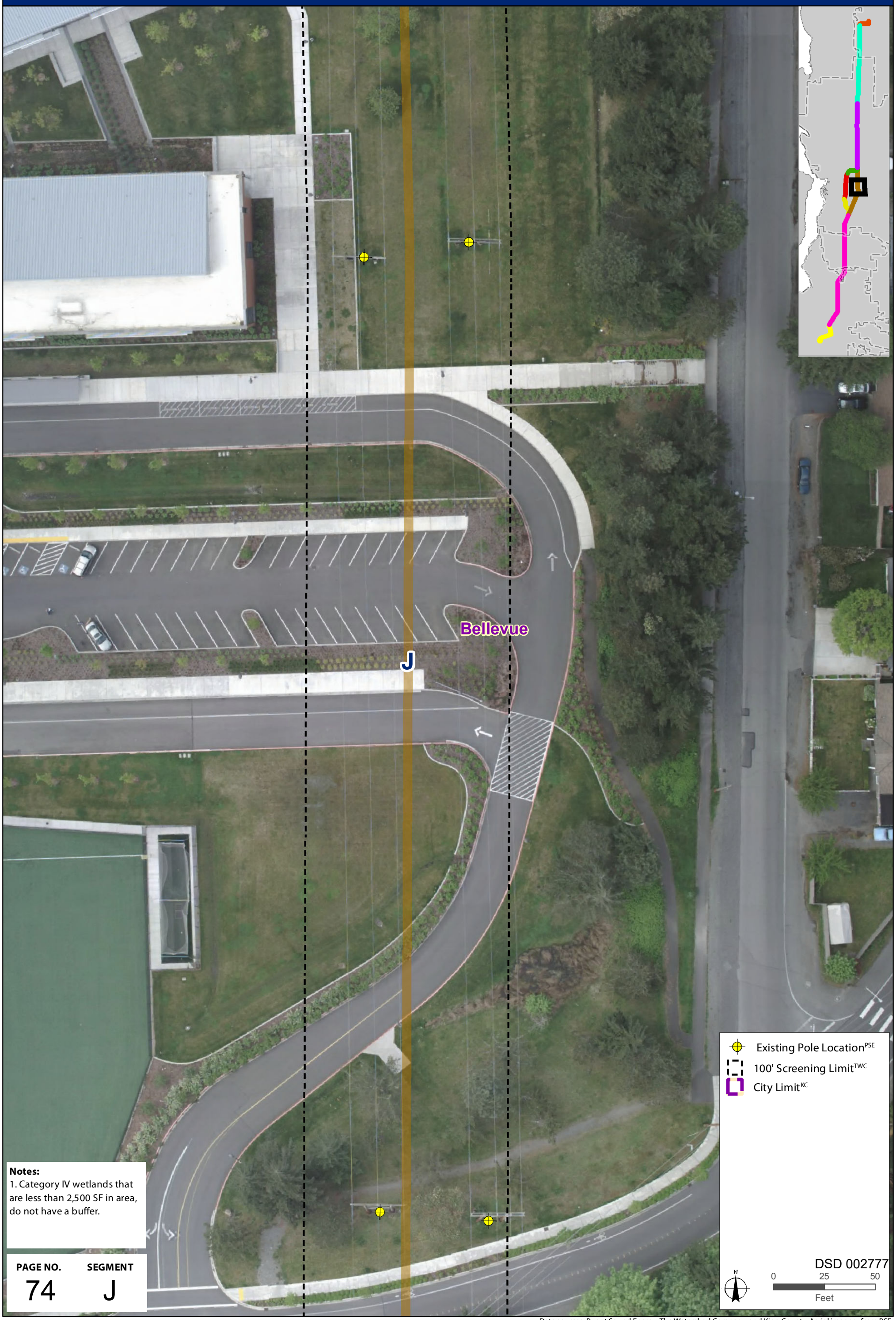


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
73	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
74	J

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

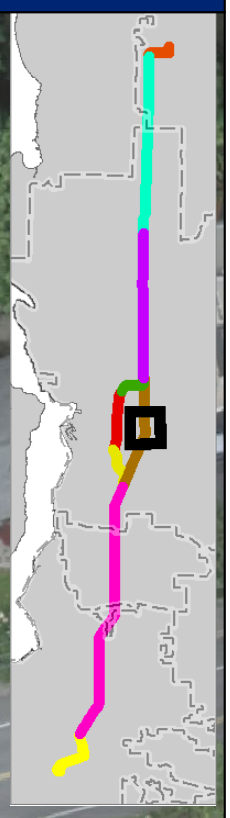
DSD 002777

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Bellevue

J

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
75	J

100' Screening Limit[TWC]
City Limit[KC]

DSD 002778

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

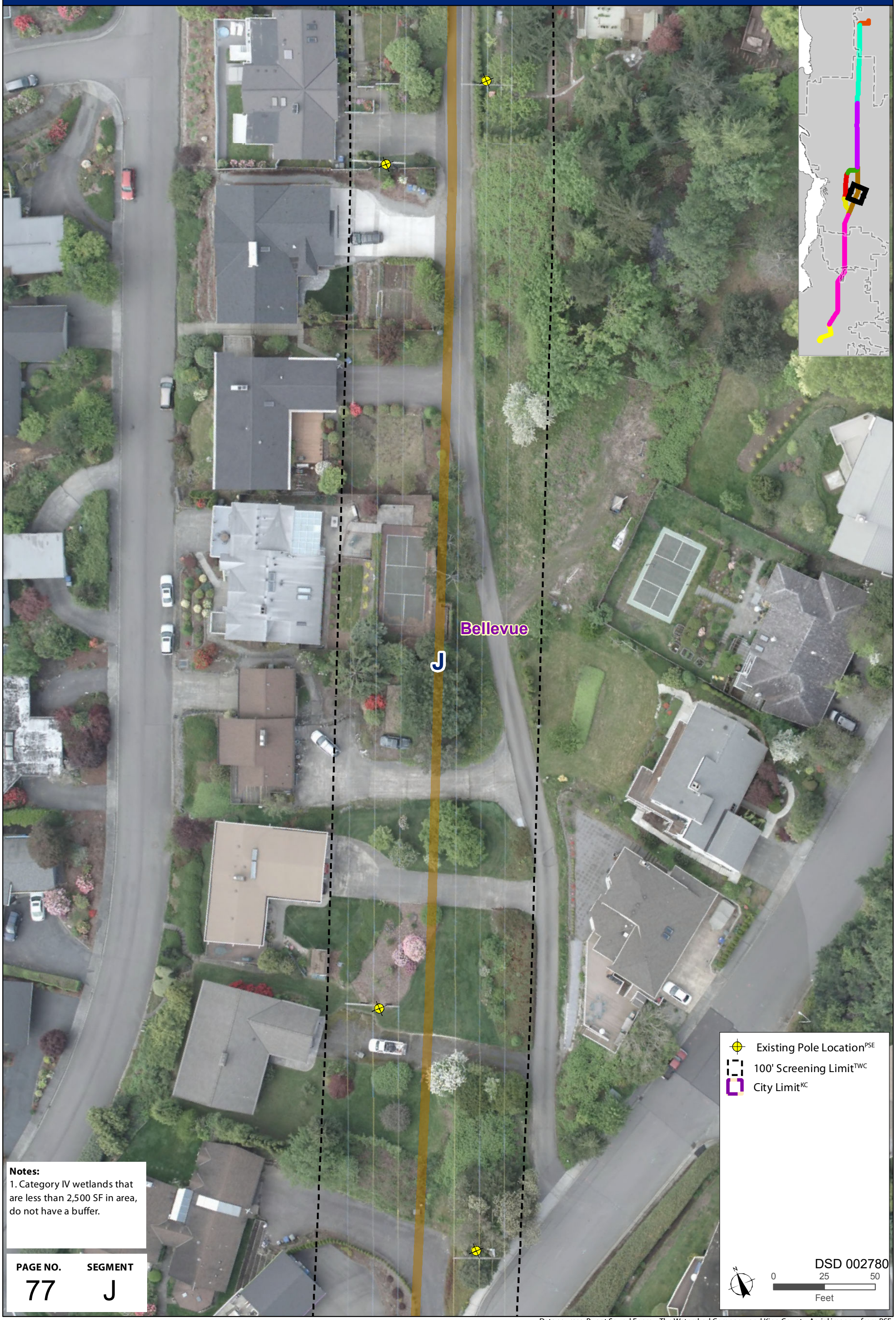
PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
76	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

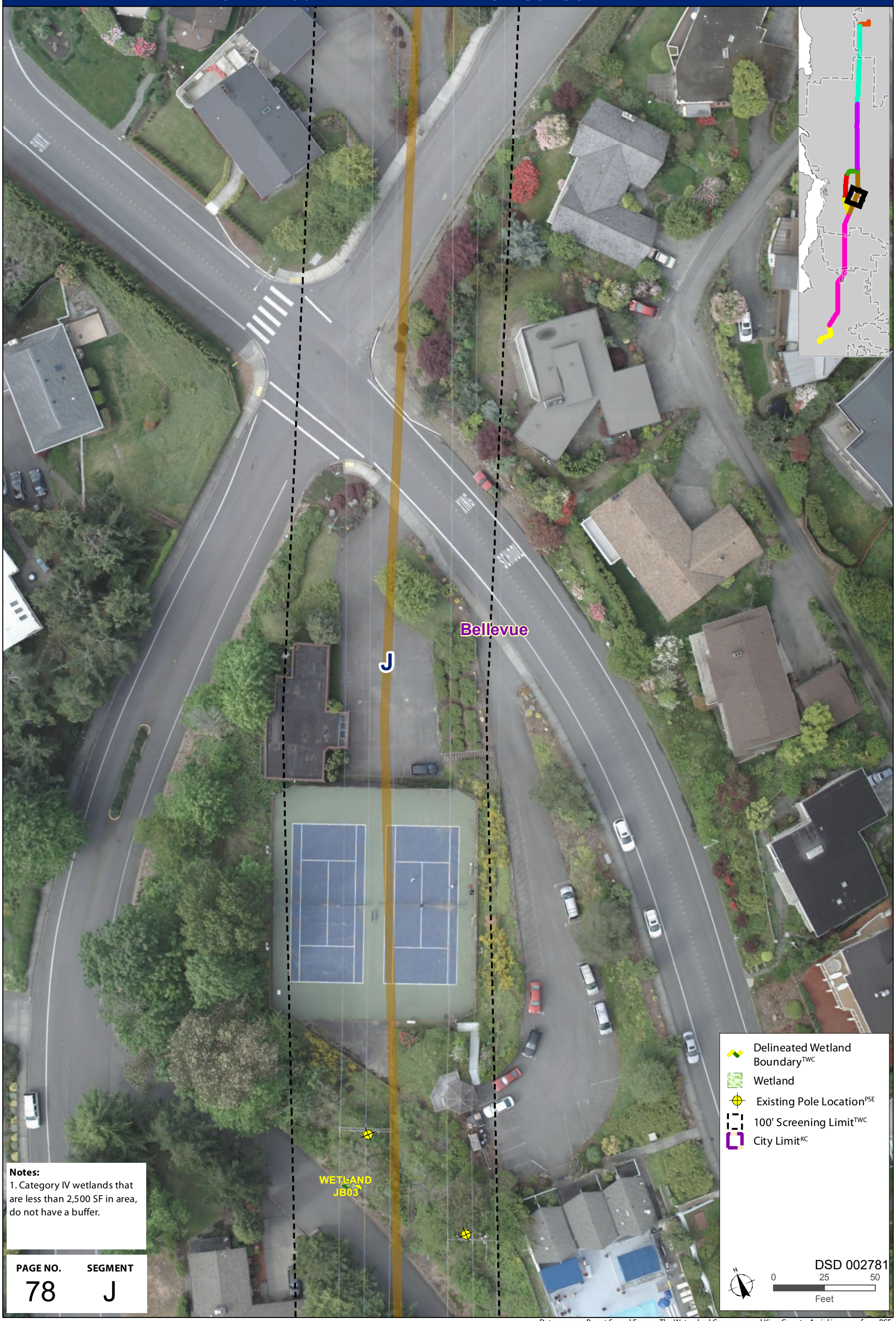
PAGE NO.	SEGMENT
77	J

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

DSD 002780
0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
78	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
79	J

- Delineated Wetland Boundary[TWC]
- Data Point[TWC]
- Wetland
- Existing Pole Location[PSE]
- 100' Screening Limit[TWC]
- City Limit[KC]

DSD 002782

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
80	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
81	J

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

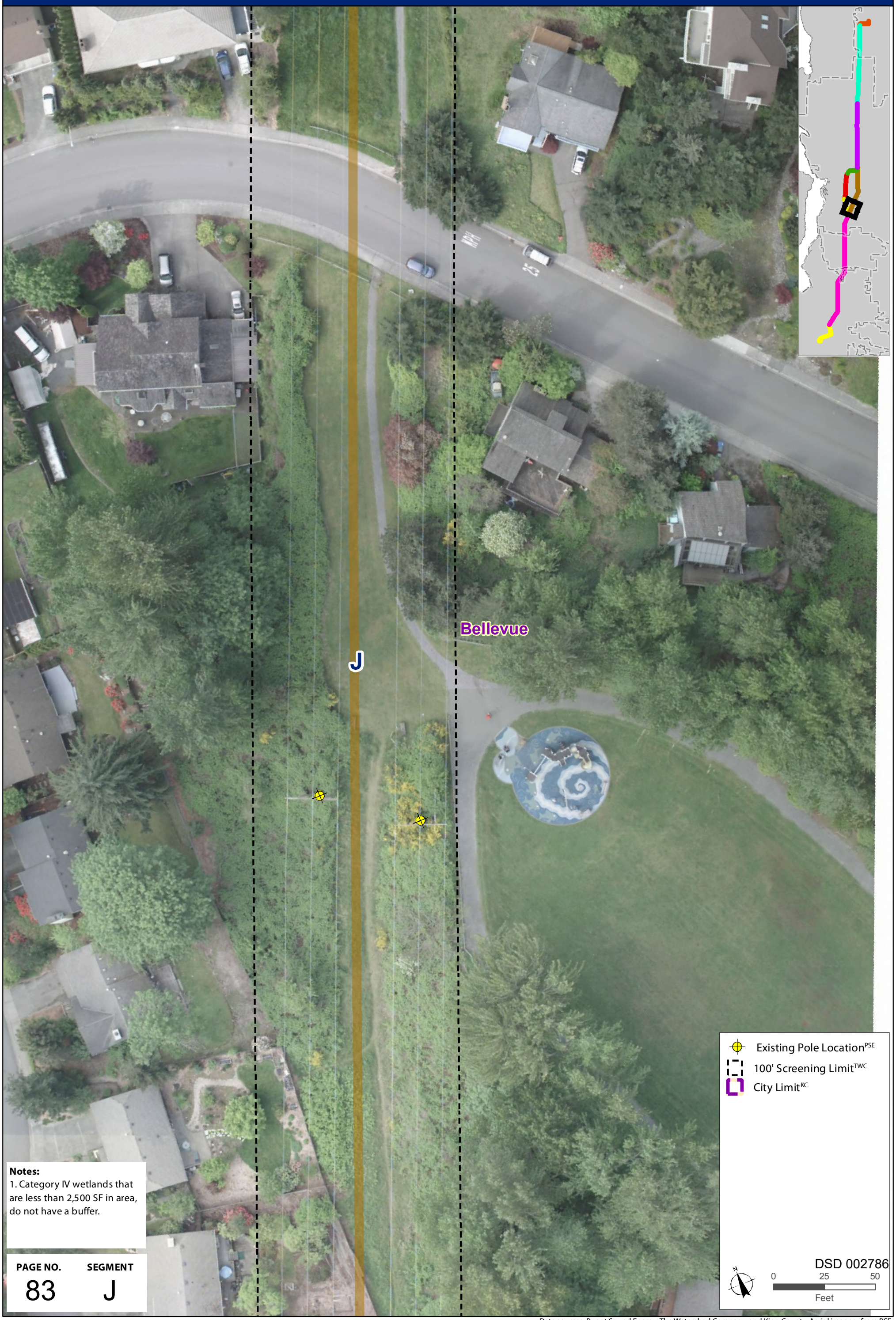
PAGE NO.	SEGMENT
82	J

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

DSD 002785
0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
83	J

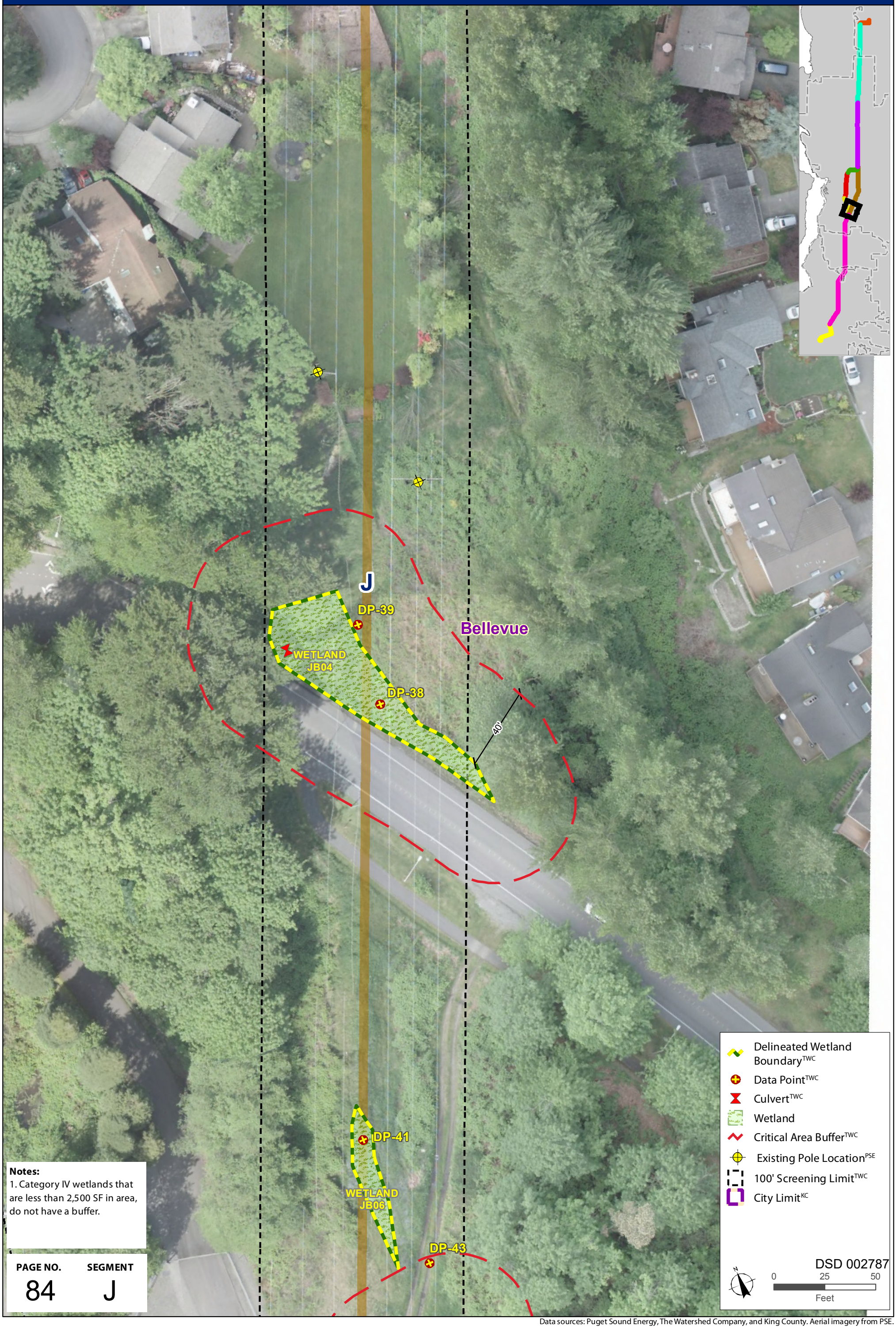
Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

DSD 002786

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
84	J

- Delineated Wetland Boundary[TWC]
- Data Point[TWC]
- Culvert[TWC]
- Wetland
- Critical Area Buffer[TWC]
- Existing Pole Location[PSE]
- 100' Screening Limit[TWC]
- City Limit[KC]

DSD 002787

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

DP-42
WETLAND JB07
40'
Bellevue
K2
J
40'
40'
WETLAND JB05
DP-40
110'

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.
2. Segment K2 continued from page 67.

