


Energize Eastside Project

Final Environmental Impact Statement

VOLUME 1

MARCH 2018

PREPARED FOR:
The Cities of Bellevue, Newcastle, Redmond and Renton

PREPARED BY:
ESA

energize EASTSIDE EIS

Environmental Impact Statement

DSD 005391

City of Bellevue
Post Office Box 90012 ▪ Bellevue, Washington ▪ 98009 9012

March 1, 2018

To Interested Parties, Agencies, and Organizations

Enclosed is the FINAL Environmental Impact Statement (Final EIS) for the "Energize Eastside" project proposed by Puget Sound Energy (PSE). The Energize Eastside project is a proposal to construct approximately 16 to 18 miles of new 230 kilovolt (kV) electrical transmission lines and add a new substation (Richards Creek) at the Lakeside substation in Bellevue to connect two existing bulk energy systems (one to the north in Redmond and one to the south in Renton), supply future electrical capacity, and improve electrical grid reliability for Eastside communities.

The City of Bellevue and its four partner Eastside Cities (Kirkland, Newcastle, Redmond, and Renton) jointly conducted a phased environmental review process under the State Environmental Policy Act for the Energize Eastside project. This Final EIS builds upon the previous Phase 1 Draft EIS and Phase 2 Draft EIS, released in January 2016 and May 2017, respectively. The Final EIS assesses PSE's project-level Proposed Alignment, as described in Section 1.5 and Chapter 2 and includes responses to comments on both the Phase 1 and Phase 2 Draft EIS documents.

We would like to acknowledge the many individual and collective efforts that went into preparing this Final EIS. We are appreciative of our partner cities for their commitment and dedication to working collaboratively to prepare this EIS document. In addition, the partner cities recognize the significant amount of time spent by community groups, property owners, and other interested parties commenting on the draft EISs and participating in public meetings. Finally, the City of Bellevue would like to acknowledge and thank the EIS Consultant Team led by Environmental Science Associates (ESA) and their subconsultants for their hard work and support provided throughout this process.

Please note that the EIS is not a permit but one of many sets of information permitting agencies will consider as they decide whether to approve the project, condition the project, and issue necessary permits. PSE has begun submitting permit applications for portions of the Energize Eastside project. Applications must be filed separately for each jurisdiction because each must issue separate permits.

Bellevue
City's webpage https://development.bellevuewa.gov/zoning-and-land-use/public-notices-and-participation/energize-eastside-updates/ or contact Heidi Bedwell (425-452-4862, hbedwell@bellevuewa.gov).

Newcastle
City's webpage http://newcastlewa.gov/departments/community_development/energize_eastside/ or contact Thara Johnson (425-649-4444, TharaJ@newcastlewa.gov).

Sincerely,

Carol V. Helland

Carol V. Helland, Environmental Coordinator
Development Services Department, City of Bellevue

Contents

energize EASTSIDE EIS

TABLE OF CONTENTS

DSD 005394

LIST OF APPENDICES (BOUND SEPARATELY AS VOLUME 2)

** For printed copies of the Final EIS, Appendix J-2 and Appendix K are bound separately as Volume 3 and Volume 4, respectively*

LIST OF FIGURES

LIST OF TABLES

Fact Sheet

energize EASTSIDE EIS

FACT SHEET

NAME OF PROPOSAL

Energize Eastside Project

PROPONENT

Puget Sound Energy (PSE)

PROJECT LOCATION

The project involves improvements to PSE's electrical grid in the Eastside area of King County, to address a deficiency in electrical transmission capacity. The area identified by PSE as having a transmission capacity deficiency is situated between Redmond in the north to Renton in the south, and between Lake Washington and Lake Sammamish. The study area goes through the jurisdictions of Redmond, Bellevue, Newcastle, King County, and Renton.

PROJECT DESCRIPTION

The purpose of the project is to address a projected deficiency in transmission capacity resulting from growth in electrical demand, which could affect the future reliability of electrical service for the Eastside. PSE proposes to construct and operate a major new transformer served by approximately 16 miles of new high-capacity electric transmission lines (230 thousand volts [kilovolts, or kV]) extending from Redmond to Renton. The proposed transformer would be placed at a new substation near the center of the Eastside. Electrical power would be transmitted to this substation and the voltage lowered, or "stepped down" (transformed), from 230 kV to 115 kV for distribution to local customers. PSE has proposed a preferred alignment for the transmission lines, referred to in this Final EIS as "PSE's Proposed Alignment."

The City of Bellevue is overseeing the Environmental Impact Statement (EIS) process in cooperation with the jurisdictions of Kirkland, Newcastle, Redmond, and Renton (collectively referred to as the Partner Cities). The City of Bellevue is the State Environmental Policy Act (SEPA) nominal Lead Agency. The Energize Eastside EIS is a Phased EIS (Washington Administrative Code [WAC] 197-11-060(5)). The Phase 1 Draft EIS (released in January 2016) broadly evaluated at a programmatic level the general impacts and implications associated with feasible and reasonable options available to address PSE's identified objectives for the project. The Phase 2 Draft EIS (released in May 2017) was a project-level evaluation, describing impacts at a project-specific level for a group of potential route segments and options. The project-level Phase 2 Draft EIS incorporated the Phase 1 Draft EIS by reference. Based on the results of the Phase 2 Draft EIS analysis, PSE has refined the proposed route of the transmission lines and associated project components, as evaluated in greater detail in this Final EIS. Although the City of Kirkland is a Partner City, the project-level analysis does not include Kirkland because PSE's Proposed Alignment for Energize Eastside does not pass within Kirkland city limits.

SUMMARY OF ALTERNATIVES AND OPTIONS

No Action Alternative	
PSE would continue to manage its maintenance programs to reduce the likelihood of equipment failure, and would continue to stockpile additional equipment so that repairs could be made quickly. As appropriate, conductor replacement on existing lines would occur. New 230 kV overhead transmission lines and a new substation would not be constructed.	
PSE's Proposed Alignment: New Substation and 230 kV Transmission Lines	
New Substation	Construct a new substation, the "Richards Creek" substation, adjacent to the existing Lakeside substation in Bellevue.
New Overhead Transmission Lines	Construct approximately 16 miles of new 230 kV overhead transmission lines between the Sammamish and Talbot Hill substations. This would occur entirely within PSE's existing transmission line corridor connecting these two substations.

CONSTRUCTION TIMING FOR THE PROJECT

PSE intends to start construction on the new substation and the south portion of the transmission line by the summer of 2018, if possible. This timeframe is based on a projected capacity deficiency that could affect system reliability by that date. After the south portion is completed, construction on the north portion would begin during PSE's next available construction work window, which is anticipated to be spring of 2019.

STATE ENVIRONMENTAL POLICY ACT LEAD AGENCY

The City of Bellevue is the Lead Agency. The following municipalities are SEPA Co-Lead Agencies for the project: Kirkland, Newcastle, Redmond, and Renton.

SEPA RESPONSIBLE OFFICIAL

Carol Helland
Development Services Department
City of Bellevue
450 110th Avenue NE
Bellevue, WA 98004

EIS CONTACT PERSON

Heidi Bedwell
Energize Eastside EIS Program Manager
City of Bellevue
450 110th Avenue NE
Bellevue, WA 98004
Phone: (425) 452-4862
Email: HBedwell@bellevuewa.gov

CONTACT PERSON FOR EACH CO-LEAD AGENCY

City of Kirkland

Jeremy McMahan
Development Services - Planning Manager
(425) 587-3229
jmcmahan@kirklandwa.gov

City of Redmond

Catherine Beam, AICP
Principal Planner
(425) 556-2429
cbeam@redmond.gov

City of Newcastle

Steve Osguthorpe
Community Development Director
(425) 649-4444
steveo@newcastlewa.gov

City of Renton

Jennifer Henning, AICP
Planning Director
(425) 430-7286
Jhenning@rentonwa.gov

GOVERNMENTAL ACTIONS

Approvals and permits that may be required for the project are listed below by jurisdictional level.