PAGE NO.	SEGMENT
85	J/K2

- Delineated Wetland Boundary[TWC]
- Data Point[TWC]
- Wetland
- Critical Area Buffer[TWC]
- Building Setback Line[TWC]
- Existing Pole Location[PSE]
- 100' Screening Limit[TWC]
- City Limit[KC]

DSD 002788

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

110'
100'
100'
40'
50'
DP-46
WETLAND JB08
STREAM JB04
STREAM JB05 (Coal Creek)
STREAM MB02
STREAM MB03
WETLAND MB04
K2
J
M
Bellevue

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
86	J/K2/M

Delineated Stream Centerline[TWC]
Delineated Wetland Boundary[TWC]
Approximate Stream[TWC]
Data Point[TWC]
Culvert[TWC]
Stream
Wetland
Critical Area Buffer[TWC]
Building Setback Line[TWC]
100' Screening Limit[TWC]
City Limit[KC]

DSD 002789

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

STREAM MB03

WETLAND MB04

DP-44

40'

DP-45

STREAM JB0

Bellevue

M

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
87	M

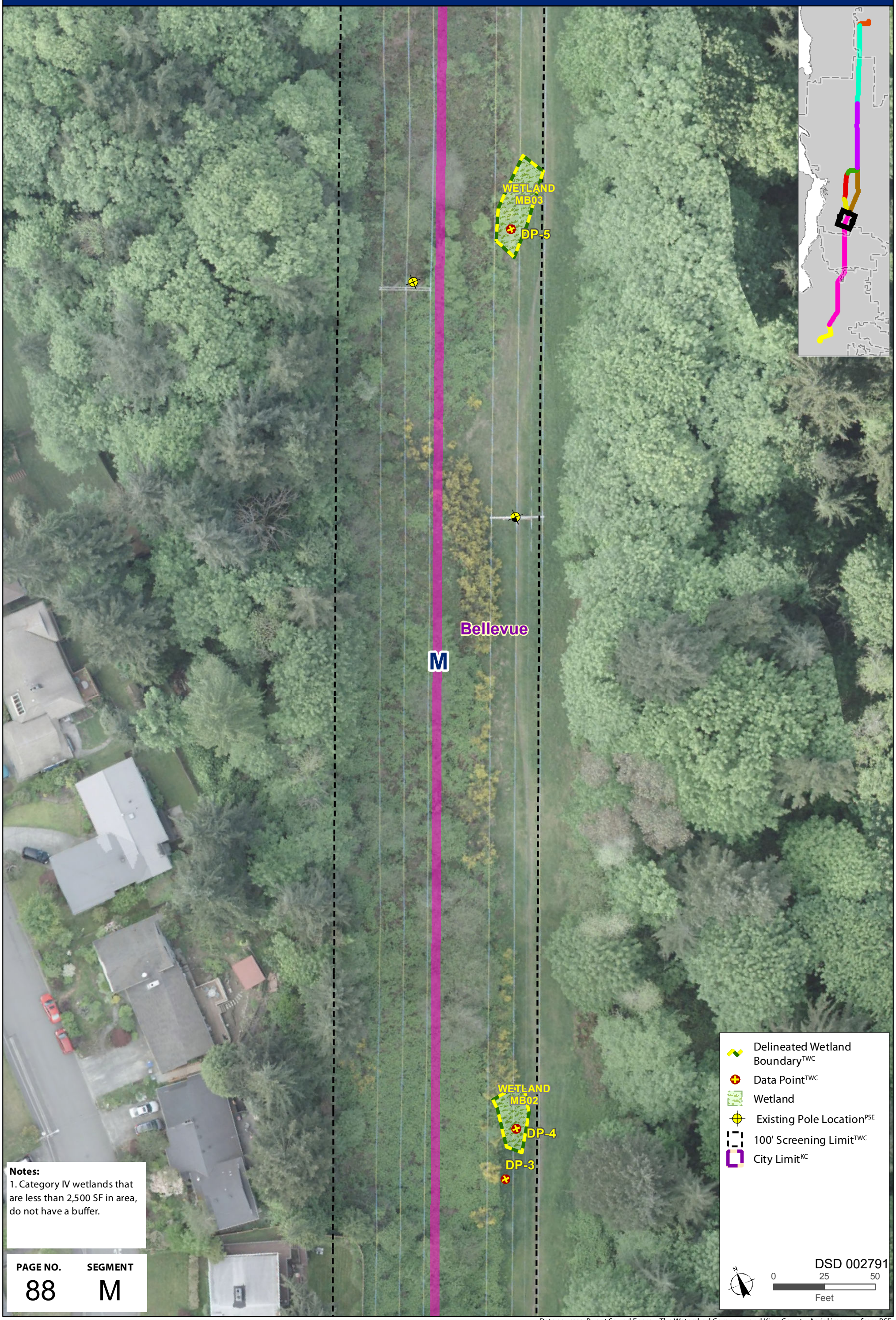
Delineated Stream Centerline[TWC]
Delineated Wetland Boundary[TWC]
Approximate Stream[TWC]
Data Point[TWC]
Stream
Wetland
Critical Area Buffer[TWC]
Building Setback Line[TWC]
Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

DSD 002790

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

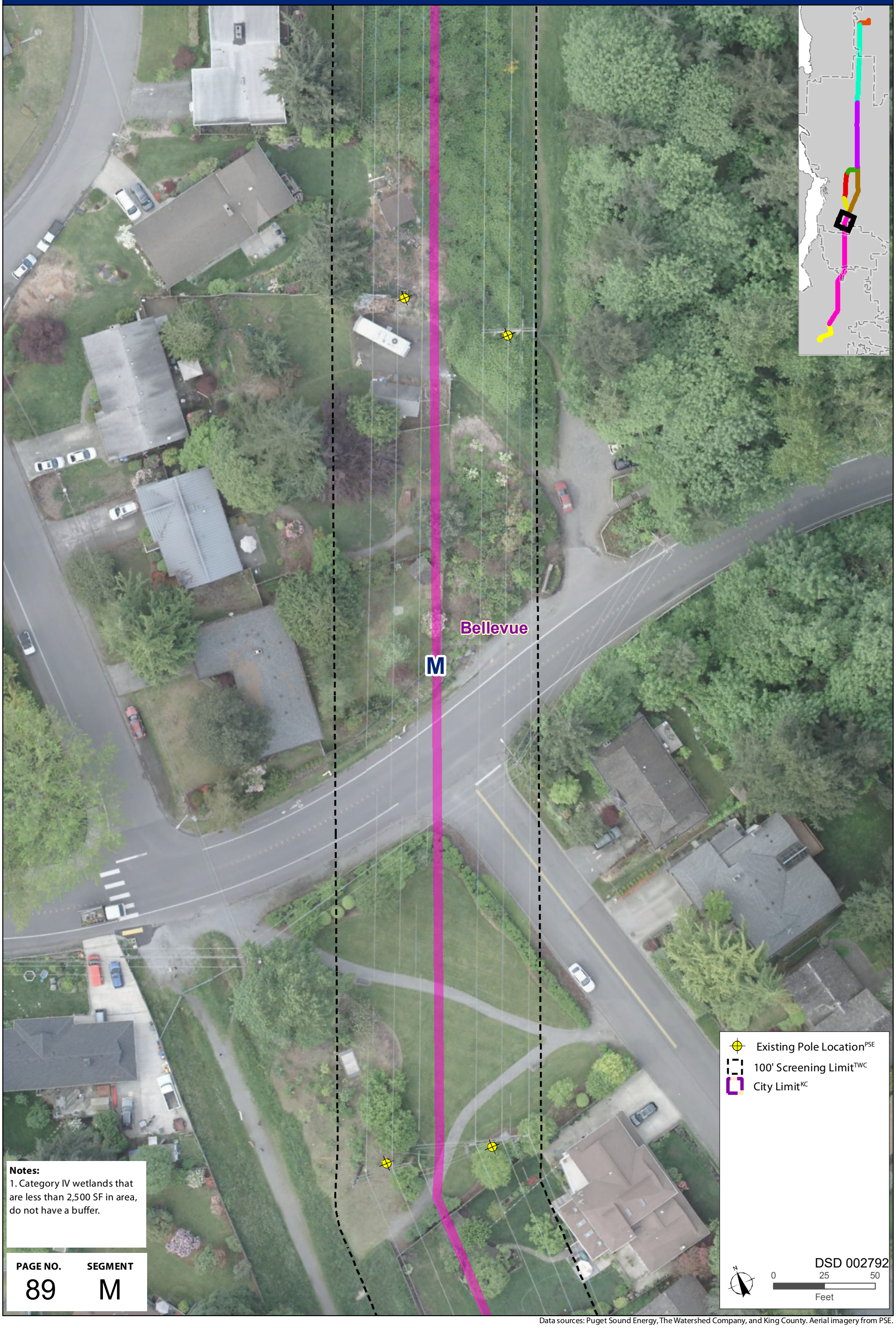


Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
88	M

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

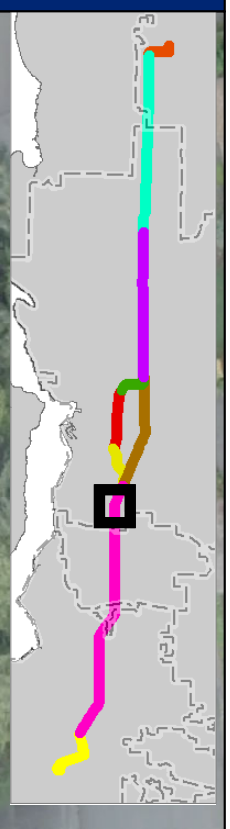
PAGE NO.	SEGMENT
89	M

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

DSD 002792
0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Bellevue

M

Existing Pole Location[PSE]

100' Screening Limit[TWC]

City Limit[KC]

DSD 002793

N

0 25 50

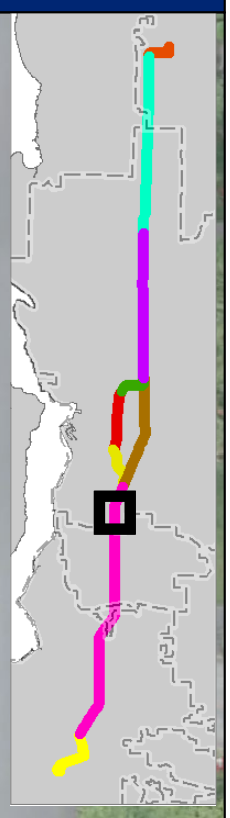
Feet

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
90	M

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Bellevue

M

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
91	M

Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

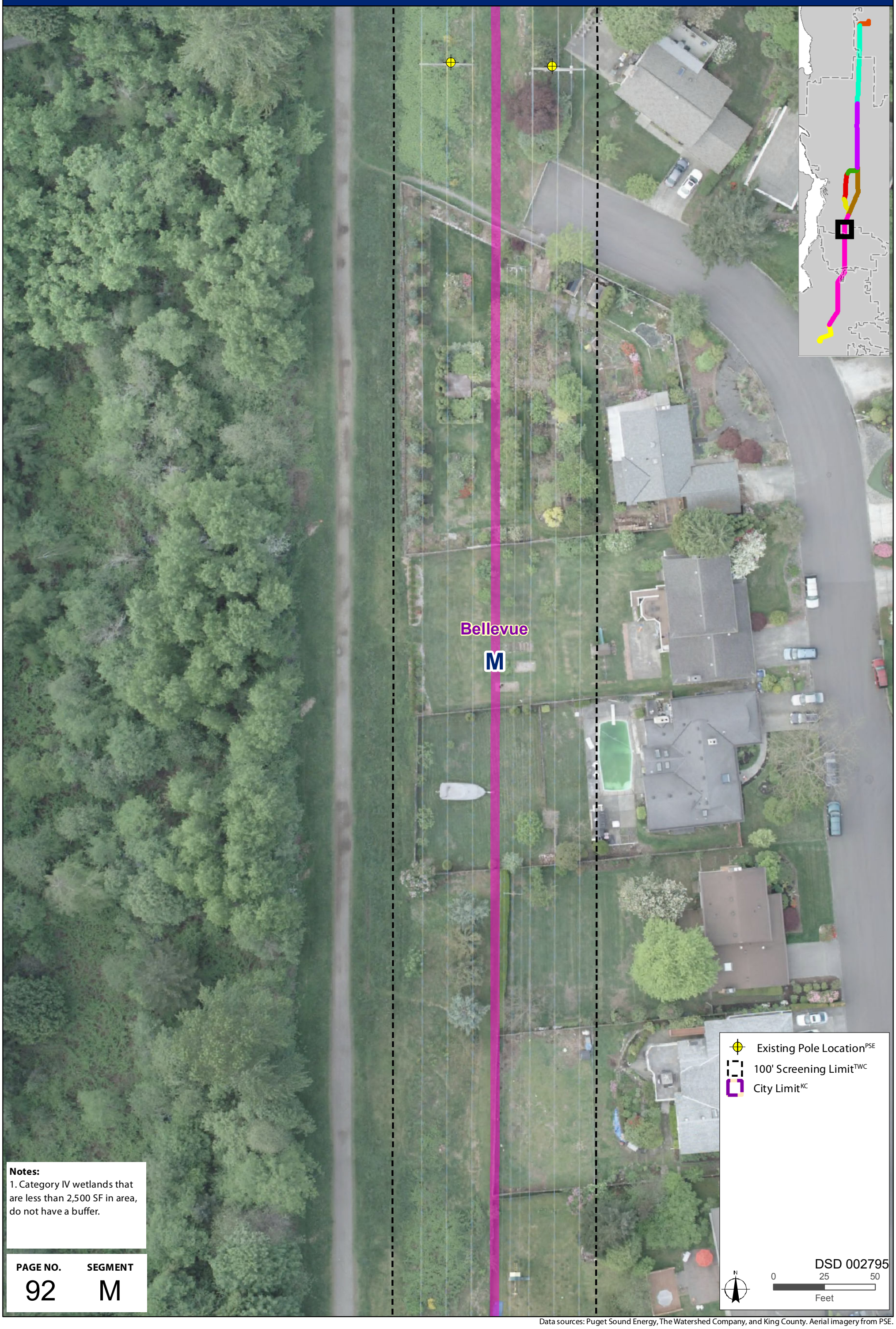
DSD 002794

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
92	M

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP

DP-2

DP-1

WETLAND
MB01

Bellevue

M

60'

Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
93	M

Delineated Wetland Boundary[TWC]
Data Point[TWC]
Wetland
Critical Area Buffer[TWC]
Building Setback Line[TWC]
Existing Pole Location[PSE]
100' Screening Limit[TWC]
City Limit[KC]

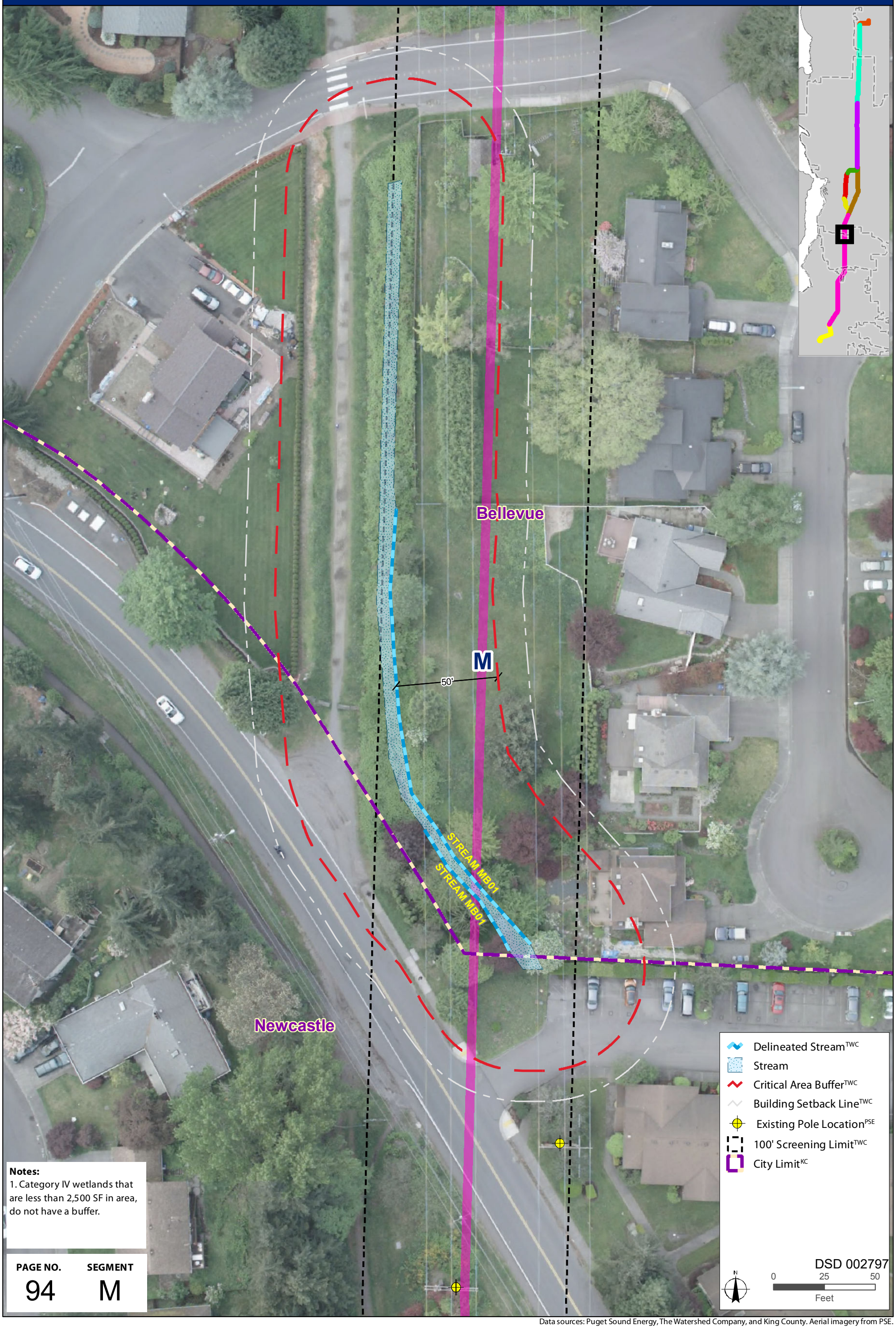
DSD 002796

N

0 25 50
Feet

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

PSE EE230 - CRITICAL AREAS ASSESSMENT MAP



Notes:
1. Category IV wetlands that are less than 2,500 SF in area, do not have a buffer.

PAGE NO.	SEGMENT
94	M

Data sources: Puget Sound Energy, The Watershed Company, and King County. Aerial imagery from PSE.

APPENDIX B

Wetland Determination Data Forms

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 1

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment M - 6308000370**	Sampling Date:	**4/6/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **1**
Investigator:	**K. Crandall**	City/County:	**Bellevue**
Sect., Township, Range:	S **28** T **24N** R **05E**	State:	**WA**

Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **<5**	Local relief (concave, convex, none): **Concave**
Subregion (LRR): **A**	Lat:	Long: Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland MB01**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Salix lasiandra***	**100**	**Y**	**FACW**
2.			
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Cornus alba***	**5**	**Y**	**FACW**
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**30**	**Y**	**FACU**
2. ***Solanum dulcamara***	**20**	**Y**	**FAC**
	50	= Total Cover	

% Bare Ground in Herb Stratum: **97**

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**75**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-1**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-14	**7.5YR 2.5/1**	**100**					**Loam**	**High organic content**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☒ 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: **Redox likely not visible due to organics masking and high moisture content**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**7" BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0" BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 2

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment M - 6308000370**	Sampling Date:	**4/6/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **2**
Investigator:	**K. Crandall**	City/County:	**Bellevue**
Sect., Township, Range:	S **28** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5-10**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☐ No ☒
Hydric Soils Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **Wetland MB01 out-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Various field grasses***	**100**	**Y**	**FAC***
2. ***Taraxacum officinale***	**7**	**N**	**FACU**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	107	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= 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:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***presumed FAC**

SOIL **Sampling Point – DP-2**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	**10YR 2/2**	**100**					**Gravelly sandy loam**	
4-8+	**10YR 3/3**	**100**					**Gravelly loamy sand**	
								Compact with cobbles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 3

Project Site:	**Segment M - 2124059001**	Sampling Date:	**4/8/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **3**
Investigator:	**K. Crandall, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and Kitsap soils, very steep**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes	☐	No	☒	**Is the Sampling Point within a Wetland?** Yes ☐ No ☒
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: **Out-pit near Wetlands MB02 and MB03**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2. ***Unknown grass***	**50**	**Y**	**FAC***
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***(Rubus armeniacus growing upslope of wetland area)***			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum: 97

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC.**

SOIL **Sampling Point – DP-3**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8+	**10YR 3/2**	**98**	**10YR 4/6**	**2**	**C**	**M**	**Gravelly sandy loam with cobbles**	**Compact**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

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

Restrictive Layer (if present):
Type: Compact fill material
Depth (inches): ~8" BGS

Hydric soil present? Yes ☐ No ☒

Remarks: **BGS = below ground surface**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **0-8 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

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WETLAND DETERMINATION DATA FORM

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DP- 4

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment M - 2124059001**	Sampling Date:	**4/8/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **4**
Investigator:	**K. Crandall, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **<5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and Kitsap soils, very steep**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland MB02**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2. ***Other mowed grasses***	**50**	**Y**	**FAC***
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum: 97

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-4**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	**10YR 2/2**	**100**					**Gravelly sandy loam**	**Roots**
4-8	**10YR 4/2**	**80**	**7.5YR 4/6**	**20**	**C**	**M**	**Gravelly loamy sand with cobbles**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

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

Restrictive Layer (if present):
Type: Compact fill material
Depth (inches): 8 BGS

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☐	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**2 BGS***
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**
*** water seeping into pit from 2-6 inches**

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DP- 5

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment M - 2124059001**	Sampling Date:	**4/8/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **5**
Investigator:	**K. Crandall, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **NA**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and Kitsap soils, very steep**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland MB03**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**50**	**Y**	**FACW**
2. ***Unknown grass***	**50**	**Y**	**FAC***
3. ***Juncus effusus***	**30**	**Y**	**FACW**
4. ***Lotus corniculatus***	**5**	**N**	**FAC**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	135	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**15**	**Y**	**FACU**
2.			
	15	= Total Cover	

% Bare Ground in Herb Stratum: 97

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**75**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***presumed FAC**

SOIL **Sampling Point – DP-5**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	**10YR 3/2**	**100**					**Sandy loam**	**With some gravel**
4-11	**10GY 4/1**	**75**	**7.5YR 4/4**	**25**	**C**	**M**	**Gravelly sandy clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

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

Restrictive Layer (if present):
Type: Compact fill material
Depth (inches): 8" BGS

Hydric soil present? Yes ☒ No ☐

Remarks: **BGS = below ground surface**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **0 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

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WETLAND DETERMINATION DATA FORM

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DP- 6

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 0672100140**	Sampling Date:	**5/29/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **6**
Investigator:	**K. Crandall, R. Whitson, M. Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **27** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **~5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB01 in-pit. Wetland near Kelsey Creek under lines; weedy corridor area.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Scirpus microcarpus***	**60**	**Y**	**OBL**
2. ***Phalaris arundinacea***	**50**	**Y**	**FACW**
3. ***Equisetum telmateia***	**30**	**N**	**FACW**
4. ***Stachys chamissonis cooleyae***	**5**	**N**	**FACW**
5. ***Galium sp.***	**5**	**N**	**FAC***
6. ***Carex obnupta***	**5**	**N**	**OBL**
7.			
8.			
9.			
10.			
11.			
	155 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-6**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	**10YR 3/1**	**100**					**Sandy loam**	
12-16	**2.5Y 3/1**	**95**	**10YR 3/4**	**5**	**C**	**M**	**Sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**7 BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

THE WATERSHED COMPANY
750 Sixth Street South
Kirkland, Washington 98033
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Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 7

Project Site:	**Segment E, parcel number 0672100140**	Sampling Date:	**5/29/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **7**
Investigator:	**K. Crandall, R. Whitson, M. Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **27** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **3**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes	☐	No	☒	**Is the Sampling Point within a Wetland?** Yes ☐ No ☒
Wetland Hydrology Present?	Yes	☐	No	☒	

Remarks: **Wetland EB01 out-pit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus parviflorus***	**10**	**Y**	**FACU**
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Holcus lanatus***	**70**	**Y**	**FAC**
2. ***Other grass***	**60**	**Y**	**FAC***
3. ***Equisetum telmateia***	**20**	**N**	**FACW**
4. ***Alopecurus pratensis***	**10**	**N**	**FAC**
5. ***Athyrium cyclosorum***	**5**	**N**	**FAC**
6.			
7.			
8.			
9.			
10.			
11.			
	155	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**10**	**Y**	**FACU**
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**75**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-7**

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	**10YR 3/2**	**100**					**Loam**	
4-8	**10YR 4/2**	**98**	**10YR 4/6**	**2**	**C**	**M**	**Loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Compact with many roots and cobbles; difficult to dig below 8 inches.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 8

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment C, parcel number 2725059045**	Sampling Date:	**6/1/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **8**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **27** T **25N** R **05E**	State:	**WA**

Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **3**	Local relief (concave, convex, none): **Concave**
Subregion (LRR): **A**	Lat:	Long: Datum:
Soil Map Unit Name: **EvC – Everett gravelly sandy loam, 5-15% slopes.**		NWI classification: **NA**

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland CB01 in-pit. Wetland is located north of 520.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**30**	**Y**	**FAC**
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**80**	**Y**	**FACW**
2. ***Scirpus microcarpus***	**70**	**Y**	**OBL**
3. ***Carex stipata***	**10**	**N**	**OBL**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	160	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3** (A)
Total Number of Dominant Species Across All Strata:	**3** (B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-8**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	**10YR 3/2**	**95**	**7.5YR 4/6**	**5**	**C**	**M**	**Sandy loam**	
6-12	**10YR 4/1**	**85**	**7.5YR 4/6**	**15**	**C**	**M, PL**	**Gravelly sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Dryer than average rainfall – 1.32 inches below average for the year to date (NOAA National Weather Service Data, generated 6/2/2015).**

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 9

Project Site:	**Segment C, parcel number 2725059045**	Sampling Date:	**6/1/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **9**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **27** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **EvC – Everett gravelly sandy loam, 5-15% slopes.**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes	☐	No	☒	**Is the Sampling Point within a Wetland?** Yes ☐ No ☒
Wetland Hydrology Present?	Yes	☐	No	☒	

Remarks: **Wetland CB01 out-pit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**10**	**Y**	**FAC**
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**70**	**Y**	**FAC**
2. ***Other grass***	**40**	**Y**	**FAC***
3. ***Galium sp.***	**15**	**N**	**FAC***
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	125	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**45**	**Y**	**FACU**
2.			
	45	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**75**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-9**

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
0-10	**10 YR 4/2**	**100**					**Sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 10

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 3425059010**	Sampling Date:	**6/3/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **10**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slope**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☐	No ☒
Hydric Soils Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **EB02 out-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 1m diam.)				
1.	***Phalaris arundinacea***	**80**	**Y**	**FACW**
2.	***Agrostis stolonifera***	**35**	**Y**	**FAC**
3.	***Holcus lanatus***	**15**	**N**	**FAC**
4.	***Vicia sp.***	**15**	**N**	**FAC***
5.	***Galium sp.***	**5**	**N**	**FAC***
6.	***Cirsium arvense***	**5**	**N**	**FAC**
7.	***Carex sp.***	**Trace**	**N**	
8.				
9.				
10.				
11.				
		155	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	***Rubus armeniacus***	**35**	**Y**	**FACU**
2.				
		35	= 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:	**67**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-10**

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
0-5	**10YR 4/2**	**100**					**Sandy loam**	
5-14	**10YR 4/3**	**97**	**7.5YR 5/8**	**3**	**C**	**M**	**Gravelly sandy loam**	**Relict redox features***

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: ***Redox features are hard nodules with sharp edges**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks: **Dry**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 11

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 3425059010**	Sampling Date:	**6/3/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **11**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB02 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Juncus ensifolius***	**60**	**Y**	**FACW**
2. ***Juncus tenuis***	**40**	**Y**	**FAC**
3. ***Holcus lanatus***	**20**	**N**	**FAC**
4. ***Carex stipata***	**5**	**N**	**OBL**
5. ***Ranunculus repens***	**5**	**N**	**FAC**
6. ***Equisetum telmateia***	**5**	**N**	**FACW**
7. ***Plantago major***	**5**	**N**	**FAC**
8. ***Trifolium repens***	**5**	**N**	**FAC**
9.			
10.			
11.			
	145	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**5**	**Y**	**FACU**
2.			
	5	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: **67** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-11**

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
0-5	**10YR 4/2**	**100**					**Sandy loam**	
5-12	**2.5Y 6/2**	**75**	**7.5YR 4/6**	**25**	**C**	**M, PL**	**Sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 12

Project Site:	**Segment E, parcel number 3425059010**	Sampling Date:	**6/3/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **12**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5-10**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB03; west of SE 1st street.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2. ***Solanum dulcamara***	**50**	**Y**	**FAC**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	150 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= 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:	**2**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Rubus armeniacus*** **growing in plot from upslope**

SOIL **Sampling Point – DP-12**

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
0-10	**10YR 3/2**	**100**					**Sandy loam**	
10-12	**5GY 4/1**	**100**					**Sandy loam**	**Slightly higher sand content**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☒	No ☐	Depth (in):	**+1/2"**
Water Table Present?	Yes ☒	No ☐	Depth (in):	**At surface**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**Throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **About a half an inch of surface water flow near the test pit.**

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 13

Project Site:	**Segment E, parcel number 3425059010**	Sampling Date:	**6/3/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **13**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB04; depression adjacent to trail south of EB03.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Holcus lanatus***	**75**	**Y**	**FAC**
2. ***Equisetum telmateia***	**25**	**N**	**FACW**
3. ***Carex stipata***	**25**	**N**	**OBL**
4. ***Phalaris arundinacea***	**20**	**N**	**FACW**
5. ***Juncus effusus***	**20**	**N**	**FACW**
6.			
7.			
8.			
9.			
10.			
11.			
	165 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= 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:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-13**

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
0-2	**2.5Y 3/2**	**100**					**Sandy loam**	
2-16	**5Y 4/1**	**85**	**10YR 4/6**	**15**	**C**	**M**	**Gravelly sandy clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**15" BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**surface**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Standing water present in nearby depression.**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 14

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 3425059010**	Sampling Date:	**6/3/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **14**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5-10**	Local relief (concave, convex, none): **NA**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☐	No ☒
Hydric Soils Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **EB03/EB04 out-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Dactylis glomerata***	**30**	**Y**	**FACU**
2. ***Holcus lanatus***	**30**	**Y**	**FAC**
3. ***Other grass***	**30**	**Y**	**FAC***
4. ***Rumex crispus***	**10**	**N**	**FAC**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**10**	**Y**	**FACU**
2.			
	10	= 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		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

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-14**

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
0-8	**10 YR 3/2**	**100**					**Gravelly sandy loam**	

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Soil very compact**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

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Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 15

Project Site:	**Segment E, parcel number 3425059010**	Sampling Date:	**6/3/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **15**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB05 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 1m diam.)				
1.	***Phalaris arundinacea***	**60**	**Y**	**FACW**
2.	***Holcus lanatus***	**60**	**Y**	**FAC**
3.	***Vicia sp.***	**5**	**N**	**FAC***
4.	***Equisetum telmateia***	**5**	**N**	**FACW**
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		130	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

☒ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-15**

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
0-9	**2.5Y 3/2**	**100**					**Loam**	**High organic content**
9-16	**5GY 4/1**	**100**					**Gravelly sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☒	No ☐	Depth (in):	**+1/2**
Water Table Present?	Yes ☒	No ☐	Depth (in):	**At surface**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**Throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Shallow standing water**

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(425) 822-5242
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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 16

Project Site:	**Segment E, parcel number 3425059010**	Sampling Date:	**6/3/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **16**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB06**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**90**	**Y**	**FACW**
2. ***Equisetum telmateia***	**50**	**Y**	**FACW**
3. ***Vicia sp.***	**20**	**N**	**FAC***
4. ***Cirsium arvense***	**5**	**N**	**FAC**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	165 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-16**

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
0-5	**2.5Y 3/2**	**100**					**Sandy loam**	
5-14	**10GY 4/1**	**90**	**10YR 4/8**	**10**	**C**	**M, PL**	**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**Throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Water seeping into pit at about 5 inches below ground surface and pooling in bottom of pit.**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 17

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 2077700035**	Sampling Date:	**6/5/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **17**
Investigator:	**Katy Crandall, Rose Whitson, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**

Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **Concave**
Subregion (LRR): **A**	Lat:	Long: Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**

Are climatic/hydrologic conditions on the site typical for this time of year?	☒ Yes	☐ No	(If no, explain in remarks.)
Are "Normal Circumstances" present on the site?	☒ Yes	☐ No	
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Soils Present?	Yes	☒	No	☐	**Is the Sampling Point within a Wetland?** Yes ☒ No ☐
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: **Wetland EB11**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus spectabilis***	**15**	**Y**	**FAC**
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**85**	**Y**	**FACW**
2. ***Juncus effusus***	**20**	**N**	**FACW**
3. ***Typha latifolia***	**15**	**N**	**OBL**
4. ***Galium sp.***	**10**	**N**	**FACU**
5. ***Stachys cooleyae***	**5**	**N**	**FACW**
6. ***Athyrium cyclosorum***	**5**	**N**	**FAC**
7. ***Equisetum telmateia***	**Trace**	**N**	**FACW**
8.			
9.			
10.			
11.			
	140	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-17**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	**10YR 3/2**	**90**	**7.5YR 3/4**	**10**	**C**	**M**	**Sandy loam**	
5-14	**10Y 3/1**	**93**	**5YR 3/4**	**7**	**C**	**PL**	**Coarse sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

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WETLAND DETERMINATION DATA FORM

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DP- 18

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Kirkland, Washington 98033
(425) 822-5242
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Project Site:	**Segment E, parcel number 2077700035**	Sampling Date:	**6/5/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **18**
Investigator:	**Katy Crandall, Rose Whitson, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**

Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **None**
Subregion (LRR): **A**	Lat:	Long: Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**

Are climatic/hydrologic conditions on the site typical for this time of year?	☒ Yes	☐ No	(If no, explain in remarks.)
Are "Normal Circumstances" present on the site?	☒ Yes	☐ No	
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☐	No ☒
Hydric Soils Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **Wetland EB11 out-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 1m diam.)				
1.	***Various unknown grasses***	**80**	**Y**	**FAC***
2.	***Equisetum telmateia***	**15**	**N**	**FACW**
3.	***Phalaris arundinacea***	**15**	**N**	**FACW**
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		110	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	***Rubus armeniacus***	**20**	**Y**	**FACU**
2.	***Rubus ursinus***	**Trace**	**N**	**FACU**
		20	= 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:	**2**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-18**

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
0-9	**10YR 2/2**	**100**					**Sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Soils contain some cobbles and is compact.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks: **dry**

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DP- 19

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 2077700042**	Sampling Date:	**6/5/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **19**
Investigator:	**Katy Crandall, Rose Whitson, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **<5**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB12**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Salix scouleriana***	**100**	**Y**	**FAC**
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus spectabilis***	**45**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	45 = Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Equisetum telmateia***	**10**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 = Total Cover		
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**50**	**Y**	**FACU**
2. ***Solanum dulcamara***	**25**	**Y**	**FAC**
	75 = Total Cover		

% Bare Ground in Herb Stratum: 70

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**4**	(A)
Total Number of Dominant Species Across All Strata:	**5**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**80**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-19**

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
0-10	**10YR 3/1**	**100**					**Silt loam**	
10-14	**2.5Y 3/1**	**100**					**Coarse loamy sand**	**Few cobbles**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Soils very saturated, no redox visible at the time of sampling.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**5 BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Surface soil visibly saturated due to groundwater seeps. BGS = below ground surface**

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WETLAND DETERMINATION DATA FORM

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DP- 20

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
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Project Site:	**Segment E, parcel number 3425059016**	Sampling Date:	**6/8/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **20**
Investigator:	**Katy Crandall, Nell Lund, Clover Muters**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5-10**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB08**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Populus balsamifera*** **(sapling)**	**5**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**90**	**Y**	**FACW**
2. ***Juncus effusus***	**35**	**Y**	**FACW**
3. ***Carex stipata***	**5**	**N**	**OBL**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	130	= Total Cover	
Woody Vine Stratum (Plot size: 3m diam)			
1. ***Solanum dulcamara***	**15**	**Y**	**FAC**
2.			
	15	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**4**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-20**

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	**10YR 3/2**	**100**					**Sandy loam**	
4-12	**10GY 4/1**	**90**	**7.5YR 4/6**	**10**	**C**	**M, PL**	**Sandy clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**4-12 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 21

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 3425059016**	Sampling Date:	**6/8/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **21**
Investigator:	**Katy Crandall, Nell Lund, Clover Muters**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Terrace**	Slope (%): **~5**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes ☐	No ☒	**Is the Sampling Point within a Wetland?**	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **Former wetland per GeoEngineers' 2008 delineation**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Alnus rubra***	**5**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Juncus effusus***	**75**	**Y**	**FACW**
2. ***Phalaris arundinacea***	**40**	**Y**	**FACW**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	115	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**20**	**Y**	**FACU**
2.			
	20	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**75**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-21**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-5	**10 YR 3/2**	**100**					**Gravelly sandy clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Compact, cannot dig below 5" depth.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

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WETLAND DETERMINATION DATA FORM

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DP- 22

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 3425059017**	Sampling Date:	**6/8/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **22**
Investigator:	**Katy Crandall, Nell Lund, Clover Muters**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Depression**	Slope (%): **2**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB09 – Stream EB07 present within boundaries.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Thuja plicata***	**30**	**Y**	**FAC**
2. ***Acer macrophllyum (rooted out)***			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus spectabilis***	**90**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	90	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Equisetum telmateia***	**20**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**10**	**Y**	**FACU**
2.			
	10	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **3** (A)
Total Number of Dominant Species Across All Strata: **4** (B)
Percent of Dominant Species that are OBL, FACW, or FAC: **75** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-22**

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
0-10	**10YR 3/1**	**100**					**Gravelly sandy clay loam**	
10-16	**5GY 5/1**	**100**					**Gravelly clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐ No ☒	Depth (in):	
Water Table Present?	Yes ☒ No ☐	Depth (in):	**15" BGS**
Saturation Present? (includes capillary fringe)	Yes ☒ No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Surface water (Stream EB07) located nearby. BGS = below ground surface**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 23

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 3425059009**	Sampling Date:	**6/8/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **23**
Investigator:	**Katy Crandall, Nell Lund, Clover Muters**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5-10**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB10**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Scirpus microcarpus***	**25**	**Y**	**OBL**
2. ***Juncus effusus***	**25**	**Y**	**FACW**
3. ***Phalaris arundinacea***	**20**	**Y**	**FACW**
4. ***Carex stipata***	**10**	**N**	**OBL**
5. ***Athyrium cyclosorum***	**10**	**N**	**FAC**
6.			
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-23**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	**2.5Y 3/1**	**95**	**2.5Y 3/3**	**5**	**C**	**M**	**Sandy clay loam**	
8-14	**10Y 4/1**	**70**	**7.5YR 4/6**	**30**	**C**	**M**	**Gravelly sandy clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 24

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 3425059009**	Sampling Date:	**6/8/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **24**
Investigator:	**Katy Crandall, Nell Lund, Clover Muters**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **>10**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☐	No ☒
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **Wetland EB10 out-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 1m diam.)				
1.	***Unknown grass***	**30**	**Y**	**FAC***
2.	***Equisetum telmateia***	**15**	**Y**	**FACW**
3.	***Phalaris arundinacea***	**5**	**N**	**FACW**
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		50	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	***Rubus armeniacus***	**5**	**Y**	**FACU**
2.				
		5	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: **67** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-24**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	**2.5Y 3/2**	**90**	**10YR 3/4**	**10**	**C**	**M**	**Sandy loam**	

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Soils compact**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 24A

Project Site:	**Segment E – parcel number 3425059010**	Sampling Date:	**6/15/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **24A**
Investigator:	**K. Crandall, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **34** T **25N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **15**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **EwC – Everett-Alderwood gravelly sandy loams, 6-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB07 inpit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2. ***Scirpus microcarpus***	**10**	**N**	**OBL**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	110 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= 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: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: **Herbaceous vegetation is mowed.**

SOIL **Sampling Point – DP-24A**

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
0-18	**2.5Y 3/1**	**100**					**Coarse loamy sand**	
18-24	**5GY 5/1**	**90**	**7.5YR 3/2**	**10**	**C**	**M**	**Gravelly loamy sand**	**Round small pea-gravel**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **0 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

Some surface water upslope from test pit

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 25

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E – parcel number 0324059066**	Sampling Date:	**6/15/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **25**
Investigator:	**K. Crandall, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No **Below avg precipitation**

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB13 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**100**	**Y**	**FAC**
2.			
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**85**	**Y**	**FACW**
2. ***Equisetum telmateia***	**15**	**N**	**FACW**
3. ***Cardamine oligosperma***	**5**	**N**	**FAC**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-25**

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
0-6	**10YR 3/2**	**100**					**Gravelly sandy loam**	
6-16	**2.5Y 3/1**	**85**	**7.5YR 3/3**	**15**	**C**	**M**	**Gravelly sandy loam**	**With large cobbles**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Groundwater seeps in pit at 6 inches below ground surface. Iron deposits near test pit.**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 26

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E – parcel number 0324059066**	Sampling Date:	**6/15/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **26**
Investigator:	**K. Crandall, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No **Below avg precipitation**

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB14 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**100**	**Y**	**FAC**
2.			
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2. ***Athyrium cyclosorum***	**25**	**N**	**FAC**
3. ***Urtica dioica***	**5**	**N**	**FAC**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	130	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

☒ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Equisetum telmateia*** **and** ***Rubus armeniacus*** **nearby.**

SOIL **Sampling Point – DP-26**

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
0-5	**10YR 3/1**	**100**					**Sandy silt loam**	**Moist**
5-18	**10YR 4/1**	**80**	**10YR 4/6**	**20**	**C**	**M, PL**	**Sandy loam**	**Medium to large sized gravel**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**5-18 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface.**

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WETLAND DETERMINATION DATA FORM

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DP- 27

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E – parcel number 1024059089**	Sampling Date:	**6/17/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **27**
Investigator:	**K. Crandall, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **10** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **NA**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **RdE – Ragnar-Indianola association, moderately steep**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes	☒	No	☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes	☒	No	☐			

Remarks: **Wetland EB20 in-pit.**

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 5m diam.)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Salix lasiandra***	**50**	**Y**	**FACW**
2.			
3.			
4.			
5.			
	50	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2. ***Cirsium arvense***	**10**	**N**	**FAC**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	110	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**20**	**Y**	**FACU**
2.			
	20	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: **67** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-27**

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
0-8	**10YR 2/2**	**100**					**Silt loam**	
8-16	**5YR 2.5/1**	**85**	**5YR 3/4**	**15**	**C**	**M, PL**	**Silt loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Damp, not saturated.**

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WETLAND DETERMINATION DATA FORM

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DP- 28

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Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E – parcel number 1024059089**	Sampling Date:	**6/17/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **28**
Investigator:	**K. Crandall, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **10** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **RdE – Ragnar-Indianola association, moderately steep**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes ☐	No ☒	**Is the Sampling Point within a Wetland?**	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **Out-pit near wetland EB20.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Dactylis glomerata***	**15**	**Y**	**FACU**
2. ***Holcus lanatus***	**15**	**Y**	**FAC**
3. ***Convolvulus sp. (bindweed)***	**15**	**Y**	**FACU***
4. ***Phalaris arundinacea***	**15**	**Y**	**FACW**
5. ***Galium aparine***	**10**	**N**	**FACU**
6.			
7.			
8.			
9.			
10.			
11.			
	70 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)
Total Number of Dominant Species Across All Strata: **4** (B)
Percent of Dominant Species that are OBL, FACW, or FAC: **50** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☐ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: ***Presumed FACU.**

Other dead/brown unidentifiable grasses and weeds make up 50% absolute cover in herbaceous stratum.