Federal

- Section /404 permit—U.S. Army Corps of Engineers
- Endangered Species Act consultation—National Oceanic and Atmospheric Administration Fisheries and U.S. Fish and Wildlife Service
- Section 106 National Historic Preservation Act Consultation – Triggered by federal nexus; lead federal agency must consult with Department of Archaeology and Historic Preservation

State

- National Pollutant Discharge Elimination System Construction Stormwater General Permit—Washington State Department of Ecology
- Section 401 Water Quality Certification—Washington State Department of Ecology
- Coastal Zone Management Consistency Determination—Washington State Department of Ecology
- Hydraulic Project Approval—Washington Department of Fish and Wildlife
- Utility Rate Approval —Washington Utilities and Transportation Commission

Local City or County

Local City or County	City of Redmond	City of Bellevue	City of Newcastle	City of Renton	King County
Shoreline Exemption				●	
Zoning Conditional Use Permit	●	●	●	●	
Critical Areas Permit		●	●	●	
Building and Related Permits		●	●	●	●
Clearing and Grading Permit	●	●	●	●	●
Right-of-Way Permit	●	●	●	●	●

AUTHORS AND PRINCIPAL CONTRIBUTORS

This Final EIS was prepared under the direction of the City of Bellevue as the Lead Agency, in consultation with the Co-Lead Agencies (i.e., Partner Cities).

Research and analyses were provided by the following consultant firms:

- Environmental Science Associates (ESA) – Alternatives development; analysis of land use and housing, scenic views and the aesthetic environment, water resources, plants and animals, greenhouse gas, recreation, historic and cultural resources, electric and magnetic fields (EMF), pipeline safety, ecosystem services, and earth resources; response to public comments; and EIS document coordination and production.
- Enertech Consultants – Peer review of EMF modeling.
- FCS Group – Economic analysis.
- EDM Services – Pipeline safety risk analysis.
- Stantec – Peer review of pipeline corrosion analysis.
- Asher Sheppard Consulting – Literature review of the health effects of EMF.

DATE OF ISSUE

March 1, 2018

AVAILABILITY OF THE FINAL EIS

Copies of the Final EIS and/or Notices of Availability have been distributed to agencies, tribal governments, and organizations on the Distribution List in Chapter 10.

The Final EIS may be viewed online or downloaded from the project website www.EnergizeEastsideEIS.org or may be viewed at the following locations:

Libraries

Bellevue Library
1111 110th Ave NE
Bellevue, WA 98004

Newcastle Library
12901 Newcastle Way
Newcastle, WA 98056

Redmond Library
15990 NE 85th St
Redmond, WA 98052

Newport Way Library
14250 SE Newport Way
Bellevue, WA 98006

Renton Highlands Library
2810 NE 10th Street
Renton, WA 98056

Renton Library
100 Mill Ave S
Renton, WA 98057

Lake Hills Library
15590 Lake Hills Blvd
Bellevue, WA 98007

Kirkland Library
308 Kirkland Avenue
Kirkland, WA 98033

City Offices

City of Bellevue Development Services Department
City Hall
450 110th Ave NE
Bellevue, WA 98004

City of Newcastle Planning Division
City Hall
12835 Newcastle Way, Suite 200
Newcastle, WA 98056

Redmond City Hall
Development Services Center (2nd floor)
15670 NE 85th St
Redmond, WA 98052

City of Renton Planning Division
City Hall, 6th floor
1055 S Grady Way
Renton, WA 98057

City of Kirkland Planning Services
City Hall
123 5th Ave
Kirkland, WA 98033

Printed copies are available to purchase for the cost of reproduction of $275 for Volume 1 (Final EIS) and Volume 2 (technical appendices), and a CD of Volumes 3 and 4 (response to comments) by contacting the project email at info@EnergizeEastsideEIS.org or by calling Environmental Science Associates at (206) 789-9658. Printed copies of Volumes 3 and 4 are available for additional cost upon request. Copies of the EIS on a thumb drive may also be obtained (available at no charge) at all four of the city offices listed directly above.

AVAILABILITY OF BACKGROUND MATERIALS

The Final EIS includes appendices with information that is important to help understand the EIS analysis and response to public comments on the Phase 1 Draft EIS and Phase 2 Draft EIS. Other background materials developed specifically for this project and used by the consultants are available on the project website at www.EnergizeEastsideEIS.org, including interactive maps that display pole and tree locations, critical areas and critical area buffers, parks, and trails.

1

Introduction & Summary

energize EASTSIDE EIS

CHAPTER 1. INTRODUCTION & SUMMARY

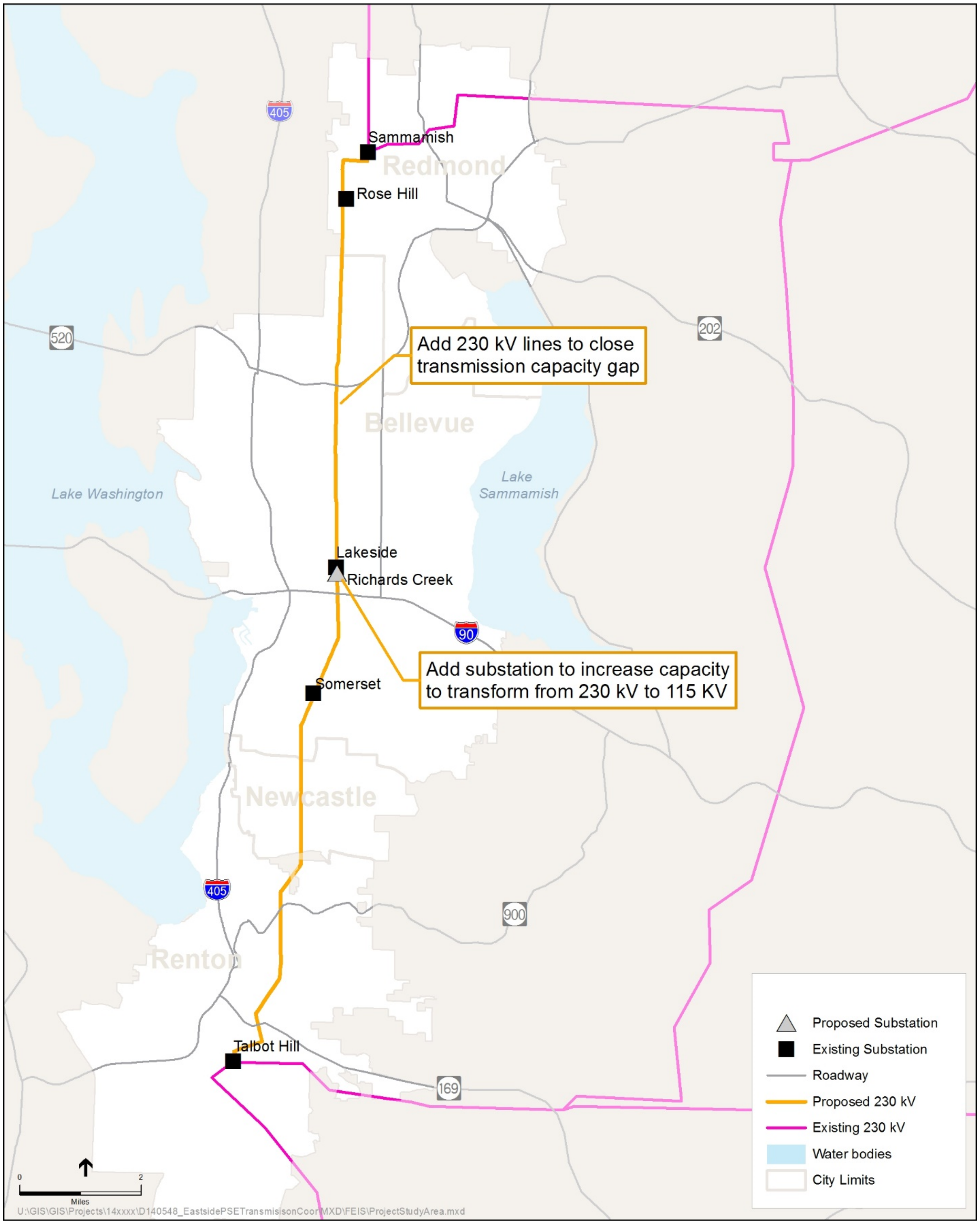
The City of Bellevue and its partner *Eastside* Cities (*Partner Cities*) are conducting a phased environmental review process under the State Environmental Policy Act (SEPA) for an electrical *transmission line* project proposed by Puget Sound Energy (PSE). The project, called Energize Eastside, is a proposal to build new electrical *transmission* infrastructure to serve PSE's customers in the Eastside area, in King County, Washington. This Final Environmental Impact Statement (Final EIS) builds upon the previous Phase 1 Draft EIS and Phase 2 Draft EIS, released in January 2016 and May 2017, respectively. The Final EIS assesses PSE's project-level Proposed Alignment, as described in Section 1.5 and Chapter 2. The Phase 1 Draft EIS assessed a range of impacts and implications associated with broad alternatives for addressing PSE's objectives, in a non-project or *programmatic* EIS. The project-level Phase 2 Draft EIS incorporated the Phase 1 Draft EIS by reference and presented a project-level assessment of several segment and route options for a new substation, overhead transmission lines, and associated components at a preliminary design level. Based on the results of the Phase 2 Draft EIS analysis, PSE has refined the proposed route of the transmission lines and associated project components, as evaluated in greater detail in this Final EIS.