SOIL **Sampling Point – DP-28**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-10	**10YR 2/2**	**100**					**Gravelly sandy loam**	**With cobbles**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

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

Restrictive Layer (if present):

Type: __Fill material_____

Depth (inches): ____10" BGS_____

Hydric soil present? Yes ☐ No ☒

Remarks: **Compact fill layer at 10 inches below ground surface**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

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DP- 29

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Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E – parcel number 0324059066**	Sampling Date:	**6/19/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **29**
Investigator:	**K. Crandall, R. Kahlo**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**

Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **Concave**
Subregion (LRR): **A**	Lat:	Long: Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**

Are climatic/hydrologic conditions on the site typical for this time of year?	☐ Yes	☒ No	(If no, explain in remarks.)
Are "Normal Circumstances" present on the site?	☒ Yes	☐ No	
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Soils Present?	Yes	☒	No	☐	**Is the Sampling Point within a Wetland?** Yes ☒ No ☐
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: **Wetland EB15 inpit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2. ***Scirpus microcarpus***	**25**	**N**	**OBL**
3. ***Galium sp.***	**25**	**N**	**FAC***
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= 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:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed**

SOIL **Sampling Point – DP-29**

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
0-8	**10YR 3/2**	**100**					**Sandy loam**	
8-16	**5GY 3/1**	**90**	**7.5YR 4/4**	**10**	**C**	**M, PL**	**Loamy coarse sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**14 BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-30

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E – parcel number 0324059066**	Sampling Date:	**6/19/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **30**
Investigator:	**K. Crandall, R. Kahlo**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**

Landform (hillslope, terrace, etc): **terrace**	Slope (%): **0**	Local relief (concave, convex, none): **Concave**
Subregion (LRR): **A**	Lat:	Long: Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**

Are climatic/hydrologic conditions on the site typical for this time of year?	☐ Yes	☒ No	(If no, explain in remarks.)
Are "Normal Circumstances" present on the site?	☒ Yes	☐ No	
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Soils Present?	Yes	☒	No	☐	**Is the Sampling Point within a Wetland?** Yes ☒ No ☐
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: **Wetland EB16 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Rubus spectabilis***	**25**	**Y**	**FAC**
2. ***Ribes lacustre***	**15**	**Y**	**FAC**
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**80**	**Y**	**FACW**
2. ***Pteridium aquilinum***	**10**	**N**	**FACU**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**20**	**Y**	**FACU**
2.			
	20	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**75**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-30**

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
0-8	**10YR 2/2**	**100**					**Sandy loam**	
8-16	**5Y 4/1**	**100**					**Gravelly loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**12 BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 31

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E – parcel number 0324059066**	Sampling Date:	**6/19/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **31**
Investigator:	**K. Crandall, R. Kahlo**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB17 in-pit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 1m diam.)				
1.	***Phalaris arundinacea***	**95**	**Y**	**FACW**
2.	***Galium sp.***	**15**	**N**	**FAC***
3.	***Scirpus microcarpus***	**15**	**N**	**OBL**
4.	***Typha latifolia***	**10**	**N**	**OBL**
5.	***Juncus effusus***	**5**	**N**	**FACW**
6.				
7.				
8.				
9.				
10.				
11.				
		140	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= 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: **1** (B)
Percent of Dominant Species that are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***presumed FAC**

SOIL **Sampling Point – DP-31**

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
0-9	**10YR 2/2**	**100**					**Loam**	
9+	**10Y 4/1**	**93**	**10YR 4/3**	**7**	**C**	**M**	**Gravelly loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

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

Restrictive Layer (if present):

Type: ___Fill material_____

Depth (inches): ____9 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**9 BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 32

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E – parcel number 0324059066**	Sampling Date:	**6/19/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **32**
Investigator:	**K. Crandall**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **Convex**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes ☐	No ☒	**Is the Sampling Point within a Wetland?**	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **Out-pit near EB17**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Unknown field grass(es)***	**80**	**Y**	**FAC***
2. ***Holcus lanatus***	**20**	**N**	**FAC**
3. ***Plantago lanceolata***	**5**	**N**	**FACU**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**50**	**Y**	**FACU**
2.			
	50	= 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:	**2**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: ***Presumed**

SOIL **Sampling Point – DP-32**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-10	**2.5Y 3/2**	**100**					**Gravelly sandy loam**	**Very compact**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Compact; could not dig below 10 inches**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks: **Dry**

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DP- 33

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment E, parcel number 0324059066**	Sampling Date:	**6/24/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **33**
Investigator:	**K. Crandall, R. Kahlo**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30%**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB18 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**75**	**Y**	**FAC**
2.			
3.			
4.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Populus balsamifera* (sapling)**	**15**	**Y**	**FAC**
2. ***Alnus rubra* (sapling)**	**10**	**Y**	**FAC**
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Athyrium cyclosorum***	**5**	**Y**	**FAC**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**50**	**Y**	**FACU**
2. ***Solanum dulcamara***	**80**	**Y**	**FAC**
	130	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**5**	(A)
Total Number of Dominant Species Across All Strata:	**6**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**83**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-33**

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
0-7	**7.5YR 2/1**	**100**					**Loam**	
7-11	**2.5Y 3/2**	**95**	**10YR 4/6**	**5**	**C**	**M**	**Gravelly sandy clay loam**	
11-16	**2.5Y 3/2**	**80**	**7.5YR3/4**	**20**	**C**	**M**	**Gravelly sandy clay loam**	**With more gravel than previous layer**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☒	No ☐	Depth (in):	**0.5 AGS***
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **AGS = Above ground surface**

***Appears to be coming from shallow groundwater seeps.**

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DP- 34

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Kirkland, Washington 98033
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Project Site:	**Segment E, parcel number 0324059066**	Sampling Date:	**6/24/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **34**
Investigator:	**K. Crandall, R. Kahlo**	City/County:	**Bellevue**
Sect., Township, Range:	S **03** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgD – Alderwood gravelly sandy loam, 15-30%**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland EB19 in-pit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= 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:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-34**

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	**10YR 2/2**	**100**					**Gravelly sandy loam**	
4-9	**2.5Y 3/2**	**85**	**7.5YR 3/3**	**15**	**C**	**M**	**Loam**	
9-14	**2.5Y 3/2**	**75**	**5YR 3/4**	**25**	**C**	**M**	**Gravelly sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0-9 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

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WETLAND DETERMINATION DATA FORM

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DP- 35

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Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 5453300320**	Sampling Date:	**7/1/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **35**
Investigator:	**R. Kahlo, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **8**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **EvD, Everett gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☒ No ☐
Hydric Soils Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **Wetland JB01 inpit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Carex rostrata***	**80**	**Y**	**OBL**
2. ***Lotus corniculatus***	**60**	**Y**	**FAC**
3. ***Scirpus microcarpus***	**10**	**N**	**OBL**
4. ***Phalaris arundinacea***	**5**	**N**	**FACW**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	155 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-35**

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	**10YR 2/1**	**100**					**Sandy clay loam**	
4-12	**2.5Y 3/1**	**100**					**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**4 BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**Throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 36

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J Parcel 5453300320**	Sampling Date:	**6/15/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **36**
Investigator:	**R. Kahlo, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **10** T **24** R **05**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **25**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **EvD, Everett gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes ☐	No ☒	**Is the Sampling Point within a Wetland?**	Yes ☐ No ☒
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **Wetland JB01 outpit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Salix spp. (hybrid)***	**15**	**Y**	**FACW***
2.			
3.			
4.			
5.			
	15	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Equisetum telmateia***	**60**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**90**	**Y**	**FACU**
2.			
	90	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**67**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed**

SOIL **Sampling Point – DP-36**

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
0-10	**2.5Y 3/2**	**100**	**None**				**Sandy loam**	
10-14	**2.5Y 4/3**	**100**	**None**				**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

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DP- 37

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Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 7855801770**	Sampling Date:	**7/20/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **37**
Investigator:	**K. Crandall, M. Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **15** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **20**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **BeD - Beausite gravelly sandy loam, 15-30% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland JB02 in-pit; wetland JB03 very similar in character. Located adjacent to Somerset Pl SE.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Carex obnupta***	**20**	**Y**	**OBL**
2. ***Equisetum telmateia***	**15**	**Y**	**FACW**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum: 85

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-37**

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
0-12	**10YR 2/2**	**100**					**Loam**	
12-16	**10YR 2/2**	**35**					**Gravelly sandy loam**	**Mixed matrix**
	10Y 4/1	**60**	**10YR 4/6**	**5**	**C**	**M, PL**	**Gravelly sandy loam**	**Mixed matrix**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐ No ☒	Depth (in):	
Water Table Present?	Yes ☒ No ☐	Depth (in):	**7 BGS**
Saturation Present? (includes capillary fringe)	Yes ☒ No ☐	Depth (in):	**throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Visually saturated at surface. Groundwater seeping at 7 inches below ground surface (BGS).**

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DP- 38

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 2268400270**	Sampling Date:	**8/11/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **38**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland JB04 in-pit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Cornus alba***	**10**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Typha latifolia***	**50**	**Y**	**OBL**
2. ***Juncus effusus***	**30**	**Y**	**FACW**
3. ***Athyrium cyclosorum***	**15**	**N**	**FAC**
4. ***Scirpus microcarpus***	**10**	**N**	**OBL**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**15**	**Y**	**FACU**
2.			
	15	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**75**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-38**

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
0-8	**7.5YR 2/2**	**100**					**Loam**	**Some organic content**
8-16	**5G 4/1**	**70**					**Gravelly sandy loam**	**Mixed matrix**
	10 YR 3/2	**30**					**Gravelly sandy loam**	**Mixed matrix**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**Throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

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WETLAND DETERMINATION DATA FORM

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DP- 39

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 2268400270**	Sampling Date:	**8/11/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **39**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **45**	Local relief (concave, convex, none): **None**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC – Alderwood gravelly sandy loam, 8-15% slopes**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☐ No ☒
Hydric Soils Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **Out-pit near Wetland JB04**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**40**	**Y**	**FACW**
2. ***Juncus effusus***	**20**	**Y**	**FACW**
3. ***Dipsacus fullonum***	**5**	**N**	**FAC**
4. ***Equisetum telmateia***	**5**	**N**	**FACW**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**70**	**Y**	**FACU**
2.			
	70	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**67**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-39**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-6	**10YR 4/3**	**100**					**Gravelly sandy loam**	**Very compact**

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Soils very compact; difficult to dig beyond six inches.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 40

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 2124059001**	Sampling Date:	**8/11/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **40**
Investigator:	**Katy Crandall, Mike Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10-20**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and kitsap soils, very steep**		NWI classification: **Click here to enter text.**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland JB05 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Alnus rubra***	**20**	**Y**	**FAC**
2. ***Salix sitchensis***	**15**	**Y**	**FACW**
3.			
4.			
5.			
	35 = Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**65**	**Y**	**FACW**
2. ***Athyrium cyclosorum***	**40**	**Y**	**FAC**
3. ***Equisetum telmateia***	**15**	**N**	**FACW**
4. ***Juncus effusus***	**5**	**N**	**FACW**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	125 = Total Cover		
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**50**	**Y**	**FAC**
2.			
	50 = Total Cover		
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**4**	(A)
Total Number of Dominant Species Across All Strata:	**5**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**80**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-40**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-10	**10YR 3/2**	**90**	**7.5YR 3/4**	**10**	**C**	**M**	**Gravelly sandy loam**	**Roots**
10-16	**10G 5/1**	**85**	**10YR 5/8**	**15**	**C**	**PL, M**	**Silty loam**	**High silt content**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 41

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 2124059071**	Sampling Date:	**9/9/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **41**
Investigator:	**K. Crandall, A. Hoenig, R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and kitsap soils, very steep**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland JB06 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 1m diam.)				
1.	***Phalaris arundinacea***	**80**	**Y**	**FACW**
2.	***Juncus effusus***	**30**	**Y**	**FACW**
3.	***Circium arvense***	**10**	**N**	**FAC**
4.	***Equisetum telmateia***	**2**	**N**	**FACW**
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		122	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: **Recently mowed.**

SOIL **Sampling Point – DP-41**

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
0-8	**7.5YR 3/2**	**100**					**Loam**	
8-12	**10YR 3/2**	**96**	**7.5YR 4/6**	**4**	**C**	**M**	**Gravelly sandy loam**	**Coarse rock and cobble**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Damp, not saturated.**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 42

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 2124059071**	Sampling Date:	**9/9/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **42**
Investigator:	**K. Crandall, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **slightly concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and kitsap soils, very steep**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland JB07 in-pit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**70**	**Y**	**FACW**
2. ***Scirpus microcarpus***	**40**	**Y**	**OBL**
3. ***Juncus effusus***	**10**	**N**	**FACW**
4. ***Athyrium cyclosorum***	**5**	**N**	**FAC**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	125 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

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

Prevalence Index Worksheet

Total % Cover of		Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: **Recently mowed.**

SOIL **Sampling Point – DP-42**

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
0-6	**10YR 2/2**	**100**					**Loam**	**Roots**
6-12	**10YR 3/1**	**98**	**10YR 5/6**	**2**	**C**	**M**	**Gravelly sandy loam**	**Large cobbles present**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Redox not distributed evenly.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Damp, not saturated**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 43

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 2124059071**	Sampling Date:	**9/9/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **43**
Investigator:	**K. Crandall, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **none**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and kitsap soils, very steep**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Soils Present?	Yes ☐	No ☒	**Is the Sampling Point within a Wetland?**	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **Out-pit between JB06 and JB07**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**90**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**5**	**Y**	**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:	**2**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: **Recently mowed**

SOIL **Sampling Point – DP-43**

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
0-5	**10YR 2/2**	**100**					**Loam**	
5-12	**10YR 2/1**	**99**	**10YR 4/6**	**<1**			**Sandy loam**	**Large cobbles and gravel present**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Redox isolated; very small percentage.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

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WETLAND DETERMINATION DATA FORM

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DP- 44

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment M, parcel number 2124059001**	Sampling Date:	**9/9/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **44**
Investigator:	**K. Crandall, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **hillslope**	Slope (%): **30**	Local relief (concave, convex, none): **convex**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and kitsap soils, very steep**		NWI classification: **NA**	
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No			
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?			
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 Sampling Point within a Wetland?**	Yes ☐	No ☒
Hydric Soils Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **Out-pit near wetland MB04**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Grass 1***	**50**	**Y**	**FAC***
2. ***Phalaris arundinacea***	**30**	**Y**	**FACW**
3. ***Grass 2***	**20**	**N**	**FAC***
4. ***Taraxicum officinale***	**5**	**N**	**FACU**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**3**	**N**	**FACU**
2.			
	3	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-44**

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
0-5	**2.5Y 3/3**	**100**					**Sandy loam**	
5-8	**2.5Y 4/3**	**97**	**7.5YR 4/6**	**3**	**CS**	**M**	**Loamy sand (coarse)**	
8-12	**7.5YR 3/2**	**100**					**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 45

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment M, parcel number 2124059001**	Sampling Date:	**9/9/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **45**
Investigator:	**K. Crandall, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **hillslope**	Slope (%): **30**	Local relief (concave, convex, none): **concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and Kitsap soils, very steep**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☒, Soil ☒, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland MB04 in-pit; area recently disturbed by construction activities.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinadea***	**60**	**Y**	**FACW**
2. ***Equisetum telmateia***	**30**	**Y**	**FACW**
3. ***Galium sp.***	**40**	**Y**	**FAC***
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	130 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC**

SOIL **Sampling Point – DP-45**

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
0-5	**10YR 2/2**	**100**					**Sandy loam**	
5-10	**10GY 3/1**	**80**	**7.5YR 5/8**	**20**	**CS**	**M, PL**	**Loamy sand**	
10-14	**5B 5/1** **5G_/1 3/1**	**45** **45**	**7.5YR 5/8** **7.5YR 3/6**	**5** **5**	**CS** **CS**	**M** **M**	**Loamy sand**	**Mixed matrix**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **throughout**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 46

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment J, parcel number 2124059001**	Sampling Date:	**9/9/2015**
Applicant/Owner:	**Puget Sound Energy**	Sampling Point:	DP- **46**
Investigator:	**K. Crandall, A. Hoenig**	City/County:	**Bellevue**
Sect., Township, Range:	S **21** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **hillslope/swale**	Slope (%): **5**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AkF – Alderwood and kitsap soils, very steep**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland JB08 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Populus balsamifera (seedlings)***	**20**	**Y**	**FAC**
2. ***Rubus spectabilis***	**10**	**Y**	**FAC**
3. ***Salix sitchensis***	**10**	**Y**	**FACW**
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Grass 1***	**10**	**Y**	**FAC***
2. ***Grass 2***	**10**	**Y**	**FAC***
3. ***Epilobium sp.***	**10**	**Y**	**FAC***
4. ***Equisetum telmateia***	**Trace**	**N**	**FACW**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**Trace**	**N**	**FACU**
2.			
	-	= Total Cover	

% Bare Ground in Herb Stratum: 50 (mulch)

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**6**	(A)
Total Number of Dominant Species Across All Strata:	**6**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Presumed FAC.**

SOIL **Sampling Point – DP-46**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	**2.5Y 3/1**	**50**	**7.5YR 4/6**	**50**	**C**	**M**	**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **4 inches of mulch on surface**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☐	No ☒	Depth (in):	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**10-12 BGS**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface. Saturation visible at soil surface nearby.**

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DP- 47

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Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment G2; Parcel # 5453300244**	Sampling Date:	**9/30/2015**
Applicant/Owner:	**PSE**	Sampling Point:	DP- **47**
Investigator:	**R. Whitson, M. Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **09** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **terrace**	Slope (%): **~1**	Local relief (concave, convex, none): **none**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **Everett-Alderwood gravelly sandy loam, 6-15% slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland G2B01 in-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**80**	**Y**	**FACW**
2. ***Typha latifolia***	**30**	**Y**	**OBL**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	110	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

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

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-47**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	**10YR 3/1**	**90**	**10YR 3/6**	**10**	**C**	**PL**	**Loam with org matter**	**Org root matter; greasy**
4-14	**10YR 3/1**	**80**	**7.5YR 4/6**	**20**	**C**	**PL**	**Silty loam**	**Slight H_2S odor**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐ No ☒	Depth (in):	
Water Table Present?	Yes ☒ No ☐	Depth (in):	**10" BGS**
Saturation Present? (includes capillary fringe)	Yes ☒ No ☐	Depth (in):	**surface**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **BGS = below ground surface**

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WETLAND DETERMINATION DATA FORM

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DP- 48

Project Site:	**Segment G2; Parcel # 5453300244**	Sampling Date:	**9/30/2015**
Applicant/Owner:	**PSE**	Sampling Point:	DP- **48**
Investigator:	**R. Whitson, M. Foster**	City/County:	**Bellevue**
Sect., Township, Range:	S **09** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **terrace**	Slope (%): **<1**	Local relief (concave, convex, none): **none**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **urban land**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Soils Present?	Yes	☐	No	☒	**Is the Sampling Point within a Wetland?** Yes ☐ No ☒
Wetland Hydrology Present?	Yes	☐	No	☒	

Remarks: **G2B01 Out-pit; adjacent to sidewalk and street**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**30**	**Y**	**FAC**
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**5**	**Y**	**FACU**
2.			
	5	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: **67** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-48**

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
0-10	**10YR 3/2**	**100**					**Sandy loam**	**Cobbles**
10-14	**10YR 4/2**	**100**					**Gravelly sandy loam**	**Cobbles**

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

[2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

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WETLAND DETERMINATION DATA FORM

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DP- 49

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment I, Parcel #: 7856590000**	Sampling Date:	**10/14/205**
Applicant/Owner:	**PSE**	Sampling Point:	DP- **49**
Investigator:	**R. Whitson, J. Palmer**	City/County:	**Bellevue**
Sect., Township, Range:	S **16** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **15**	Local relief (concave, convex, none): **none**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **Alderwood gravelly sandy loam, 8 to 15 percent slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☐	No ☒
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **Wetland IB02. Out-pit. Some garbage in the vicinity.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Betula pendula***	**40**	**Y**	**FAC**
2.			
3.			
4.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Ranunculus repens***	**95**	**Y**	**FAC**
2. ***Unknown mowed grass***	**5**	**N**	**FAC***
3. ***Polygonum cuspidatum***	**Trace**	**N**	**NL**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		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

☒ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***presumed FAC; NL = not listed**

SOIL **Sampling Point – DP-49**

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
0-6	**10YR 3/2**	**100**					**Loam**	
6-14	**10YR 4/2**	**97**	**10YR 4/6**	**3**	**C**	**M**	**Sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 50

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment I, Parcel #: 7856590000**	Sampling Date:	**10/14/205**
Applicant/Owner:	**PSE**	Sampling Point:	DP- **50**
Investigator:	**R. Whitson, J. Palmer**	City/County:	**Bellevue**
Sect., Township, Range:	S **16** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Depression**	Slope (%): **3**	Local relief (concave, convex, none): **concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **Alderwood gravelly sandy loam, 8 to 15 percent slopes**		NWI classification: **na**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland IB02. inpit.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Ranunculus repens***	**60**	**Y**	**FAC**
2. ***Unknown mowed grass***	**50**	**Y**	**FACW**
3. ***Phalaris arundinacea***	**40**	**Y**	**FAC**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Juncus effuses also present outside of plot.***

SOIL **Sampling Point – DP-50**

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
0-6	**10YR 2/1**	**100**					**Silty loam**	
6-12	**10YR 3/1**	**95**	**10YR 4/6**	**5**	**C**	**M**	**Sandy loam with large gravel**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Soil is so saturated that some of the redox may be obscured. Top layer very dark and also saturated. It may also have redox.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐ No ☒	Depth (in):	
Water Table Present?	Yes ☒ No ☐	Depth (in):	**5**
Saturation Present? (includes capillary fringe)	Yes ☒ No ☐	Depth (in):	**surface**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 51

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment I, Parcel #: 1624059023**	Sampling Date:	**10/23/2015**
Applicant/Owner:	**PSE**	Sampling Point:	DP- **51**
Investigator:	**R. Whitson, J. Palmer**	City/County:	**Bellevue**
Sect., Township, Range:	S **16** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **>20**	Local relief (concave, convex, none): **none**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **AgC - Alderwood gravelly sandy loam, 8 to 15 percent slopes**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☐	No ☒
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: **IB03 Outpit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1. ***Salix lasiandra***	**30**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Unknown meadow grass****	**95**	**Y**	**FAC**
2. ***Convolvulus arvensis***	**Trace**	**N**	**UPL**
3. ***Ranunculus repens***	**Trace**	**N**	**FAC**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 3m diam.)			
1. ***Rubus armeniacus***	**40**	**Y**	**FACU**
2.			
	40	= Total Cover	

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**67**	(A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***presumed FAC**

SOIL **Sampling Point – DP-51**

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	**10YR 3/2**	**100**					**Gravelly sandy loam**	**Moist, not saturated**
4-10	**2.5Y 5/3**	**49**	**10YR 4/4**	**2**	**C**	**M**	**Gravely sandy loam**	**Redox diffuse, moist not saturated**
4-10	**2.5Y 5/2**	**49**					**Gravely sandy loam**	
10-12	**2.5Y 4/2**	**99**	**10YR 4/6**	**1**	**C**	**M**	**Cemented silty sand**	**Moist, not saturated**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks: **Steep slope with *Acer macrophyllum* above. Well-drained, no hydrological indicators present.**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 52

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment I, Parcel #: 1624059023**	Sampling Date:	**10/23/2015**
Applicant/Owner:	**PSE**	Sampling Point:	DP- **52**
Investigator:	**R. Whitson, J. Palmer**	City/County:	**Bellevue**
Sect., Township, Range:	S **16** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope**	Slope (%): **10**	Local relief (concave, convex, none): **none**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **Norma sandy loam**		NWI classification: **NA**	

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

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **IB03 In-pit**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m diam.)			
1. ***Ranunculus repens***	**90**	**Y**	**FAC**
2. ***Juncus effusus***	**20**	**N**	**FACW**
3. ***Convolvulus arvensis***	**Trace**	**N**	**UPL**
4. ***Lotus corniculatus***	**Trace**	**N**	**FAC**
5. ***Equisetum telmateia***	**3**	**N**	**FACW**
6.			
7.			
8.			
9.			
10.			
11.			
	113 = Total Cover		
Woody Vine Stratum (Plot size: 3m diam.)			
1.			
2.			
	= 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: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP-52**

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
0-6	**10YR 3/2**	**100**					**Sandy loam**	
6-14	**2.5Y 5/2**	**93**	**10YR 4/6**	**7**	**C**	**M, PL**	**Sandy loam**	**With some clay**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ 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: **Large cobble in bottom layer. DP is near a French drain. Soils moist and not saturated.**

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

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

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

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 53

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Segment I, Parcel #: 1624059023 (Newport HS)**	Sampling Date:	**10/23/2015**
Applicant/Owner:	**PSE**	Sampling Point:	DP- **53**
Investigator:	**R. Whitson**	City/County:	**Bellevue**
Sect., Township, Range:	S **16** T **24N** R **05E**	State:	**WA**
Landform (hillslope, terrace, etc): **Hillslope/terrace**	Slope (%): **10**	Local relief (concave, convex, none): **Concave**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **Urban land**		NWI classification: **NA**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
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 Sampling Point within a Wetland?**	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: **Wetland IB04**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Convolvulus arvensis***	**Trace**	**N**	**UPL**
2. ***Phalaris arundinacea***	**100**	**Y**	**FACW**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. ***Rubus armeniacus***	**3**	**N**	**FACU**
2.			
	3	= 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: **1** (B)
Percent of Dominant Species that are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index Worksheet

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

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***Rubus armeniacus*** **rooted partially out.** ***Juncus effusus*** **nearby.**

SOIL **Sampling Point – DP-53**

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
0-8	**2.5Y 4/1**	**100**					**Gravelly silt**	**With cobble**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☒ 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: **Too wet to see redox. Swale feature densely vegetated with *Phalaris arundinacea*, *Juncus effusus*, and *Typha spp.***

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 (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ 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 & 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

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):	
Water Table Present?	Yes ☒	No ☐	Depth (in):	**1" BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**Surface**

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: **Seeping in at 1 inch. BGS = below ground surface**

APPENDIX C

Wetland Rating Forms

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): Wetland CB01 Date of site visit: 6/1/2015

Rated by: Katy Crandall, Mike Foster Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 27 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	10
Score for Habitat Functions	15
TOTAL score for functions	**31**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**6**

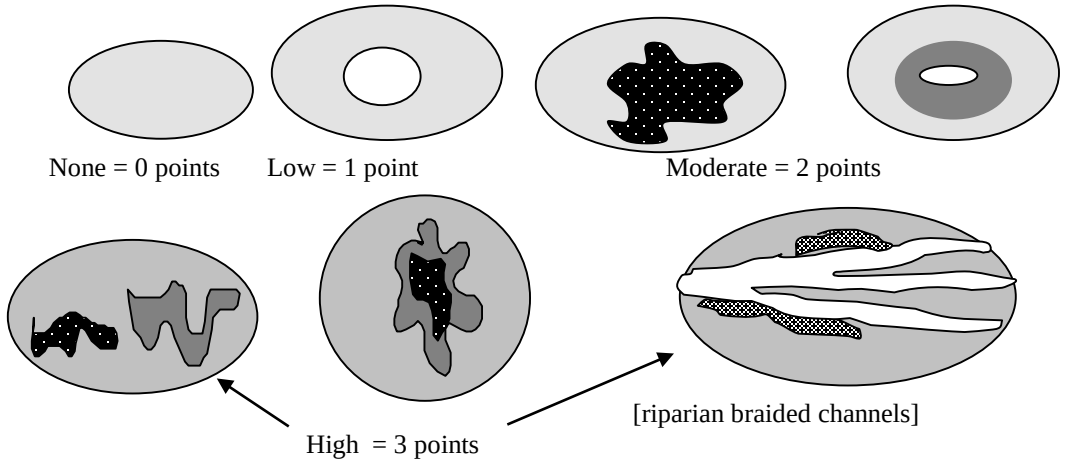
S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 68)***
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems* ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

S 4 – *Presumably wetland drains to urban stream with flooding problems.

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

Note: Only a portion of Wetland CB01 was investigated for this study. Aerial photographs and various online mapping applications were used to characterize off-site portions of the wetlands.

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	3
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 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 ☐ 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.*	2
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	9

H 1.5 – Large downed wood and standing snags are presumed to exist in off-site portions of the wetlands.

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	1

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	6
TOTAL for H1 from page 14	9
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	15

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? 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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth	
YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions?	
☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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.	**Cat. II**
☐ The wetalnd is larger than 1/10 acre (4350 square feet)	
YES = Category I NO = Category II	

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB01 Date of site visit: 5/29/2015

Rated by: K. Crandall, R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 27 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	10
Score for Habitat Functions	15
TOTAL score for functions	**31**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

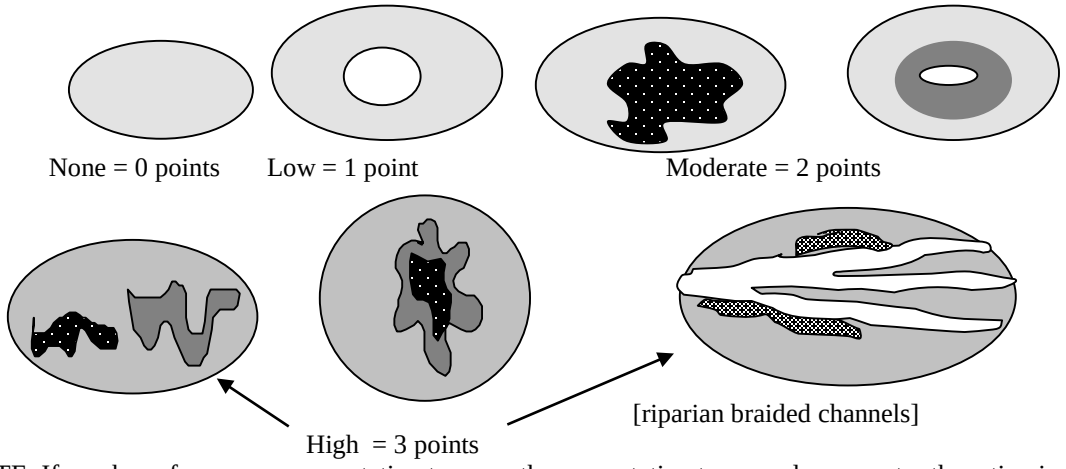
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**6**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	3
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	7

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	2
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	7
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	15

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB02 Date of site visit: 6/3/2015

Rated by: K. Crandall, M. Foster Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 34 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	10
Score for Habitat Functions	16
TOTAL score for functions	**32**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

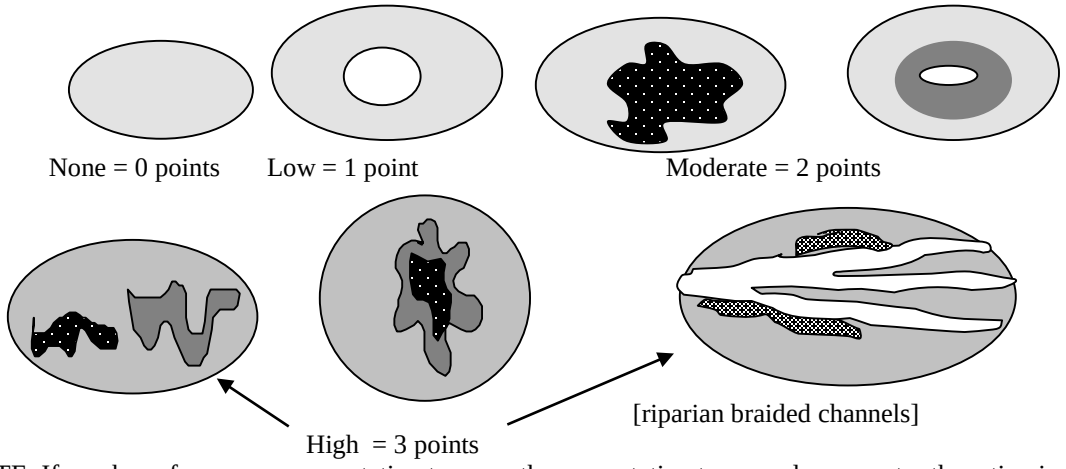
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft*.....points = 3 Slope is 1% - 2% .....points = 2 Slope is 2% - 5% .....points = 1 Slope is greater than 5% .....points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area.....points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area .....points = 3 Dense, woody, vegetation > ½ of area .....points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area .....points = 1 Does not meet any of the criteria above for vegetation .....points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**6**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☒ Other: <u>Golf course downslope</u> *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	2

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	3
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 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 ☐ 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*	9

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	9
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	16

H 2.4 – No other wetlands mapped or observed.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

DSD 002949

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? 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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB03 Date of site visit: 6/3/2015

Rated by: K. Crandall, M. Foster Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 34 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	16
Score for Habitat Functions	9
TOTAL score for functions	**37**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

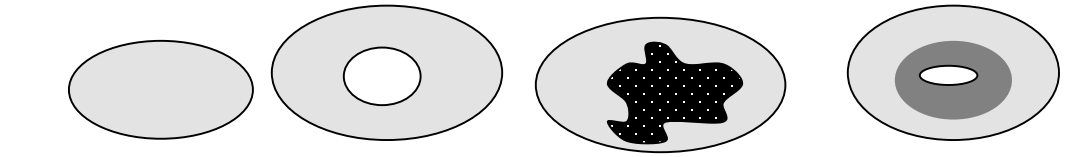
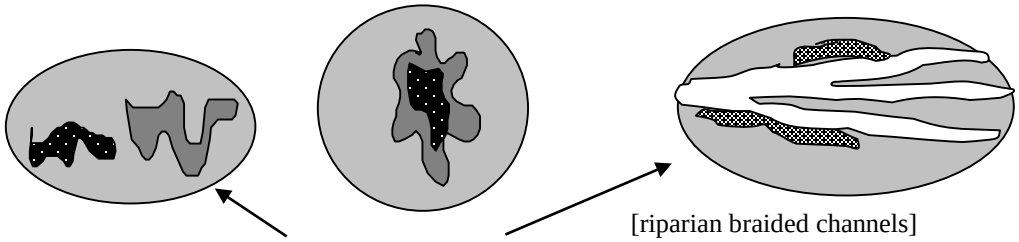
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft*.....points = 3 Slope is 1% - 2% .....points = 2 Slope is 2% - 5% .....points = 1 Slope is greater than 5% .....points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area.....points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area .....points = 3 Dense, woody, vegetation > ½ of area .....points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area .....points = 1 Does not meet any of the criteria above for vegetation .....points = 0	6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**12**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	2

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

DSD 002963

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

DSD 002964

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB04 Date of site visit: 6/3/2015

Rated by: K. Crandall Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 34 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	14
Score for Hydrologic Functions	10
Score for Habitat Functions	9
TOTAL score for functions	**33**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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.

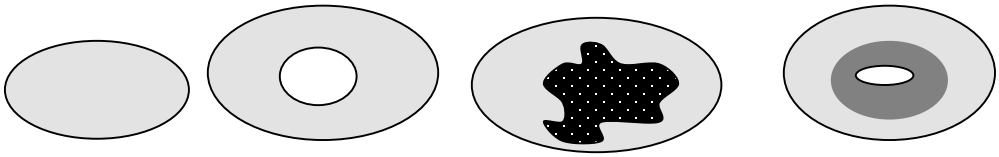
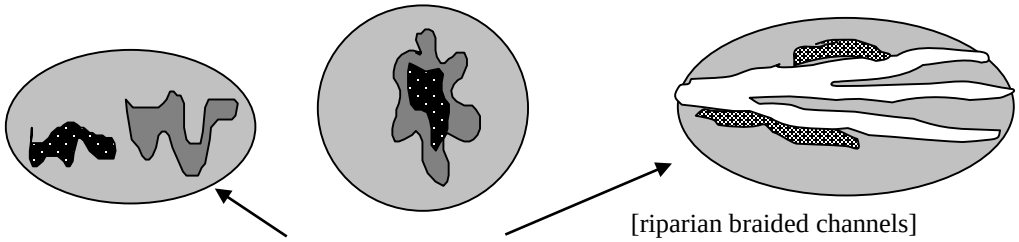
HGM classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	**Depressional and Flats Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	2
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area.....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	0
D	**Total for D 1** *Add the points in the boxes above*	7
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>2</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**14**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	*(see p. 46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	2
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	5
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☒ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**10**

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	2

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB05 Date of site visit: 6/3/2015

Rated by: K. Crandall Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 34 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	10
Score for Habitat Functions	12
TOTAL score for functions	**28**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

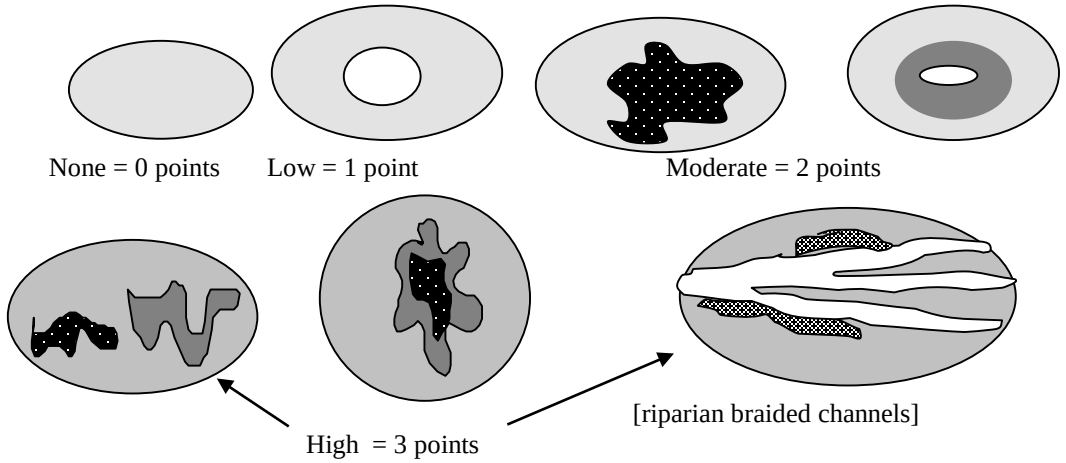
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**6**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types 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**	2
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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	5

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	5
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	12

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

DSD 002994

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth	
YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions?	
☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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.	**Cat. II**
☐ The wetalnd is larger than 1/10 acre (4350 square feet)	
YES = Category I NO = Category II	

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB06 Date of site visit: 6/3/2015

Rated by: K. Crandall Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 34 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	16
Score for Habitat Functions	11
TOTAL score for functions	**39**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

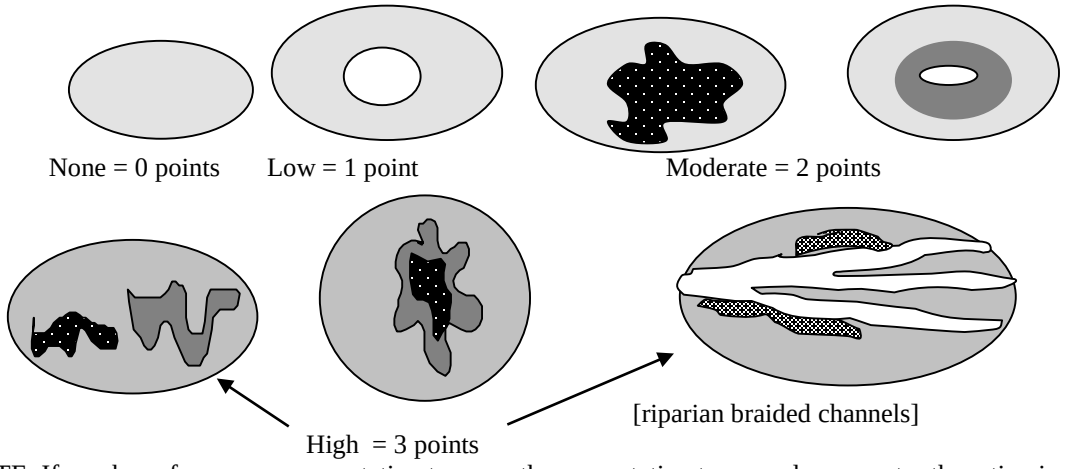
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 S 1 by S 2 ***Add score to table on p. 1***	**12**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	11

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB07 Date of site visit: 6/15/2015

Rated by: K. Crandall, R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	0
Score for Hydrologic Functions	4
Score for Habitat Functions	8
TOTAL score for functions	**11**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	0
S	**Total for S 1** *Add the points in the boxes above*	0
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 S 1 by S 2 ***Add score to table on p. 1***	**0**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....points = 3 Dense, uncut, **rigid** vegetation > 1/4 area .....points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid .....points = 0	0
S	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	**Total for S 3** *Add the points in the boxes above*	2
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**4**

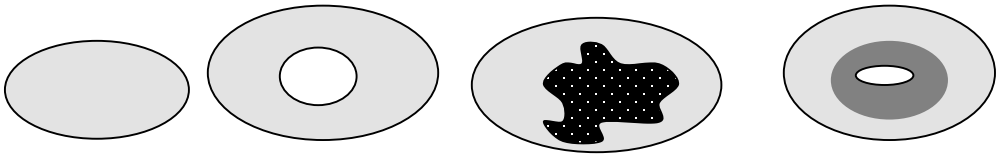
Comments

S 4 – Surface water drains to a ditch down-slope.

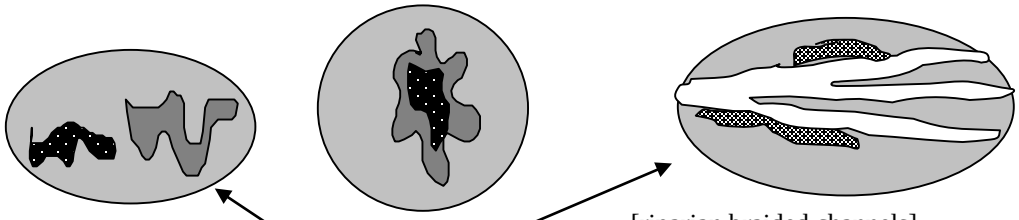
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	0
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

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

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



High = 3 points [riparian braided channels]

NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".

0

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 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

☐ 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.

0

H 1. TOTAL Score - potential for providing habitat

Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

1

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	1
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	8

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB08 Date of site visit: 6/8/2015

Rated by: K. Crandall, N. Lund Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 34 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	10
Score for Habitat Functions	10
TOTAL score for functions	**32**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

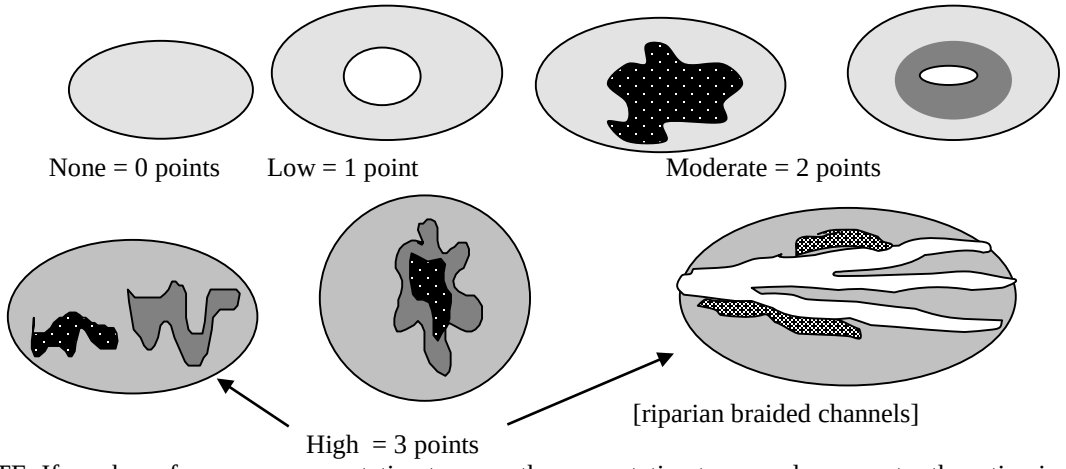
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**12**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☒ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	2

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	10

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth	
YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions?	
☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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.	**Cat. II**
☐ The wetalnd is larger than 1/10 acre (4350 square feet)	
YES = Category I NO = Category II	

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB09 Date of site visit: 6/8/2015

Rated by: K. Crandall N. Lund Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	20
Score for Hydrologic Functions	6
Score for Habitat Functions	15
TOTAL score for functions	**41**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

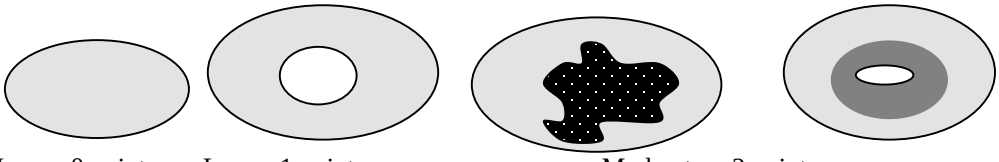
D	Depressional and Flats Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	1
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	4
D	**Total for D 1** *Add the points in the boxes above*	10
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>2</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**20**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	3
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☒ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**6**

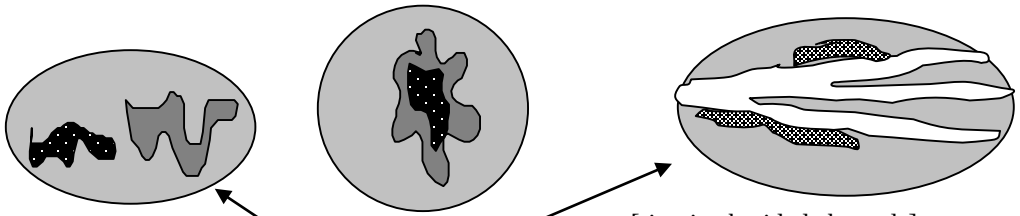
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☒ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	2
H 1.2. <u>Hydroperiods</u> ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☐ Saturated only — 1 types present…….points = 0 ☒ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle* If you counted: > 19 species.....points = 2 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

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

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



High = 3 points [riparian braided channels]

NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".

2

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 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

☐ 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

7

Wetland name or number: EB09

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing)..... 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

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?

YES = **1 point** NO = **0 points**

0

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?
(NOTE: the connections do not have to be relatively undisturbed)

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres).

☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.