The **Eastside,** as referred to in this EIS, is an area of King County between Lake Washington and Lake Sammamish, roughly extending from Redmond in the north to Renton in the south.

This chapter provides an overview of the project and a summary of the findings of the Final EIS. The project includes numerous terms that may not be familiar to all readers. Throughout the EIS, words shown in *italics* when they first appear in the document are included in the glossary (Chapter 11). Some of the information presented in this Final EIS repeats information that was included in the Phase 2 Draft EIS, although focused on PSE's Proposed Alignment, which differs from PSE's preferred alignment from the Phase 2 Draft EIS (referred to as the Willow 2 route). PSE's Proposed Alignment also differs in some details from the other segment routes in the Phase 2 Draft EIS. This repetition of information is intentional, with the goal of presenting a comprehensive Final EIS document that includes the information about PSE's Proposed Alignment needed by decision-makers to support permitting decisions. In particular, the Final EIS includes a full analysis of potential impacts associated with the construction and operation of PSE's Proposed Alignment. Supplemental material that supports the analysis is included as appendix material, or cross-referenced, with the Phase 1 and Phase 2 Draft EIS documents incorporated by reference.

1.1 ENERGIZE EASTSIDE PROJECT

PSE's proposal is to construct and operate a new 230 thousand volt (kilovolt or kV) to 115 kV electrical *transformer* served by approximately 16 miles of new high-capacity electric *transmission lines* (230 kV) extending from Redmond to Renton. The transformer would be 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. Figure 1-1 shows the Eastside and the locations of existing substations and 230 kV transmission lines, and the area where a new substation and new 230 kV lines are proposed. This set of facilities is proposed to address a deficiency in electrical transmission capacity during peak periods that PSE has identified through its system planning process.



Source: King County, 2015; Ecology, 2014.

Figure 1-1. PSE 230 kV Transmission System in the Eastside

This deficiency is expected as a result of anticipated population and employment growth on the Eastside. PSE expects this deficiency within the next few years to negatively affect their ability to meet federal requirements for protecting the regional electrical grid while also supplying continuous power to its Eastside customers.

Transmission lines are designed to move large amounts of power. In western North America, transmission level power is provided at 230 kV and higher. The next lower voltage level in the regional grid is 115 kV, which is considered a sub-transmission voltage level.

Based on federally mandated planning standards, PSE's analysis found that the existing transmission system could place Eastside customers and/or the regional *power grid* at risk of power outages or system damage during peak power events that typically occur in cold or hot weather as early as the summer of 2018 (PSE, 2017a). PSE's analysis concluded that the most effective solution was to add a 230-to-115 kV transformer within the center of the Eastside to relieve stress on the existing 230-to-115 kV transformers that currently supply the area. This would need to be fed by new 230 kV transmission lines from the north and south. By having lines from two different directions, a substation can continue to be supplied even if one line goes down.

The 230 kV system is proposed because that is the next highest voltage level (greater than the existing 115 kV lines) that PSE could feasibly install and operate consistent with the regional grid system that would meet project reliability goals and PSE's project criteria. As illustrated in Figure 1-1, there is no 230 kV transmission line operated by PSE that reaches the center of the Eastside area.

This Final EIS evaluates the proposed 230 kV improvements as part of PSE's proposal (i.e., PSE's Proposed Alignment), as described in more detail in Chapter 2.

1.2 NEED FOR A SEPA EIS

Discussions between the Partner Cities in 2014 (including the cities of Bellevue, Kirkland, Newcastle, Redmond, and Renton) and PSE indicated that the project is likely to have significant adverse environmental impacts. Pursuant to SEPA, a Threshold Determination of Significance was issued on April 30, 2015, in compliance with the Washington Administrative Code (WAC) 197-11-360.

What is a Reasonable Alternative?

WAC 197-11-440(5)(b) defines a reasonable alternative as 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.

To address the potential for significant environmental impacts, PSE submitted an application for processing of an EIS with the City of Bellevue. As the largest and potentially most affected city, the City of Bellevue agreed with the other Partner Cities to take the role of *Lead Agency*, consistent with WAC 197-11-944. The City of Bellevue is directing the overall preparation of the EIS, with assistance by consulting firms referred to as the EIS Consultant Team. The cities of Newcastle, Redmond, and Renton have reviewed preliminary versions of this Final EIS and provided input on its preparation. The City of Kirkland has not been involved in the review of this Final EIS because PSE's project is not located within Kirkland city limits.

The Phase 1 Draft EIS (released in January 2016) broadly evaluated the general impacts and implications associated with feasible and reasonable alternatives available to address PSE's identified objectives for the project. The Phase 2 Draft EIS (released in May 2017) was a project-level evaluation, describing impacts at a site-specific and project-specific level for a group of segments and options that would meet PSE's objectives, at a conceptual design level. This Final EIS focuses on a single route alignment (PSE's Proposed Alignment), informed by the results of the Phase 1 and Phase 2 analyses. This approach is consistent with the requirements for Phased Review outlined in WAC 197-11-060 (5)(c). The Partner Cities have not identified a preferred alternative, nor have they made a final decision on any portion of the project.

This project-level EIS began at an early stage of design development for the project. PSE's project design has been refined since publication of the Phase 2 Draft EIS, including route preference and design details, such as pole types, locations, voltage configuration, and associated project components. This is consistent with rules that intend for SEPA to be "*integrated with agency activities at the earliest possible time to ensure that planning and decisions reflect environmental values, to avoid delays later in the process, and to seek to resolve potential problems*" (WAC 197-11-055). Information about the project is approximate and subject to change and refinement as the design is developed, but is accurate enough to determine the impacts expected from the project. Where there is uncertainty about potential impacts, the Final EIS uses conservatively high impact assumptions to ensure that any potential significant impacts are addressed.