4

Wetland name or number: EB09

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	7
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	15

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 ☒

Cat. I

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

SC 3.0 Bogs ***(see p. 87)***

Does the wetland (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB10 Date of site visit: 6/15/2015

Rated by: K. Crandall, N. Lund Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	16
Score for Habitat Functions	14
TOTAL score for functions	**42**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

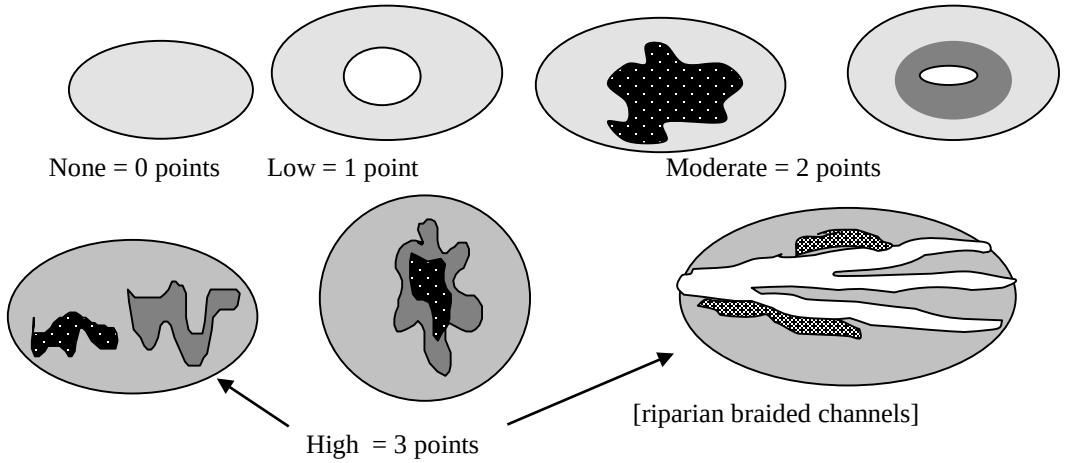
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**12**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types 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**	2
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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	2
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	6

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	6
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	14

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? 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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB11 Date of site visit: 6/5/2015

Rated by: K. Crandall R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	0
Score for Habitat Functions	16
TOTAL score for functions	**28**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

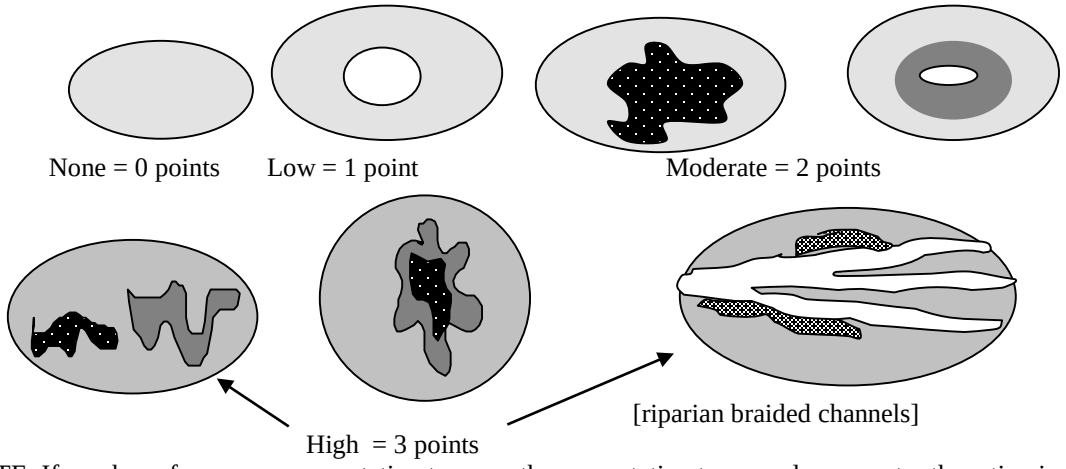
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	**Depressional and Flats Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	1
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	0
D	**Total for D 1** *Add the points in the boxes above*	6
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>2</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**12**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	0*
D	**Total for D 3** *Add the points in the boxes above*	1
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☒ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**0**

*D3.3 – Presumed based on the presence of two culverts that drain into wetland from adjacent areas.

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types 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**	2
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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	2
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 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 ☐ 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*	8

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	8
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	16

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB12 Date of site visit: 6/5/2015

Rated by: K. Crandall, R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	4
Score for Hydrologic Functions	10
Score for Habitat Functions	15
TOTAL score for functions	**29**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

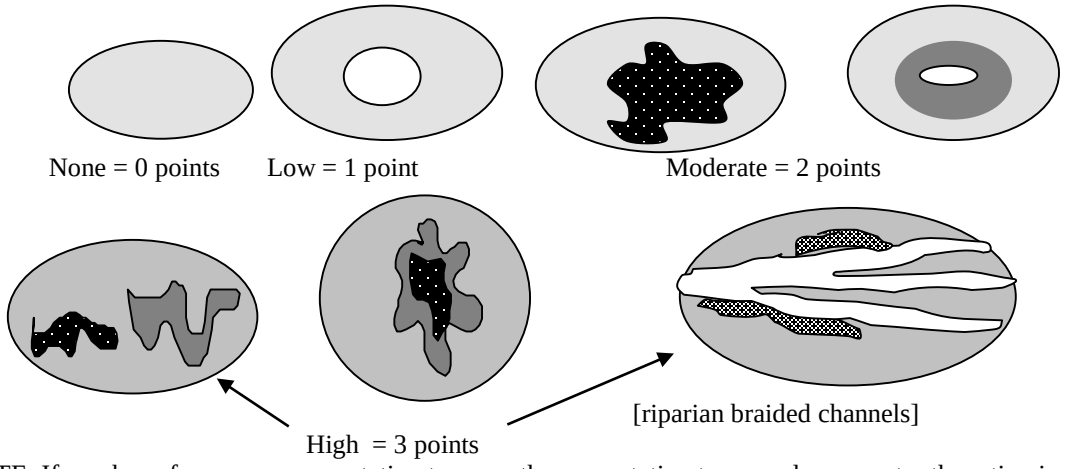
S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	2*
S	**Total for S 1** *Add the points in the boxes above*	2
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**4**

*Including Himalayan blackberry as "woody."

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the potential to reduce flooding and 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	2
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 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 ☐ 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*	7

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	7
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	15

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB13 Date of site visit: 6/15/2015

Rated by: K. Crandall, R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	10
Score for Habitat Functions	18
TOTAL score for functions	**40**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

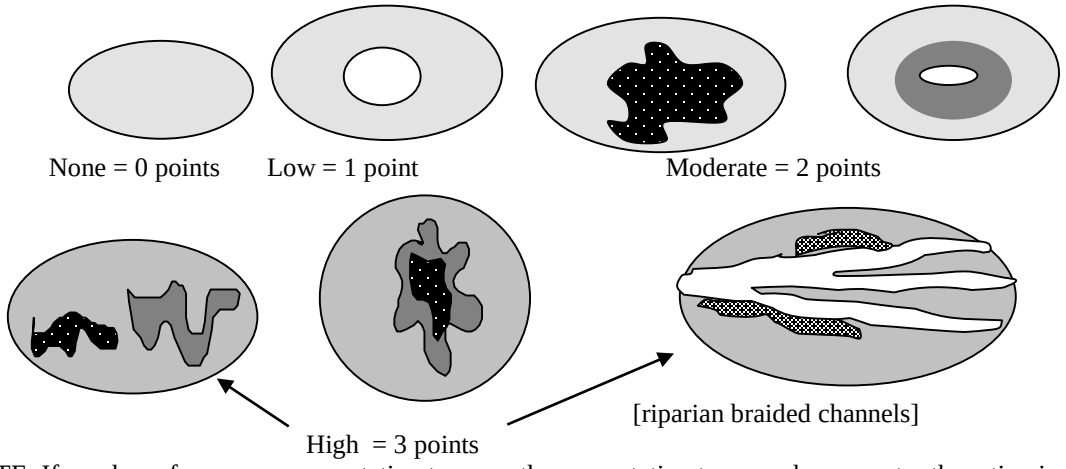
S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**12**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

S 3.1 – Shaded reed canarygrass and water parsley not considered rigid.

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	3
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	7

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	11
TOTAL for H1 from page 14	7
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	18

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? 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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB14 Date of site visit: 6/15/2015

Rated by: K. Crandall, R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	2
Score for Hydrologic Functions	10
Score for Habitat Functions	15
TOTAL score for functions	**27**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

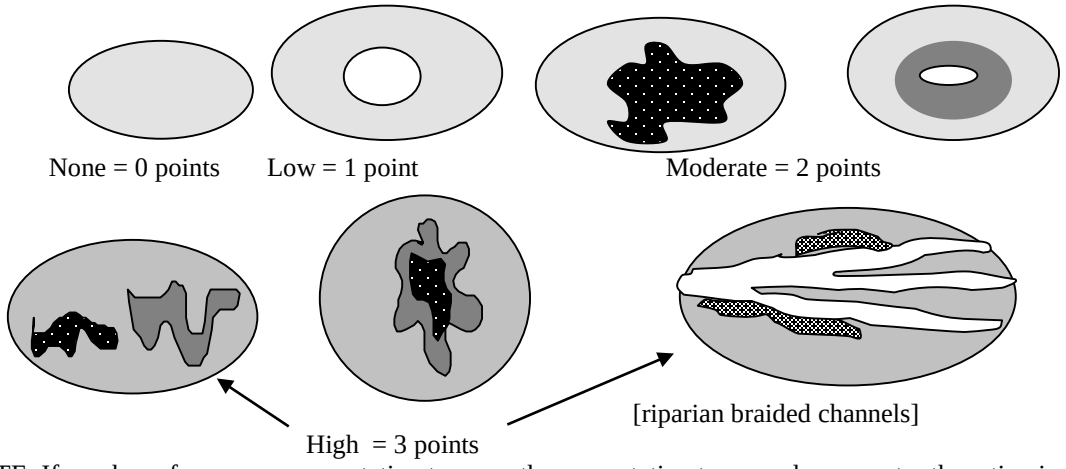
S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	2*
S	**Total for S 1** *Add the points in the boxes above*	2
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ 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 <u>1</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**2**

*Including Himalayan blackberry as "woody."

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the potential to reduce flooding and 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	0
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	3

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	3
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	12
TOTAL for H1 from page 14	3
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	15

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB15 Date of site visit: 6/19/2015

Rated by: K. Crandall, R. Kahlo Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	4
Score for Hydrologic Functions	16
Score for Habitat Functions	17
TOTAL score for functions	**37**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

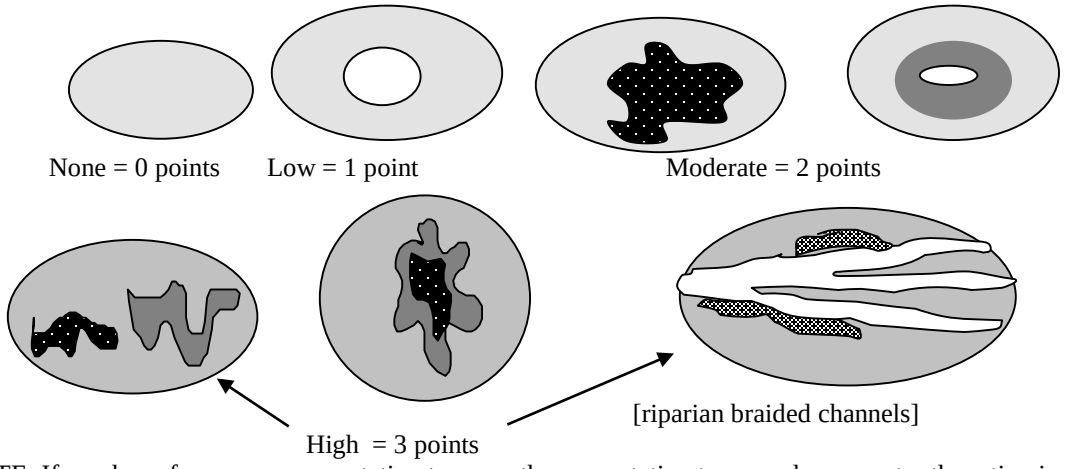
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	2
S	**Total for S 1** *Add the points in the boxes above*	2
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**4**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☒ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	2
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	6

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	11
TOTAL for H1 from page 14	6
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	17

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

DSD 003144

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB16 Date of site visit: 6/19/2015

Rated by: K. Crandall, R. Kahlo Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 03 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	6
Score for Habitat Functions	18
TOTAL score for functions	**30**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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.

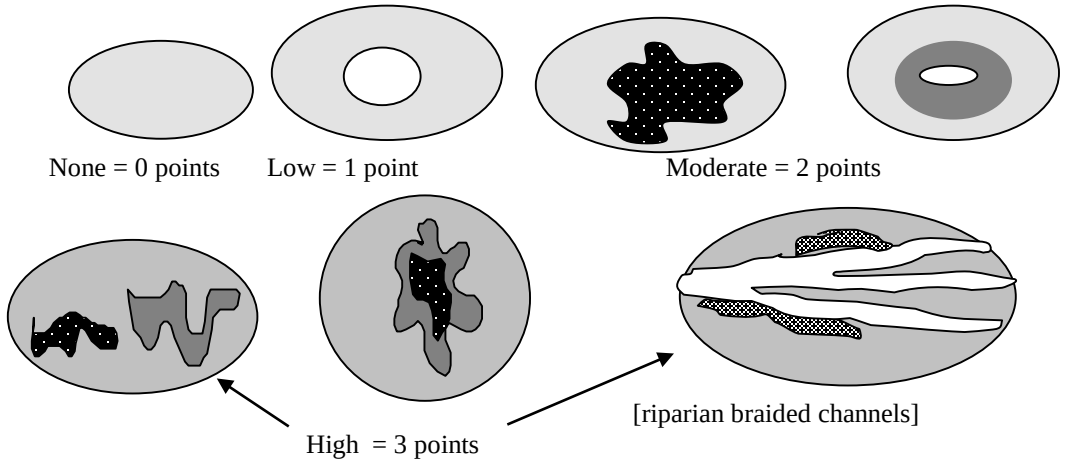
HGM classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	**Depressional and Flats Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	1
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	0
D	**Total for D 1** *Add the points in the boxes above*	6
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>1</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**6**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	3
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☒ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**6**

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☐ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	2
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	6

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	3
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	12
TOTAL for H1 from page 14	6
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	18

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB17 Date of site visit: 6/19/2015

Rated by: K. Crandall, R. Kahlo Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 03 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	6
Score for Habitat Functions	23
TOTAL score for functions	**35**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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.

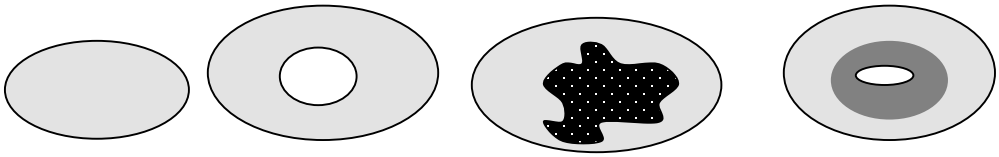
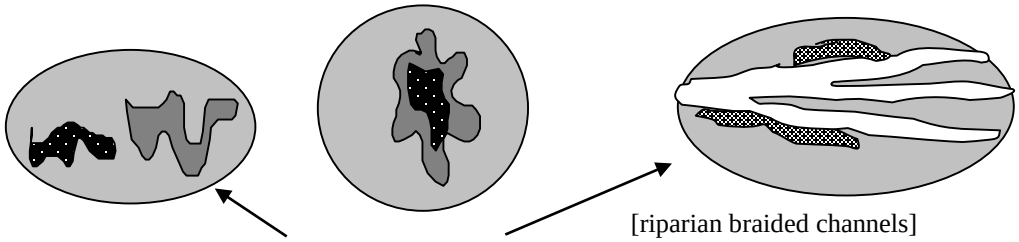
HGM classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	**Depressional and Flats Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	1
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	0
D	**Total for D 1** *Add the points in the boxes above*	6
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>1</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**6**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	3
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☒ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**6**

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☒ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	4
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types 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**	2
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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	3
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 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 ☐ 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.*	2
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	12

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	11
TOTAL for H1 from page 14	12
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	23

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB18 Date of site visit: 6/24/2015

Rated by: K. Crandall, R. Kahlo Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	4
Score for Hydrologic Functions	10
Score for Habitat Functions	13
TOTAL score for functions	**27**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

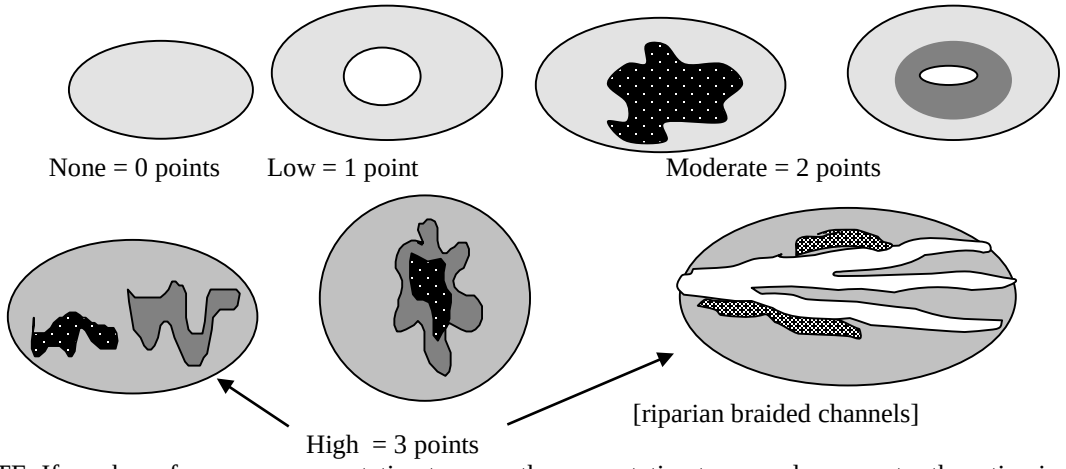
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	2
S	**Total for S 1** *Add the points in the boxes above*	2
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**4**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the potential to reduce flooding and 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 .....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	3
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	**Total for S 3** *Add the points in the boxes above*	5
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**10**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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*	3

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	10
TOTAL for H1 from page 14	3
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	13

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB19 Date of site visit: 6/24/2015

Rated by: K. Crandall, R. Kahlo Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 3 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	16
Score for Habitat Functions	11
TOTAL score for functions	**39**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

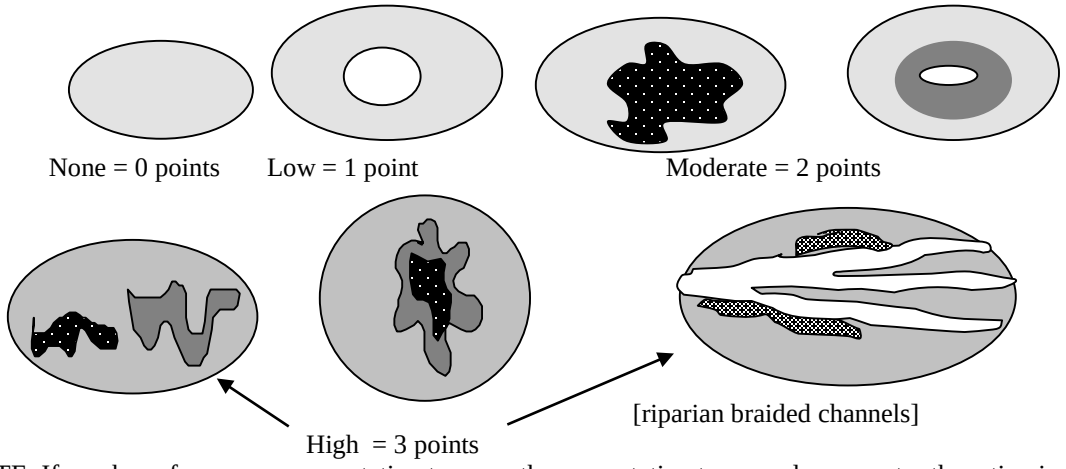
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**12**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	0
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	1

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	10
TOTAL for H1 from page 14	1
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	11

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland EB20 Date of site visit: 6/17/2015

Rated by: K. Crandall, R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 10 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	16
Score for Habitat Functions	8
TOTAL score for functions	**36**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

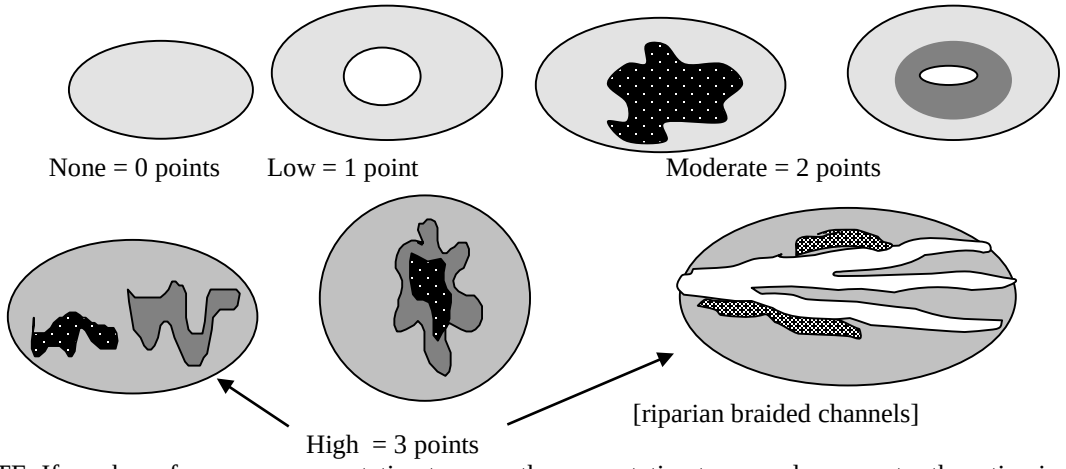
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**12**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems* ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	0
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	3

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	1

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	5
TOTAL for H1 from page 14	3
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	8

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? 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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland G2B01 Date of site visit: 9/30/2015

Rated by: R. Whitson, M. Foster Trained by Ecology? Yes ☒ No ☐ Date of Training 03/2015

SEC: 09 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	16
Score for Hydrologic Functions	26
Score for Habitat Functions	15
TOTAL score for functions	**57**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	X*	
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).** Coho salmonid use and breeding have been documented here.

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

DSD 003224

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

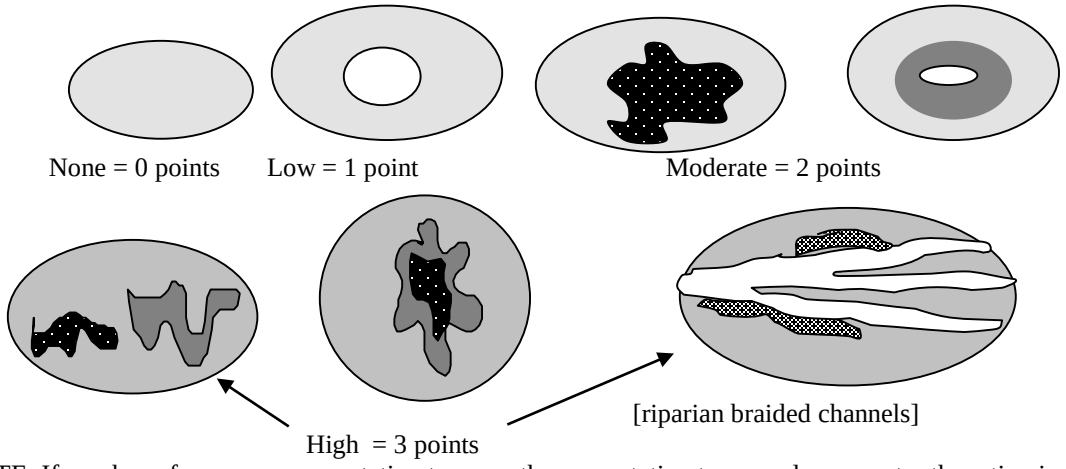
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

R	**Riverine and Freshwater Tidal Fringe Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
R	**R 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 52)***
R	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: Depressions cover >3/4 area of wetland.....points = 8 Depressions cover > 1/2 area of wetland.....points = 4 Depressions present but cover < 1/2 area of wetland.....points = 2 No depressions present.....points = 0	2
R	R 1.2 Characteristics of the vegetation in the wetland (areas with > 90% cover at person height): Forest or shrub > 2/3 the area of the wetland.....points = 8 Forest or shrub > 1/3 area of the wetland.....points = 6 Ungrazed, emergent plants > 2/3 area of wetland.....points = 6 Ungrazed emergent plants > 1/3 area of wetland.....points = 3 Forest, shrub, and ungrazed emergent < 1/3 area of wetland.....points = 0	6
R	**Total for R 1** *Add the points in the boxes above*	8
R	**R 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 53)*** 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.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality ☐ Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	**2** multiplier
R	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from R 1 by R 2 ***Add score to table on p. 1***	**16**

Comments

R	Riverine and Freshwater Tidal Fringe Wetlands	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	R 3. Does the wetland have the potential to reduce flooding and erosion?	***(see p. 54)***
R	R 3.1 Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (width of wetland)/(width of stream).* If the ratio is more than 20.....points = 9 If the ratio is between 10 – 20 .....points = 6 If the ratio is 5- <10 .....points = 4 If the ratio is 1- <5 .....points = 2 If the ratio is < 1 .....points = 1	6
R	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description.* (polygons need to have >90% cover at person height NOT Cowardin classes) Forest or shrub for >1/3 area OR Emergent plants > 2/3 area.....points = 7 Forest or shrub for > 1/10 area OR Emergent plants > 1/3 area.....points = 4 Vegetation does not meet above criteria.....points = 0	7
R	**Total for R 3** *Add the points in the boxes above*	13
R	**R 4. Does the wetland have the opportunity to reduce flooding and erosion?** ***(see p. 57)*** Answer YES if the wetland is in a location in the watershed where the flood storage, or 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.* ☒ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ☐ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 57) multiplier 2
R	**TOTAL - Hydrologic Functions** Multiply the score from R 3 by R 4 ***Add score to table on p. 1***	26

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types 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**	2
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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	2
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 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 ☐ 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.*	3
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	8

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	8
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	15

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? 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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth

YES = Category 1 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 surgace 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

Cat. I

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

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II

Cat. II

DSD 003236

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	

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): Wetland IB01 Date of site visit: 10/7/2015

Rated by: A. Hoenig Trained by Ecology? Yes ☒ No ☐ Date of Training 10/2015

SEC: 09 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	8
Score for Habitat Functions	12
TOTAL score for functions	**26**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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.

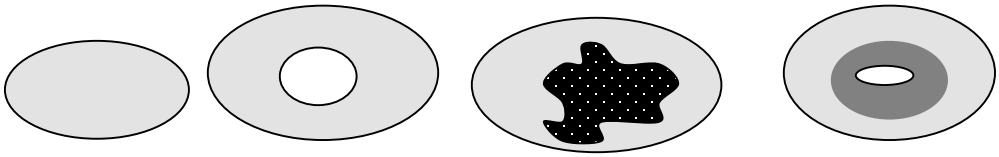
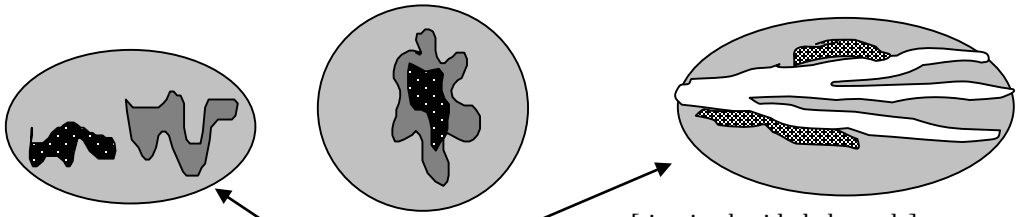
HGM classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	Depressional and Flats Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	<u>3</u>
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	0
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	0
D	**Total for D 1** *Add the points in the boxes above*	3
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>2</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**6**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	4
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	0
D	**Total for D 3** *Add the points in the boxes above*	4
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☒ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☒ Other <u>Drainage complaints in adjacent property</u> ☐ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**8**

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types 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**	2
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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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*	4

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	1

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

DSD 003247

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	12

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth

YES = Category 1 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 surgace 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

Cat. I

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

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II

Cat. II

DSD 003251

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	

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): Wetland IB02 Date of site visit: 10/14/2015

Rated by: R. Whitson, J. Palmer Trained by Ecology? Yes ☒ No ☐ Date of Training 03/2015

SEC: 16 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	8
Score for Hydrologic Functions	10
Score for Habitat Functions	7
TOTAL score for functions	**25**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

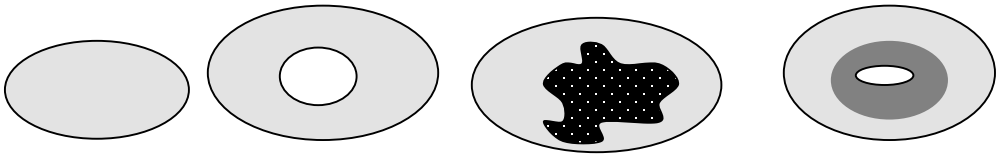
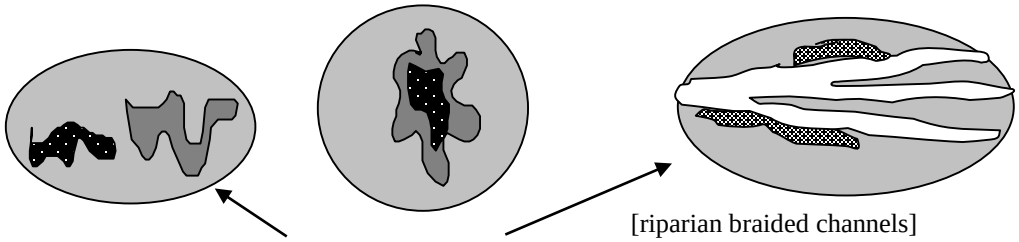
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	**Depressional and Flats Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	<u>2</u>
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	0
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	2
D	**Total for D 1** *Add the points in the boxes above*	4
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>2</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**8**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	*(see p. 46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	2
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	5
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☒ Other **__drainage complaints in downstream properties____** ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**10**

DSD 003258

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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*	3

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	0

DSD 003262

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	4
TOTAL for H1 from page 14	3
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	7

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

DSD 003264

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? YES = Category I NO ☐ is not a bog for purpose of rating	**Cat. I**

DSD 003265

SC 4.0 Forested Wetlands ***(see p. 90)***

Does the wetland 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth

YES = Category 1 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 surgace 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

Cat. I

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

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II

Cat. II

DSD 003266

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	

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): Wetland IB03 Date of site visit: 10/23/2015

Rated by: R. Whitson, J. Palmer Trained by Ecology? Yes ☒ No ☐ Date of Training 03/2015

SEC: 16 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	0
Score for Habitat Functions	6
TOTAL score for functions	**12**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

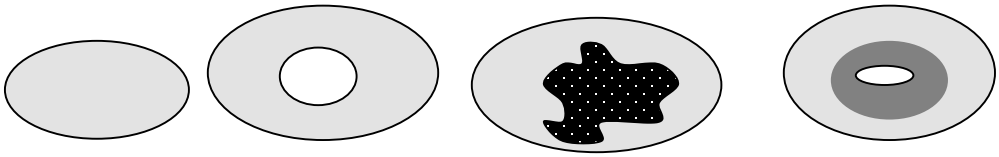
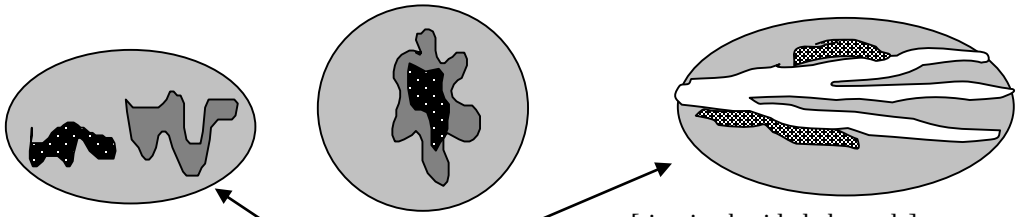
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**6**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....points = 3 Dense, uncut, **rigid** vegetation > 1/4 area .....points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid .....points = 0	0
S	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	0
S	**Total for S 3** *Add the points in the boxes above*	0
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☒ Other **<u>Wetland drains to a ditch where it might otherwise flood the road or school property</u>** *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**0**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	0
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	1

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	1

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	0

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	5
TOTAL for H1 from page 14	1
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	6

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth

YES = Category 1 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 surgace 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

Cat. I

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

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II

Cat. II

DSD 003281

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	

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): Wetland IB04 Date of site visit: 10/23/2015

Rated by: R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 03/2015

SEC: 16 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	16
Score for Hydrologic Functions	0
Score for Habitat Functions	9
TOTAL score for functions	**25**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	Depressional and Flats Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	<u>1</u>
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	2
D	**Total for D 1** *Add the points in the boxes above*	8
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>2</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**16**

D	Depresssional and Flats Wetlands	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	*(see p. 46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	0
D	**Total for D 3** *Add the points in the boxes above*	0
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☒ Other <u>Sheet flowing into parking lot and drainage complaints in downstream properties(iMap)</u> ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**0**

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

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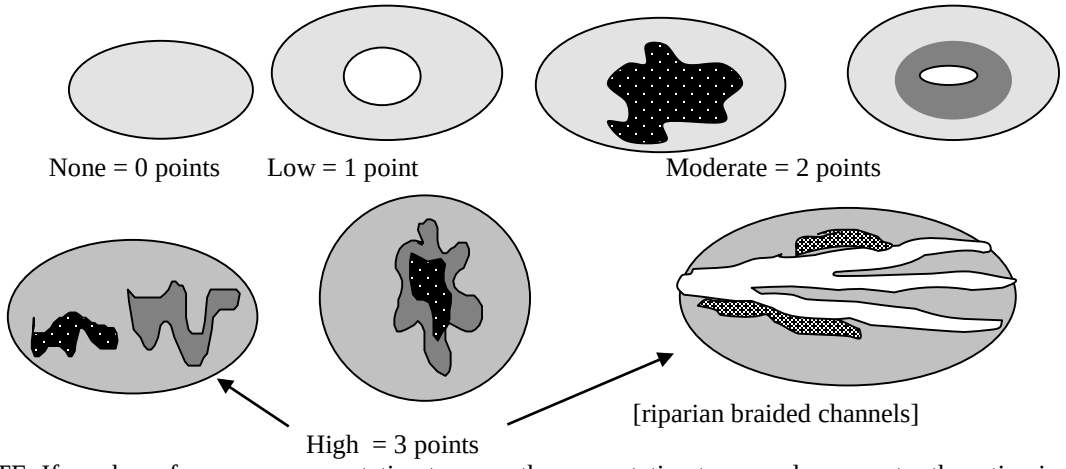
H 1.4. Interspersion of habitats ***(see p. 76)*** Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

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H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	1

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	0

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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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	5
TOTAL for H1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? 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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth

YES = Category 1 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 surgace 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

Cat. I

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

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II

Cat. II

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	

/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): Wetland JB01 Date of site visit: 7/1/2015

Rated by: R. Kahlo, A. Hoenig Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 10 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	6
Score for Hydrologic Functions	16
Score for Habitat Functions	19
TOTAL score for functions	**41**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

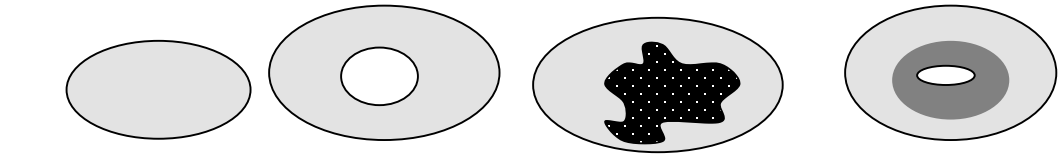
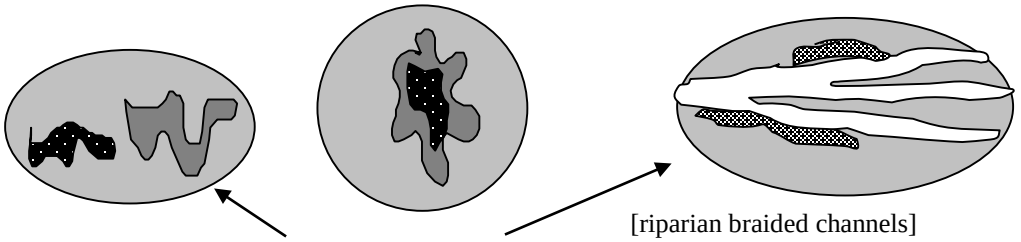
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	3
S	**Total for S 1** *Add the points in the boxes above*	3
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 S 1 by S 2 ***Add score to table on p. 1***	**6**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 ..... 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	6
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	**Total for S 3** *Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**16**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more ..... points = 4 3 structures ..... points = 2 2 structures ..... points = 1 1 structure ..... points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 ..... points = 1 ☒ Saturated only — 1 types present……points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species ..... points = 1 < 5 species ..... points = 0	2

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	3
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 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 ☐ 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.*	3
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	11

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	11
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	19

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

/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): Wetland JB02 Date of site visit: 7/20/2015

Rated by: K. Crandall, M. Foster Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 15 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	0
Score for Hydrologic Functions	0
Score for Habitat Functions	7
TOTAL score for functions	**7**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	0
S	**Total for S 1** *Add the points in the boxes above*	0
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 S 1 by S 2 ***Add score to table on p. 1***	**0**

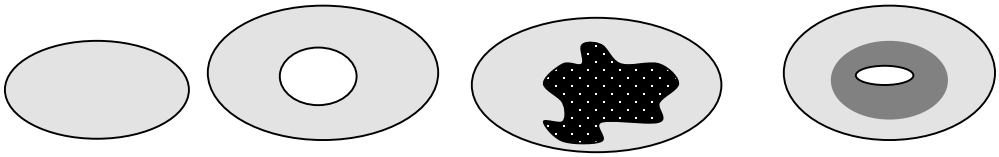
S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 68)***
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during 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 .....points = 3 Dense, uncut, **rigid** vegetation > 1/4 area .....points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid .....points = 0	0
S	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	0
S	**Total for S 3** *Add the points in the boxes above*	0
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**0**

Comments

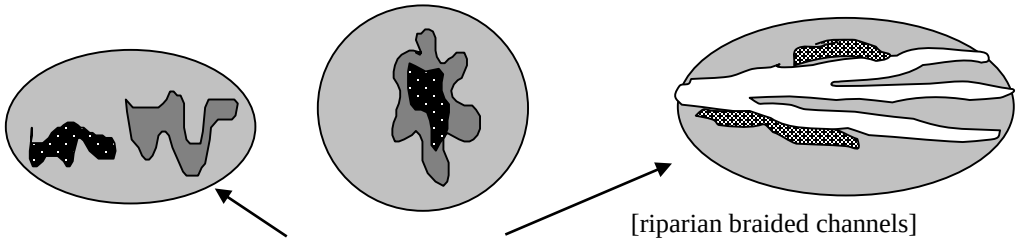
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	0
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	0

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

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



High = 3 points [riparian braided channels]

NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".

1

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 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

☐ 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

3

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	0

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	4
TOTAL for H1 from page 14	3
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	7

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 ☒

Cat. I

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

SC 3.0 Bogs ***(see p. 87)***

Does the wetland (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

/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): Wetland JB03 Date of site visit: 7/20/2015

Rated by: K. Crandall, M. Foster Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 15 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	0
Score for Hydrologic Functions	0
Score for Habitat Functions	7
TOTAL score for functions	**7**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

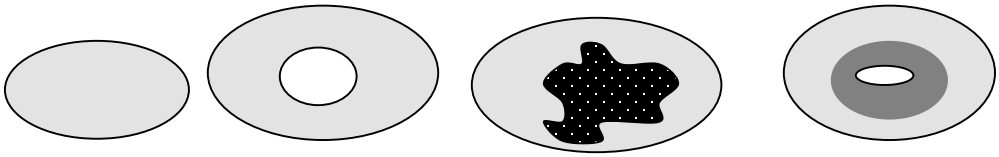
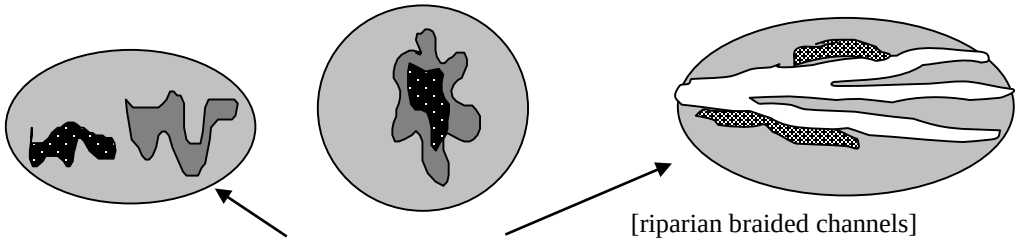
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	0
S	**Total for S 1** *Add the points in the boxes above*	0
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**0**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....points = 3 Dense, uncut, **rigid** vegetation > 1/4 area .....points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid .....points = 0	0
S	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	0
S	**Total for S 3** *Add the points in the boxes above*	0
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**0**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	0
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	0

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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*	3

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	0

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	4
TOTAL for H1 from page 14	3
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	7

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth	
YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions?	
☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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.	**Cat. II**
☐ The wetalnd is larger than 1/10 acre (4350 square feet)	
YES = Category I NO = Category II	

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

/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): Wetland JB04 Date of site visit: 8/11/2015

Rated by: K. Crandall, M. Foster Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 21 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	2
Score for Hydrologic Functions	6
Score for Habitat Functions	9
TOTAL score for functions	**17**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

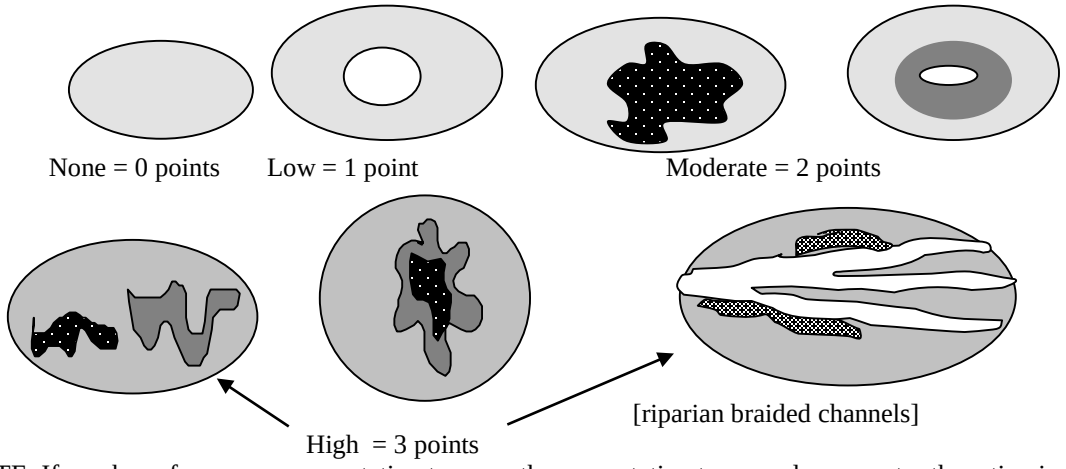
S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	1
S	**Total for S 1** *Add the points in the boxes above*	1
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ 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 <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**2**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	**Total for S 3** *Add the points in the boxes above*	3
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other: *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**6**

Comments

*Wetland in corridor recently mowed.