1.3 APPLICANT'S OBJECTIVES FOR THE ENERGIZE EASTSIDE PROJECT

PSE has determined that there is a need to construct a new 230 kV bulk electrical transmission line and an associated electrical substation east of Lake Washington to supply future electrical capacity and improve the reliability of the Eastside's electrical grid. PSE prepared two studies that describe the need: the *Eastside Needs Assessment Report* and the *Supplemental Eastside Needs Assessment Report* (Gentile et al., 2014, 2015). These are referred to collectively as PSE's Eastside Needs Assessment, as described in more detail in the Phase 1 Draft EIS, Section 1.3. Based on PSE's needs analysis, PSE established broad objectives for the project as follows:

- Address PSE's identified deficiency in transmission capacity.
- Find a solution that can be feasibly implemented before system reliability is impaired.
- Be of reasonable project cost.
- Meet federal, state, and local regulatory requirements.
- Address PSE's electrical and non-electrical criteria for the project.

More details on the project objectives, including PSE's electrical and non-electrical criteria, are described in detail in Chapters 1 and 2 of the Phase 1 Draft EIS.

As outlined in WAC 197-11-060 (3)(a), the lead agency is responsible for ensuring that a proposal that is the subject of environmental review is properly defined. The process of defining the proposal includes an understanding of the need for the project, to enable a thorough understanding of the project's objectives (see Section 1.8 of the Phase 1 Draft EIS) and technical requirements, and to accurately identify feasible and reasonable project alternatives for consideration in the EIS. According to WAC 197-11-060(3)(a)(iii), proposals should be described in ways that encourage considering and comparing alternatives, and agencies are encouraged to describe proposals in terms of objectives rather than preferred solutions. An understanding of the need for the project helps to clarify the objectives used to develop project alternatives.

This Final EIS will not be used to reject or validate the need for the project; it will be used to inform decision-makers reviewing land use permits that PSE will need to secure from each affected jurisdiction to build the proposed substation and transmission line. The EIS process is intended to identify reasonable alternatives that could attain or approximate PSE's objectives at a lower environmental cost and disclose potential significant adverse environmental impacts associated with the alternatives analyzed.

The deficiency in transmission capacity on the Eastside identified by PSE is based on a number of factors. Key factors include growing population and employment in the Eastside, changing consumption patterns associated with larger buildings, more air-conditioned space, and changing utility regulations that require a higher standard of electrical system resilience than was required in the past. Heightened concerns about resilience that underlie the regulatory changes trace back to an August 2003 blackout in the Midwestern and Northeastern portions of North America that affected 55 million customers.[1]

PSE has concluded that the most effective and cost-efficient solution to meet its objectives is to site a new 230 kV transformer in the center of the Eastside, which would be fed by new 230 kV transmission lines from the north and south (Stantec, 2015).

The Eastside population is expected to grow at a rate of approximately 1.2 percent annually over the next decade, and employment is expected to grow at an annual rate of approximately 2.1 percent, a projection based on internal forecasting conducted by PSE. Given the nature of expected development, PSE has projected that peak electrical demand within the Eastside will grow at an annual rate of 2.4 percent[2]. This forecast is based on the concept that economic activity has a significant effect on energy demand. As described in PSE's *Eastside Needs Assessment*, this growth rate takes into account population and employment growth as well as expected "*block load*" growth that PSE is aware will be coming in the next 10 years (Gentile et al., 2014, 2015).

Without adding transmission capacity for local peak periods in the Eastside, a deficiency could develop as early as winter of 2017–2018, with potential for *load shedding* (forced power outages) by summer of 2018 (PSE, 2017a). To address this risk in the near term, PSE would continue to deploy and expand the use of a series of operational steps to prevent system overloads or large-scale loss of customers' power; these steps are referred to as *Corrective Action Plans (CAPs).* CAPs generally involve shutting off or reducing load on overloaded equipment and rerouting the load to other equipment. The CAPs are seen as temporary measures to keep the entire system operating, but they can place large numbers of customers at risk of a power outage (e.g., rolling blackout plan) if anything else on the system begins to fail. CAPs are described in more

Block loads are substantial increases in expected electrical demand from individual customers, typically industrial, commercial, or institutional customers. PSE regularly communicates with large customers to estimate upcoming block load to ensure that their supply and *distribution system* will be capable of serving the need.

[1] See U.S. - Canada Power System Outage Task Force Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations, April 2004.
[2] PSE annually updates projected electrical demand systemwide; however, it does not develop annual estimates for the Eastside only.

detail in Section 2.2.1.12 of the Phase 1 Draft EIS. For additional information, see the Energize Eastside Outage Cost Study (Nexant, 2015), available on the project EIS website.

Load shedding would be initiated if the electrical demand reaches limits established by PSE engineers to avoid violating federal standards designed to protect the regional grid (e.g., as established by the North American Electric Reliability Corporation [NERC]) (Stantec, 2015). These peak load periods can occur during typical cold or hot weather conditions. If one or more components of the system are not operating for any reason, load shedding could be required to protect the Eastside and the rest of the regional grid. This is because 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. Either condition would leave the Eastside in a vulnerable state where the system is incapable of reliably serving customer load. At that point, further actions such as load shedding may be needed to keep the system intact within the Eastside service area and beyond.

By the end of the 10-year forecast period, PSE's estimate is that in the summer 2024 scenario, if there were a period of above average temperatures, over 211,000 customers could experience rotating outages on up to 9 days over a period of 16 days. In the winter 2023–2024 scenario, if there were a period of below average temperatures, around 175,000 customers could experience rotating outages on up to 13 days over a period of 29 days (Nexant, 2015).

The load area in question is situated between two existing sources of bulk electrical power: the Sammamish substation on the north end (Redmond/Kirkland area) and the Talbot Hill substation on the south end (Renton area) (Figure 1-1). These two sites are the closest substations that bring 230 kV power supply to the Eastside, and therefore supply power to this geographic area. Because of the configuration and limited capacity of the transmission system within the Eastside, a direct change in electrical demand for power flowing through these two substations, or a change in power being supplied to 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 these two substations to the electrical load and feed the area (Stantec, 2015).

1.4 SEPA REVIEW PROCESS FOR THE PROJECT

The Energize Eastside EIS is a Phased EIS (WAC 197-11-060(5)). Figure 1-2 illustrates the overall process for preparing the two phases of the Draft EIS, followed by this Final EIS.

The Phase 1 Draft EIS evaluated, at a programmatic level, various alternatives for addressing the identified project need. It describes the types of impacts that the alternatives could cause, mitigation that would be available to minimize or avoid such impacts, and any significant impacts that would be unavoidable. This programmatic evaluation was not required by SEPA but was optional and intended to provide decision-makers and community members with a better understanding of what constructing and operating the alternative methods would mean to the community, and how to best evaluate the environmental impacts of project-level alternatives that are described and analyzed in the Phase 2 Draft EIS, and in the Final EIS.