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	1

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	5
TOTAL for H1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 ☒

Cat. I

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

SC 3.0 Bogs ***(see p. 87)***

Does the wetland (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland JB05 Date of site visit: 9/9/2015

Rated by: K. Crandall, A. Hoenig Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 21 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	2
Score for Hydrologic Functions	6
Score for Habitat Functions	13
TOTAL score for functions	**21**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

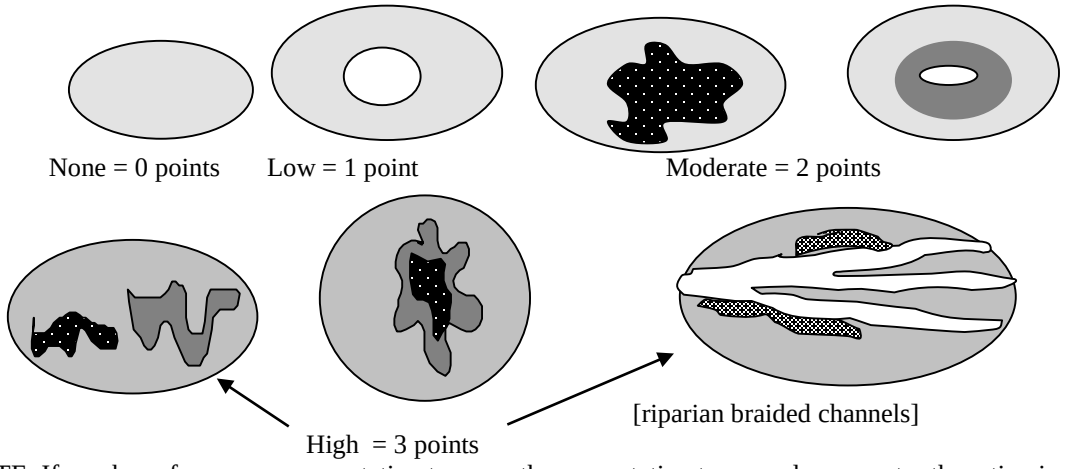
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	1
S	**Total for S 1** *Add the points in the boxes above*	1
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☒ Other utility station within 130 ft upslope **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 67) multiplier 2
S	**TOTAL - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**2**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....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	**Total for S 3** *Add the points in the boxes above*	3
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**6**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	9
TOTAL for H1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	13

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland JB06 Date of site visit: 9/9/2015

Rated by: K. Crandall, A. Hoenig Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 21 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	0
Score for Hydrologic Functions	4
Score for Habitat Functions	9
TOTAL score for functions	**13**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

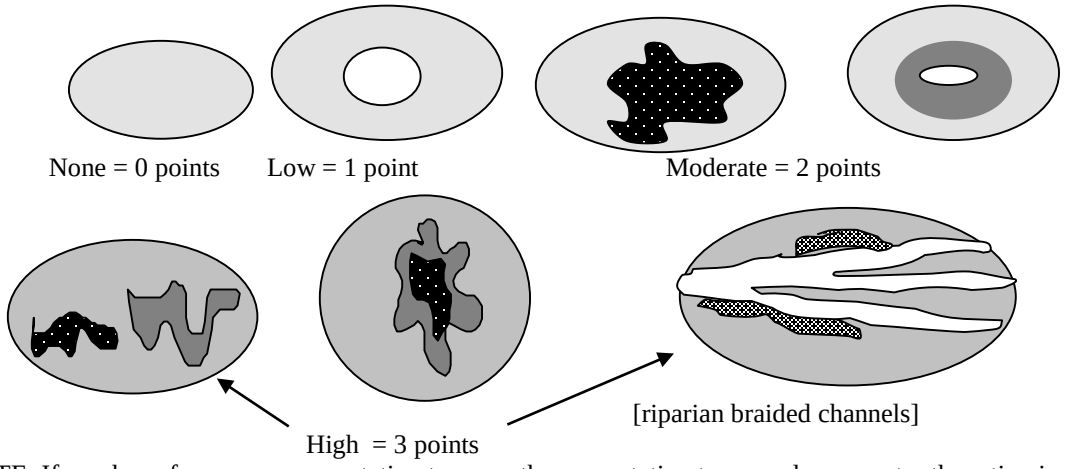
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	0
S	**Total for S 1** *Add the points in the boxes above*	0
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☒ Other: <u>road</u> **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 67) multiplier <u>2</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**0**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....points = 3 Dense, uncut, **rigid** vegetation > 1/4 area .....points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid .....points = 0	0
S	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	**Total for S 3** *Add the points in the boxes above*	2
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**4**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	2

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

DSD 003384

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland JB07 Date of site visit: 9/9/2015

Rated by: K. Crandall, A. Hoenig Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 21 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	0
Score for Hydrologic Functions	4
Score for Habitat Functions	10
TOTAL score for functions	**14**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

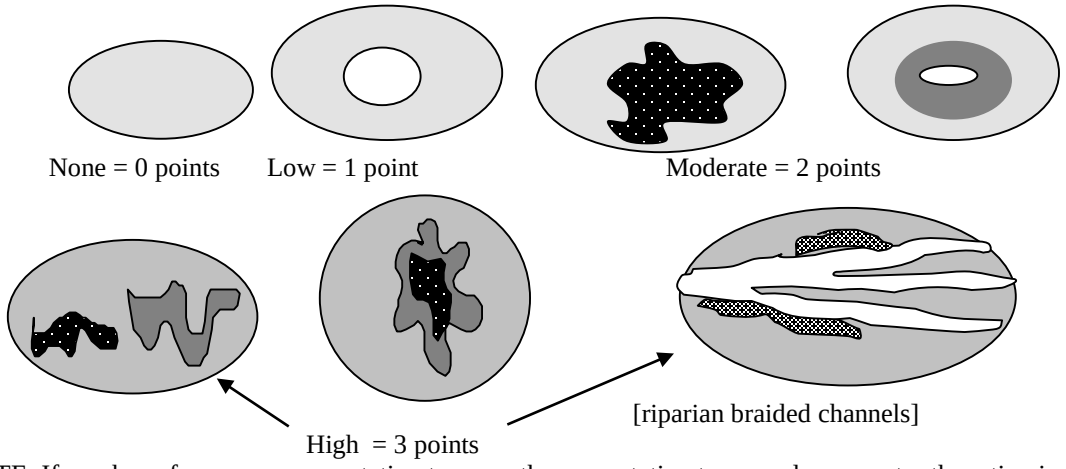
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	0
S	**Total for S 1** *Add the points in the boxes above*	0
S	**S 2. Does the wetland have the <u>opportunity</u> to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ 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 <u>1</u>
S	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**0**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....points = 3 Dense, uncut, **rigid** vegetation > 1/4 area .....points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid .....points = 0	0
S	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	**Total for S 3** *Add the points in the boxes above*	2
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **2**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**4**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	2

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	10

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland JB08 Date of site visit: 9/9/2015

Rated by: K. Crandall, A. Hoenig Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 21 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	8
Score for Hydrologic Functions	12
Score for Habitat Functions	21
TOTAL score for functions	**41**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

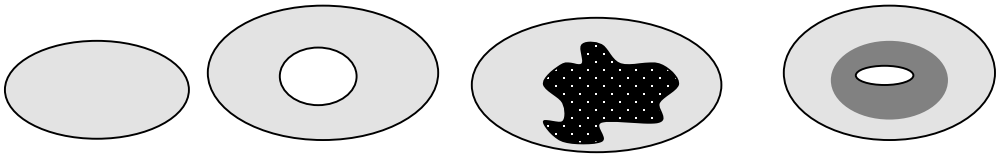
D	Depressional and Flats Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the potential to improve water quality?**	*(see p. 38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	1
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	3
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	0
D	**Total for D 1** *Add the points in the boxes above*	4
D	**D 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 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	*(see p. 44)* multiplier 2
D	**TOTAL - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**8**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	3
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	6
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☒ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**12**

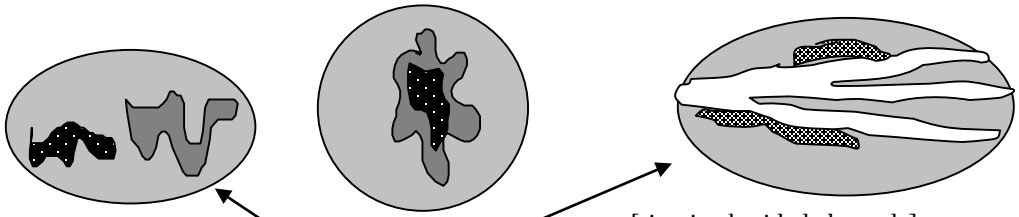
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☒ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types 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**	2
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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

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

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



High = 3 points [riparian braided channels]

NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".

2

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 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

☐ 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.

2

H 1. TOTAL Score - potential for providing habitat

Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

9

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	3
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 co~~ridor 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? YES = **1 point** NO = **0 points**	2

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	12
TOTAL for H1 from page 14	9
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	21

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond? Yes - go to Q.3 NO ☒ is not a bog for purpose of rating 3. Does the wetland 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 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.* 4. Is the wetland 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)? 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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) YES – Go to SC 5.1 NO ☒ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland MB01 Date of site visit: 4/6/2015

Rated by: K. Crandall, M. Foster Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 28 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	16
Score for Hydrologic Functions	20
Score for Habitat Functions	12
TOTAL score for functions	**48**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

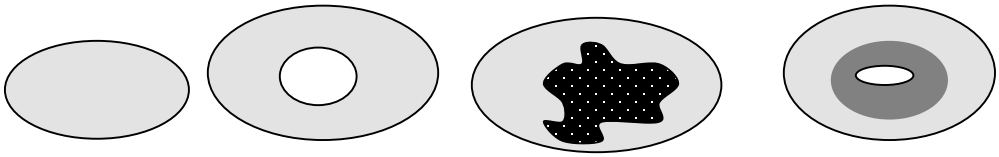
D	**Depressional and Flats Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	0
D	**Total for D 1** *Add the points in the boxes above*	8
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☒ Other: <u>walking trail with dogs</u> **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	***(see p. 44)*** multiplier <u>2</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**16**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	4
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	3
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	10
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☒ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☐ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**20**

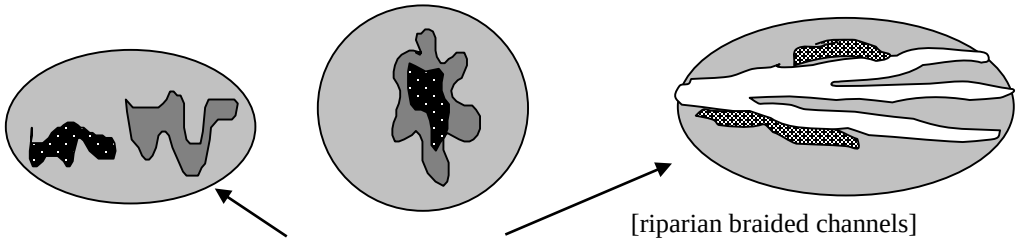
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

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

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



High = 3 points [riparian braided channels]

NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".

1

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 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

☐ 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

5

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	2
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
TOTAL for H1 from page 14	5
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	12

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland MB02 Date of site visit: 4/8/2015

Rated by: K. Crandall, R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 21 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	2
Score for Hydrologic Functions	4
Score for Habitat Functions	9
TOTAL score for functions	**15**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

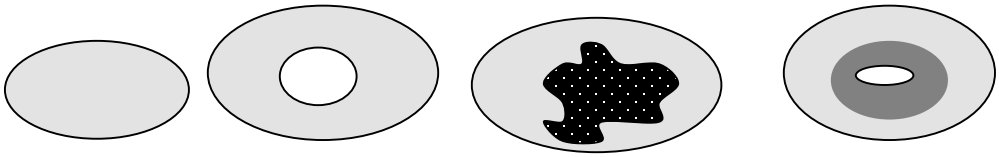
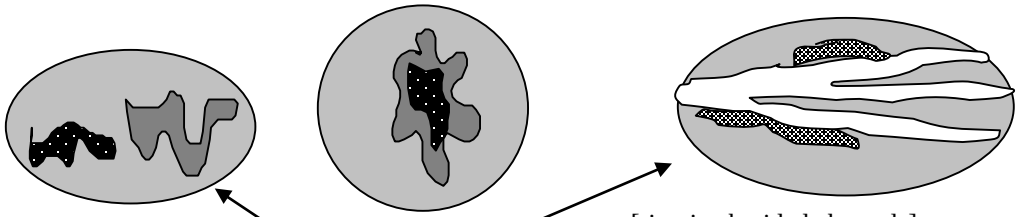
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	**Slope Wetlands**	**Points**
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	***(see p. 64)***
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft*.....points = 3 Slope is 1% - 2% .....points = 2 Slope is 2% - 5% .....points = 1 Slope is greater than 5% .....points = 0	1
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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area.....points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area .....points = 3 Dense, woody, vegetation > ½ of area .....points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area .....points = 1 Does not meet any of the criteria above for vegetation .....points = 0	0
S	**Total for S 1** *Add the points in the boxes above*	1
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☒ Other: powerline corridor **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 67) multiplier 2
S	**TOTAL - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**2**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....points = 3 Dense, uncut, **rigid** vegetation > 1/4 area .....points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid .....points = 0	0
S	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	**Total for S 3** *Add the points in the boxes above*	2
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **<u>2</u>**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**4**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	0

H 1.4. Interspersion of habitats ***(see p. 76)*** 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  High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	1

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	1
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

DSD 003444

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland MB03 Date of site visit: 4/8/2015

Rated by: K. Crandall, R. Whitson Trained by Ecology? Yes ☒ No ☐ Date of Training 09/2014

SEC: 21 TWNSHP: 24N RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	0
Score for Hydrologic Functions	4
Score for Habitat Functions	9
TOTAL score for functions	**13**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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

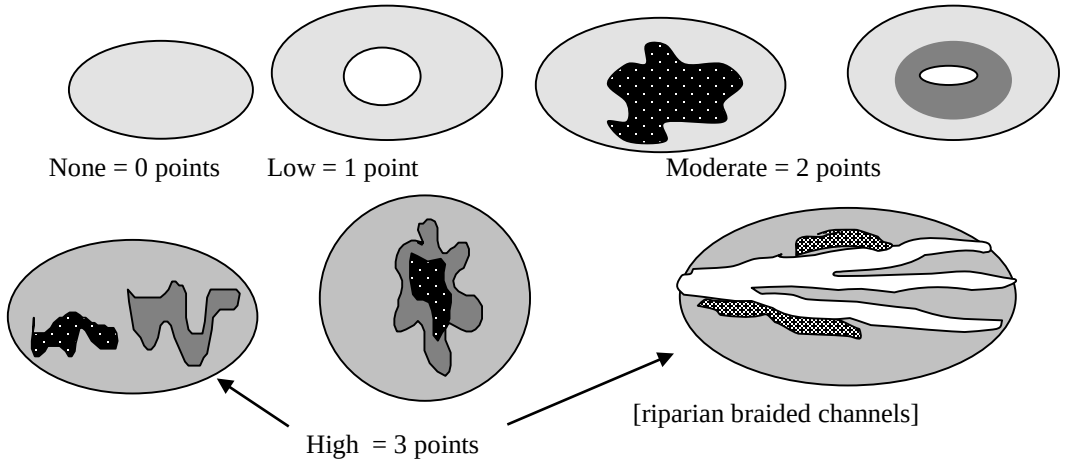
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
S	**S 1. Does the wetland have the potential to improve water quality?**	*(see p. 64)*
S	S 1.1 Characteristics of average slope of wetland: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation horizontal distance) for every 100 ft* ..... points = 3 Slope is 1% - 2% ..... points = 2 Slope is 2% - 5% ..... points = 1 Slope is greater than 5% ..... points = 0	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. 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, ungrazed, herbaceous vegetation > 90% of the wetland area ..... points = 6 Dense, ungrazed, herbaceous vegetation > 1/2 of area ..... points = 3 Dense, woody, vegetation > ½ of area ..... points = 2 Dense, ungrazed, herbaceous vegetation > 1/4 of area ..... points = 1 Does not meet any of the criteria above for vegetation ..... points = 0	0
S	**Total for S 1** *Add the points in the boxes above*	0
S	**S 2. Does the wetland have the opportunity to improve water quality?** ***(see p. 67)*** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants.A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☒ Other: powerline corridor **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 67) multiplier 2
S	**TOTAL - Water Quality Functions** Multiply the score from S 1 by S 2 ***Add score to table on p. 1***	**0**

S	Slope Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	
	S 3. Does the wetland have the <u>potential</u> to reduce flooding and 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 .....points = 3 Dense, uncut, **rigid** vegetation > 1/4 area .....points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid .....points = 0	0
S	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	**Total for S 3** *Add the points in the boxes above*	2
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** ***(see p. 70)*** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☒ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	(see p. 70) multiplier **<u>2</u>**
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	**4**

Comments

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	0

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 High = 3 points [riparian braided channels] NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	0
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 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 ☐ 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.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	1

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	0

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within 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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	8
TOTAL for H1 from page 14	1
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

DSD 003459

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 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 (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA

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): Wetland MB04 Date of site visit: 9/9/2015

Rated by: K. Crandall, A. Hoenig Trained by Ecology? Yes ☒ No ☐ Date of Training 9/2014

SEC: 21 TWNSHP: 24N RNGE: R05E Is S/T/R in Appendix D? Yes ☐ No ☒

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	4
Score for Hydrologic Functions	0
Score for Habitat Functions	17
TOTAL score for functions	**21**

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

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

Check the appropriate type and class of wetland being rated.

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

Does the wetland 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.		X*
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).		X*
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X*
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.		X

***The study area was reviewed for the presence of endangered, threatened, and priority species using WDFW online Priority Habitat and Species Data, PHS on the Web (http://wdfw.wa.gov/mapping/phs/).**

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. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

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 wetland 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 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 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 types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a 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 classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within 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.

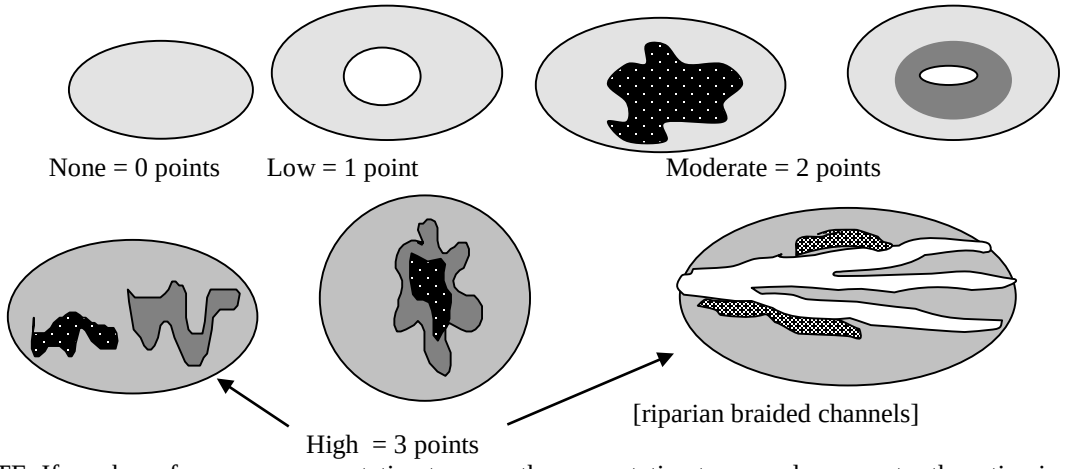
HGM classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and 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 you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	Depressional and Flats Wetlands	Points
	WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	
D	**D 1. Does the wetland have the <u>potential</u> to improve water quality?**	***(see p. 38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) .....points = 3 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)*..points = 1 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")*	1
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*). YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): Wetland has persistent, ungrazed, vegetation > = 95% of area.....points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area .....points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area .....points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area .....points = 0	1
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland .....points = 4 Area seasonally ponded is > ¼ total area of wetland .....points = 2 Area seasonally ponded is < ¼ total area of wetland .....points = 0 NOTE: *See text for indicators of seasonal and permanent inundation.*	0
D	**Total for D 1** *Add the points in the boxes above*	2
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?**	***(see p. 44)***
	Answer YES if you know or believe there are pollutants in groundwater or surface <u>water coming into the wetland</u> that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiply score in D 1. **by 2** **NO** multiply score in D 1. **by 1**	multiplier <u>2</u>
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	**4**

D	**Depresssional and Flats Wetlands**	
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	***(see p. 46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) .....points = 4 Unit has an intermittently flowing, or highly constricted permanently flowing outlet .....points = 2 Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet**, and/or outlet is a man-made ditch .....points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*)..points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are at least 3 ft or more above the surface or bottom of outlet .....points = 7 The wetland is a "headwater" wetland".....points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet .....points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet.....points = 3 Unit is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water.....points = 1 Marks of ponding less than 0.5 ft .....points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit.....points = 5 The area of the basin is 10 to 100 times the area of the unit.....points = 3 The area of the basin is more than 100 times the area of the unit.....points = 0 Entire unit is in the FLATS class.....points = 5	0
D	**Total for D 3** *Add the points in the boxes above*	0
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☒ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☒ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	*(see p. 49)* multiplier <u>2</u>
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	**0**

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat**	
H 1. Does the wetland have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin) if the class is ¼ acre or covers more than 10% of the area of the wetland if unit smaller than 2.5 acres.* ☐ Aquatic bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) ☐ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation types that qualify. If you have:* 4 structures or more.....points = 4 3 structures.....points = 2 2 structures.....points = 1 1 structure.....points = 0	1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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 .....points = 1 ☒ Saturated only — 1 types present…….points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points**	1
H 1.3. Richness of Plant Species ***(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 *List species below if you want to:* 5 - 19 species.....points = 1 < 5 species.....points = 0	1

H 1.4. Interspersion of habitats ***(see p. 76)*** 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 [riparian braided channels] High = 3 points NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".	1
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 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 ☐ 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.*	2
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	6

H 2. Does the wetland 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. 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 developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) ..... 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	2
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? YES = **1 point** NO = **0 points**	2

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? *(NOTE: the connections do not have to be relatively undisturbed)* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acres). ☒ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full description 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 > 30cm (12 in) in diameter at the largest end, and > 6m (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 wetland are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H2.4.*	4

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	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	11
TOTAL for H1 from page 14	6
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	17

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate 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 332-151? ☐ 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 are aof 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 wetland. ☐ The wetland has at least 2 or the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

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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 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 ☒

Cat. I

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

SC 3.0 Bogs ***(see p. 87)***

Does the wetland (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 wetland have organic soils horizons (i.e. layers of organic soil), either peats or mucks, that compose 16" 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 wetland 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 top of a lake or pond?
   Yes - go to Q.3 NO ☒ is not a bog for purpose of rating
3. Does the wetland 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 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.
4. Is the wetland 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)?
   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 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 in (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quanitity of large downed material is generally less than that found in old-growth YES = Category 1 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 surgace 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	**Cat. I**
SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of 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 wetalnd is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. II**

SC 6.0 Interdunal Wetlands (see p. 93) Is the wetalnd unit west of the 1889 line (also called the Westarn 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 1 acre or larger, or is it in a mosaic of wetlands that is 1 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 categorie, and record on p. 1 .* If you answered NO for all types enter "Not Applicable" on p.1.	NA