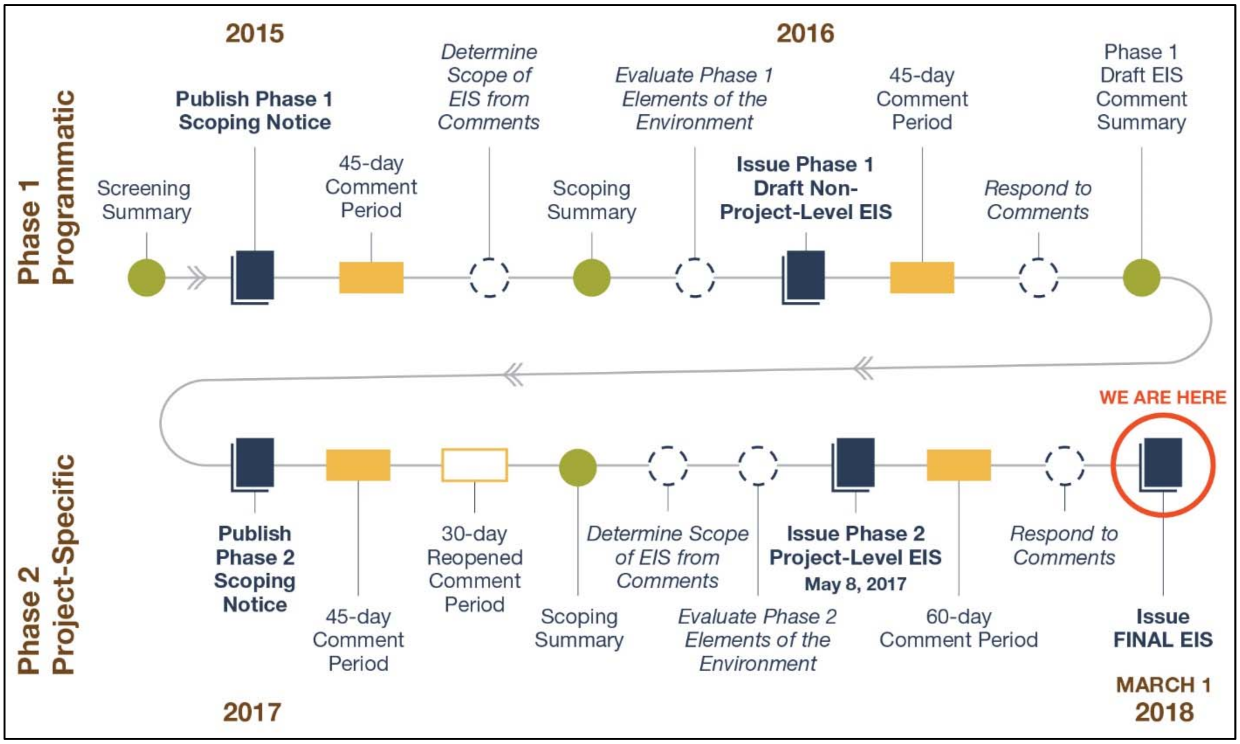


Figure 1-2. Phased EIS Process

Following release of the Phase 1 Draft EIS (in January 2016), comments were reviewed and summarized in the Phase 1 Draft EIS comment summary, available on the project website. These comments, along with comments received during the Phase 2 *scoping* period, were used to inform the selection of alternatives carried forward into the Phase 2 Draft EIS, which included additional detail on the project alternatives.

The Phase 1 Draft EIS generally did not analyze impacts associated with specific development at specified geographic locations. The Phase 2 Draft EIS included project-level alternatives based on more defined geographic locations, and a more detailed analysis of potential environmental impacts.

This Final EIS includes responses to comments on both the Phase 1 and Phase 2 Draft EIS documents (see Chapter 6, Appendix J, and Appendix K). Given the programmatic nature of the Phase 1 Draft EIS, responses to comments during Phase 1 were prepared in a comment-response narrative summary. Because the Phase 2 Draft EIS focused on a specific project proposed by PSE, responses to Phase 2 comments are presented for each individual comment received. Comments that resulted in corrections or other modifications to information presented in the Phase 1 and Phase 2 Draft EIS documents are included in Chapter 3, *Errata*.

The Final EIS evaluates PSE's Proposed Alignment, which combines and refines elements of the alternatives evaluated in the Phase 2 Draft EIS. PSE's Proposed Alignment is the alignment PSE has begun submitting permits for. The Phase 2 Draft EIS analyzed options for routing the transmission lines along various corridors other than PSE's existing 115 kV corridor. These options are not PSE's preferred alignment, but they may still be considered by the jurisdictions in their permitting decisions, since the Partner Cities have not made a decision on a preferred alternative.

DSD 005416

Together, the Phase 1 Draft EIS, Phase 2 Draft EIS, and Final EIS are intended to provide a comprehensive analysis of the project and alternatives. The Final EIS supplements the analysis in the Phase 2 Draft EIS and Phase 1 Draft EIS as part of a phased EIS process per WAC 197-11-060(5). Commenting was invited for each of the Draft EIS stages and at each of the scoping stages. All phases of the EIS will be used by the Partner Cities to support any permit decisions required.

1.5 HOW THIS EIS WAS DEVELOPED

As with the Phase 1 Draft EIS and Phase 2 Draft EIS, this Final EIS was developed under the direction of the City of Bellevue, working closely with its Partner Cities and its consultants. The project is proposed by PSE, a regulated utility. Therefore, PSE developed the project objectives and helped to define alternatives that would attain or approximate the project objectives, as required by SEPA. The City of Bellevue and its team conducted scoping to identify alternatives and the impacts to be analyzed, and based on information from PSE and public scoping comments, refined the alternatives to meet SEPA requirements, including development of a No Action Alternative.

The following major steps were taken to develop the Final EIS:

1. Following the Phase 2 Draft EIS comment period (which ended July 6, 2017), comments on the Phase 2 Draft EIS were received and compiled. Responses to comments on both the Phase 1 Draft EIS (in a narrative summary) and the Phase 2 Draft EIS (individually) were prepared, as described above.
2. PSE identified its Proposed Alignment, described in Chapter 2 of the Final EIS. This alignment uses the existing transmission line corridor described in the Phase 2 Draft EIS, but differs in some design details. The Final EIS addresses the specific impacts that are expected from PSE's Proposed Alignment.
3. The City of Bellevue and the other Partner Cities reviewed drafts of the EIS chapters prepared by the EIS Consultant Team and provided comments for EIS Consultant Team response. PSE reviewed Chapter 2, Section 2.1 only and provided appropriate clarifying revisions to the description of PSE's Proposed Alignment. The City of Bellevue, as SEPA Lead Agency, performed final review of the Final EIS prior to publication.

Project background materials are available on the Energize Eastside EIS Project website, via the Library tab (www.EnergizeEastsideEIS.org/library.html).

1.6 PARTNER CITY REVIEW PROCESS

The Partner Cities were engaged through the preparation of the EIS. During the scoping process for each phase, the Partner Cities were presented with options for alternatives to be considered. In examining alternatives, the EIS Consultant Team, including technical subconsultants, met with the Partner Cities and responded to questions about technical feasibility, likely impacts, and other concerns. In some instances, this involved additional research and inquiry by both the EIS Consultant Team and the Partner Cities into specific potential alternatives. The Partner Cities reached unanimous agreement on the alternatives to be included in each Draft EIS, as well as the Final EIS.

During preparation of the EIS documents, the EIS Consultant Team worked closely with the Lead Agency, the City of Bellevue, to develop the outline, methodology, and content of the EIS. While initial and final review was delegated to the City of Bellevue, preliminary drafts of all sections of the

EIS were provided to assigned City staff for each City, with sufficient time to review and provide comments. The EIS Consultant Team discussed the comments and concerns with the Partner Cities in meetings, and Partner Cities provided their comments in writing. The EIS Consultant Team responded to each comment by making the changes requested or providing an explanation in the limited instances where the requested change could not be made. When requested, Partner Cities were provided with second or third drafts of revisions to ensure that their concerns had been adequately addressed. The final products (Phase 1 Draft EIS, Phase 2 Draft EIS, and Final EIS) reflect the input and consensus of all of the Partner Cities.

1.7 PUBLIC INPUT

The scope of this EIS has incorporated public comment received through website forms, emails, oral testimony, and letters. During Phase 1, comments regarding the need for the project helped focus attention on clarifying the project objectives. In both Phases 1 and 2, comments about the alternatives resulted in changes to the alternatives as originally proposed. Comments from both Phase 1 and Phase 2 about potential impacts were catalogued and evaluated by the EIS Consultant Team and the Lead Agency to determine which impacts could be significant. The results of the scoping process for the Phase 2 Draft EIS are summarized in the *Phase 2 Draft EIS Scoping Comment Summary Reports (Parts 1 and 2)* (City of Bellevue, 2016a, 2016b). Scoping and public comment from both Phase 1 and Phase 2 informed the analysis as presented in the Final EIS. Public comments on the Phase 2 Draft EIS also led to additional analysis and clarification in the Final EIS.

1.8 ALTERNATIVES EVALUATED IN THE FINAL EIS

Chapter 2 describes in detail the alternatives included in the Final EIS. The EIS evaluates a No Action Alternative and one action alternative (PSE’s Proposed Alignment), summarized below.

The action alternative evaluated in the Final EIS (PSE’s Proposed Alignment) is a refined route based on the results of the analysis of the action alternative segments and options as presented in the Phase 2 Draft EIS. In particular, the Phase 2 Draft EIS included analysis of several options in central and south Bellevue, some of which departed from PSE’s existing 115 kV corridor. Based on the results of that analysis and subsequent comments received, PSE has refined its proposed route, and PSE’s Proposed Alignment as evaluated within this Final EIS is entirely within PSE’s existing 115kV corridor. Two options are evaluated for the Newcastle Segment for this Final EIS. The No Code Variance Option (Option 1) is similar to what was evaluated in the Phase 2 Draft EIS. The Code Variance Option (Option 2) is PSE’s preferred option in this segment because the poles can be shorter and can be set farther away from homes. More information is provided in Chapter 2, Project Alternatives.

Under either alternative, it is assumed that PSE would continue to achieve 100 percent of the company’s conservation goals as outlined in its *2017 Integrated Resource Plan* (PSE, 2017d), system wide and for the Eastside. Conservation goals are achieved through a variety of energy efficiency improvements implemented by PSE and its customers. Conservation refers to electrical energy savings above and beyond state or local energy code requirements. For additional information on conservation efforts in PSE’s service area, see Section 2.3.1 of the Phase 1 Draft EIS. Since conservation efforts would not change as a result of the project, impacts associated with such efforts are not analyzed in this EIS.

1.8.1 No Action Alternative

As required by SEPA, the No Action Alternative must be evaluated in an EIS, as a baseline against which the action alternatives can be evaluated and compared. The No Action Alternative includes the following:

- Ongoing maintenance that PSE can do without requiring state or local approvals.
- No new 230 kV transmission lines or substation.

1.8.2 PSE's Proposed Alignment: New Substation and Overhead 230 kV Transmission Lines

PSE's proposed project (PSE's Proposed Alignment) includes two main components:

1. **New 230 kV overhead transmission lines,** connecting the Sammamish substation in Redmond and the Talbot Hill substation in Renton, a distance of approximately 16 miles; and
2. **A new substation, called the Richards Creek substation,** adjacent to the existing Lakeside substation in Bellevue.

The new Richards Creek substation and upgraded transmission lines would increase electrical capacity and improve reliability of the electrical grid for Eastside communities. PSE has proposed an alignment for the transmission line, described in Section 2.2.2. PSE proposes to use its existing 115 kV corridor, replacing the existing poles and conductors with new poles and conductors.

The segments analyzed in the EIS are broken down by jurisdiction. The Redmond, Newcastle, and Renton Segments each consists of one alignment that extends through that jurisdiction. Although the Final EIS presents two options for the Newcastle Segment, both of these options follow the same alignment (the options differ by pole type and placement). Bellevue is divided into three segments, because the Phase 2 Draft EIS included several route options within those areas. As Lead Agency, the City of Bellevue decided to retain the three-segment organization of the analysis within Bellevue for the Final EIS, to facilitate comparison of the options presented in the Phase 2 Draft EIS with PSE's Proposed Alignment in the Final EIS. PSE's Proposed Alignment, as evaluated in this Final EIS, is entirely within PSE's existing 115 kV corridor.

1.9 ENVIRONMENTAL REVIEW AND NEXT STEPS IN THE ENERGIZE EASTSIDE EIS PROCESS

The City of Bellevue and other Partner Cities published the Phase 1 Draft EIS on January 28, 2016. For Phase 1, a 45-day comment period was open until March 14, 2016 and included five public hearings (from February 23 through March 1, 2016). The City of Bellevue and other Partner Cities published the Phase 2 Draft EIS on May 8, 2017. For Phase 2, a 60-day comment period (initially a 45-day period but extended by request) was open until July 6, 2017 and included three public hearings (from May 23 through June 3, 2017). Based on the analysis in the Phase 1 Draft EIS and Phase 2 Draft EIS, public comments, and technical analysis by PSE engineers and consulting engineers, PSE refined its proposal as PSE's Proposed Alignment, the alignment evaluated in this Final EIS. The Partner City communities and other permitting agencies will use the Final EIS in making permit decisions regarding the project.

Following publication of the Final EIS, PSE will need to obtain land use and construction permits from each of the five jurisdictions where the Energize Eastside project is proposed to be built: Redmond, Bellevue, Newcastle, Redmond, and unincorporated King County. Applications for local permits have already been submitted for the first phase of the project, including Renton, Newcastle, and the southern portion of the project in Bellevue.

Each of the five jurisdictions has its own land use permitting process. The permits required for the Partner Cities are shown in Figure 1-3.

PSE would also require other permits, including land use and construction permits from King County. For any construction in a wetland, PSE would also need a Section 404 permit issued by the U.S. Army Corps of Engineers. Other entities such as the Washington Utilities and Transportation Commission (WUTC), Bonneville Power Administration (BPA), North American Electric Reliability Corporation (NERC), and Federal Energy Regulatory Commission (FERC) would not be involved in local construction permitting. They would, however, be involved in setting utility rates and regulating PSE's system to ensure it is operating safely and in accord with regional and federal requirements. For additional detail on required permits, see the Fact Sheet.

If approved, the final design and permitting process for the first phase of the project is expected to be completed by summer 2018, with construction beginning soon after. (Phasing is described in further detail in Chapter 2.) Project completion would be late 2019 or early 2020 at the earliest.

1.10 ELEMENTS OF THE ENVIRONMENT NOT ANALYZED IN THE FINAL EIS

As required by SEPA (WAC 197-11-440(6)), elements of the environment that are not significantly affected do not need to be included in an EIS. The following are elements of the environment evaluated in the Phase 1 Draft EIS that would not be significantly affected by the proposed project, and were therefore not analyzed in either the Phase 2 Draft EIS or this Final EIS.

Public Services – As described in the Phase 1 Draft EIS, neither the No Action Alternative nor the Energize Eastside project alternatives would significantly increase the demand for public services, or significantly hinder the delivery of services. Existing services are also adequate to address impacts from the project. Therefore, no significant impacts are expected. Several comments were received during the Phase 1 Draft EIS and Phase 2 Draft EIS regarding the ability of local emergency service providers to respond to a fire or other release on the *Olympic Pipeline system*. For additional discussion of this issue, please see "Key Theme" (Issue) SVC-1 in the response to comments on the Phase 1 Draft EIS in Chapter 6 and Appendix J of this Final EIS.

Utilities – As described in the Phase 1 Draft EIS, neither the No Action Alternative nor the Energize Eastside project alternatives would significantly increase the demand for utilities, or significantly affect utility operations, except as described in the Phase 1 Draft EIS with regard to electrical reliability. Therefore, no significant adverse impacts are expected for the Energize Eastside project alternatives. Significant adverse impacts to utilities (e.g., rolling blackouts) could occur under the No Action Alternative if capacity increases are not implemented, as described in the Phase 1 Draft EIS. Public safety issues related to the Olympic Pipeline system are addressed in this Final EIS under Environmental Health - Pipeline Safety.

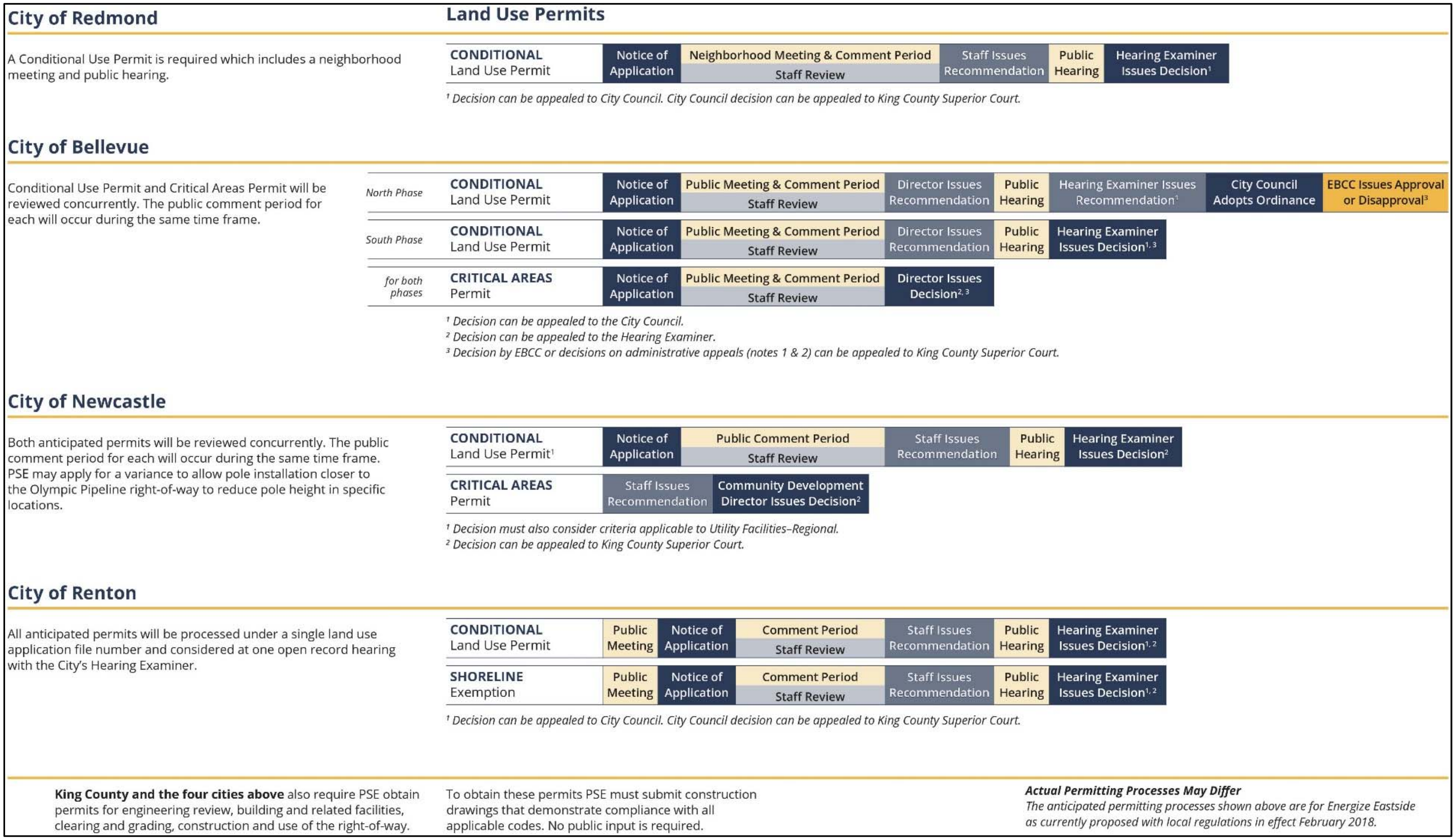


Figure 1-3. Permitting Required for the Energize Eastside Project by Partner Cities

Transportation – The only potential for significant transportation impacts that was described in the Phase 1 Draft EIS was the possibility of building the transmission line underground in a street right-of-way. Since this alternative is not being carried forward, there was no need to further analyze transportation impacts from the project in the Phase 2 Draft EIS or the Final EIS. Transportation impacts resulting from construction of PSE's Proposed Alignment would be below the level of significance and addressed through regulatory requirements as part of the right-of-way use permit. If undergrounding were required as mitigation, regulatory requirements for right-of-way use could ensure that significant impacts are avoided.

Energy and Natural Resources – The project would not affect the generation or consumption of energy. Energy consumption would be essentially the same under all alternatives, with the exception that any temporary minor reduction in consumption under the No Action Alternative due to rolling blackouts would not be as likely to occur under PSE's Proposed Alignment. The project would consume other natural resources, but such consumption is not considered a significant impact.

Noise – As described in the Phase 1 Draft EIS, there would be no significant and unavoidable adverse noise impacts associated with any of the project alternatives, either during construction or operation. Several comments were received during the Phase 1 Draft EIS and Phase 2 Draft EIS regarding potential noise impacts. For additional discussion of this issue, please see Topic Noise (and associated "NOI" Key Themes) in the response to comments summary in Appendix J-1, as well as Chapter 6, of this Final EIS.

Each of these elements was analyzed in the Phase 1 Draft EIS. Comments from Phase 1 that address these topics are included and responded to in this Final EIS (see Chapter 6 and Appendix J).

1.11 KEY FINDINGS OF THE EIS (SUMMARY BY ELEMENT OF THE ENVIRONMENT)

The following pages provide a summary of the findings of each element of the environment, as analyzed in detail in Chapter 4 and Chapter 5 of this Final EIS. For each element of the environment evaluated in the EIS, these two-page summaries provide a brief description of key findings about the affected environment, potential impacts, mitigation available, cumulative impacts, and any unavoidable significant impacts. Summaries are not intended as a replacement for the more thorough analyses presented in Chapter 4 and Chapter 5.

Impacts are generally categorized as less-than-significant, or significant. Less-than significant does not imply the impacts would be negligible or insignificant, but rather that the impact does not meet the definition of a significant impact under SEPA, as determined by the lead agency. SEPA also provides substantive authority to mitigate moderate and minor impacts to the environment. Each subsection of Chapters 4 and 5 defines "significant" and "less-than-significant" for the specific element of the environment and provides detailed descriptions of impacts. Impacts that are described in this EIS as "negligible" refer to small impacts that would be inconsequential.

For each element of the environment evaluated, the EIS identifies mitigation measures. Mitigation measures are implemented to reduce or eliminate the adverse impacts associated with a proposed action. Mitigation can be achieved through avoidance, minimization, rectification, elimination, compensation, or monitoring of environmental impacts (WAC 197-11-768, *Mitigation*).

Mitigation measures must be related to a specific adverse impact clearly identified in an environmental document (WAC 197-11-744) on the proposal, and must be reasonable and capable of being accomplished [WAC 197-11-660(1)(b) and (c)]. They can be mandated through regulations, suggested by the applicant, or recommended in an environmental document, such as this EIS. Mitigation measures may be required if existing regulations are not sufficient to provide adequate mitigation for an impact. Mitigation beyond compliance with existing regulations can be required, even if the impacts are not considered significant, provided the mitigation is based on a SEPA policy adopted by the decision making agency.

Mitigation measures can be applied prior to construction (e.g., through design changes), during construction, or during operation of the project. In general, mitigation measures applied prior to construction or during operation address long-term impacts. Conversely, mitigation measures applied during construction address short-term, construction-related impacts.

In the Final EIS, possible mitigation measures for PSE's Proposed Alignment are listed and described in Chapters 4 and 5 at the end of each element of the environment. Application of these measures and/or additional measures will be determined during the permit process. In addition, the Final EIS includes a new appendix (Appendix M) that compiles and summarizes potential mitigation measures presented in the Phase 1 Draft EIS, Phase 2 Draft EIS, and the Final EIS.

Land Use & Housing

Typical multi-family residential development in Bellevue

Typical single-family residential development

AFFECTED ENVIRONMENT

Land Use

Existing Land Use: The most common existing land uses in the study area are residential (49 percent), vacant land (17 percent), and institutional (9 percent).

Neighborhood Character: The study area passes through numerous neighborhoods. The proposed Richards Creek substation site is surrounded by mostly industrial area. The Redmond, Bellevue North, and Newcastle Segments pass through mostly residential neighborhoods. The Bellevue Central Segment, Bellevue South Segment, and the Renton Segment pass through a mix of neighborhoods, including residential, commercial, recreation, and institutional.

Zoning: The most common zoning category along the corridor is single-family residential (70 percent).

Future Land Use: Comprehensive Plans for the Partner Cities identify future land use designations to protect existing single-family neighborhoods, provide opportunities for infill development, increase opportunities for new multi-family development, and encourage redevelopment of commercial land uses into mixed-use developments, particularly in the Bellevue Central and Bellevue South Segments.

Housing

There are about 663 single-family and 2,205 multi-family residences in the study area, with the highest density areas in the Bellevue Central Segment.

Renton Technical College, Renton

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- Each segment of the project would be consistent with land use-related policies in applicable city and subarea plans.
- Some segments were found to be inconsistent with aesthetic and recreation-related policies. See the corresponding sections for more detail.
- For crossing of Cedar River Shoreline, operation must be considered maintenance or repair.

CONSTRUCTION IMPACTS

- Construction impacts, due to their temporary nature, would be less-than-significant.

CUMULATIVE IMPACTS

- The project is not expected to alter land use or the supply of housing. The project would not affect the scale of additional development, but if the project were not constructed, it could slow the rate of additional development on the Eastside.

NO ACTION ALTERNATIVE IMPACTS

- No direct impacts to land use and housing in the study area would occur.
- Potential inconsistency with the Growth Management Act and Comprehensive Plan policies that require planning for utilities to accommodate anticipated growth.

Mitigation Measures

- Co-locate utilities.
- Adhere to zoning regulations.
- Comply with conditional use permits and other permits, as required.
- Underground distribution lines where feasible.
- Underground portions of the transmission line.

Significant Unavoidable Adverse Impacts

- There are no significant unavoidable adverse impacts to land use and housing.

Scenic Views & Aesthetic Environment


Coal Creek Natural Area in Bellevue


Cedar River Trail in Renton

AFFECTED ENVIRONMENT

Aesthetic Environment

Natural Environment: Rolling topography with hills (e.g., Woodridge, Somerset, and Olympus), ravines (Coal Creek, May Creek, and Honey Creek), and valleys (Richards Valley and Cedar River). Notable water bodies crossed by or near the project include the Cedar River; Sunset, Coal, Richards, Kelsey, May, and Honey creeks; and Swan Lake. Tree density is highest in undeveloped areas (e.g., the ravines) and lowest in highly urbanized areas (e.g., Bel-Red).

Built Environment: Predominately single-family housing, with some low-density commercial buildings with large parking lots (e.g., Bel-Red and Sunset Plaza). Some industrial warehouses (e.g., west of Lakeside substation) and larger institutional buildings (schools and churches) throughout the study area. Utility infrastructure includes substations, 230 kV lattice towers, and 115 kV and 12.5 kV circuits on wood poles.

Visual Quality: In general, visual quality varies but is better in areas where the natural environment is relatively intact, residential and commercial areas have consistent scale and character, and where there is minimal utility presence. The study area has areas with low, medium, and high visual quality. Areas with higher visual quality include the ravines and natural areas (e.g., Coal Creek Natural Area), Lake Boren, and residential areas away from the existing transmission corridor that have consistent building height and form. Areas with lower visual quality include the existing transmission line corridor, the industrial area surrounding the Lakeside substation, and areas with a variety of building forms and heights (e.g., north of Bel-Red Road and south of SR-520).

Scenic Views

The Olympics, the Cascades, Mount Rainier, Cougar Mountain, Lake Washington, Lake Sammamish, and the downtown Bellevue and downtown Seattle skylines.


View of Lake Washington from Somerset neighborhood

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- Visual quality could change due to contrast with the natural and built environment from vegetation removal, incompatibility with the surrounding environment, and visual clutter.
- Scenic views could be obstructed by increased pole height.
- Viewer sensitivity to impacts to scenic views and the aesthetic environment is important. Groups with the highest viewer sensitivity are residential viewers and users of recreation areas.
- The Newcastle Segment (both options) and the Bellevue South Segment are expected to have significant impacts due to high viewer sensitivity and substantial contrast with the aesthetic environment.

CONSTRUCTION IMPACTS

- Construction impacts, due to their temporary nature, would be less-than-significant.

CUMULATIVE IMPACTS

- Development increases the likelihood of impacts to scenic views and the aesthetic environment. The project would not affect the scale of development, but if the project were not constructed, it could slow the rate of development on the Eastside.

NO ACTION ALTERNATIVE IMPACTS

- No substantial new infrastructure would be introduced into the aesthetic environment; therefore, no significant contrast would be created.

Mitigation Measures

- Co-locate utilities.
- Limit vegetation disturbance, and revegetate with vegetation compatible with clearance requirements.
- Sight-screen utilities using landscaping and fencing.
- Underground portions of the transmission line.
- Design overhead transmission lines to be aesthetically compatible with surrounding land uses. This could include design measures such as changes to pole height, spacing, location, or color.

Significant Unavoidable Adverse Impacts

- There would be no significant adverse impacts to scenic views.
- Significant aesthetic impacts from the Bellevue South Segment could be avoided by selecting a different option that has shorter poles.
- Significant aesthetic impacts from the Newcastle Segment could be reduced if the Variance Option is selected; however, significant impacts would not be avoided.
- All significant impacts could be avoided if the lines were placed underground.

Water Resources

May Creek, Newcastle

Cedar River, Renton

AFFECTED ENVIRONMENT

Streams and Rivers

The study area includes several streams and the Cedar River. Most major streams, including Kelsey Creek, Coal Creek, and May Creek, flow generally from east to west and drain to Lake Washington. Streams in the Redmond and Bellevue North area, including Willows Creek, drain to Lake Sammamish or the Sammamish River. Kelsey Creek in Bellevue and Cedar River in Renton are Shorelines of the State and regulated under each jurisdiction's Shoreline Master Program.

Wetlands

Numerous wetlands are located along the transmission line corridor. The majority are small Category II or III wetlands (using Ecology's wetland rating system), but a major wetland complex is located at the north end of the transmission line in connection with Willows Creek in Redmond.

Groundwater

Depths to groundwater along the transmission line range from less than 10 feet to approximately 60 feet. Within the study area, Redmond and Renton utilize groundwater for their water supply. The north end of the transmission line is located over Redmond's Wellhead Protection Zone 4, and the south end is located over Renton's Wellhead Protection Zone 2.

Kelsey Creek Park wetland mitigation

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- Minor loss of function and acreage of wetlands, and stream and wetland buffers that would be mitigated through compliance with applicable regulations.
- Minor increases in stormwater runoff and erosion from new poles and access roads. Compliance with applicable stormwater regulations would mitigate impacts.

CONSTRUCTION IMPACTS

- Construction would require vegetation clearing, excavation, and limited in-water work, which could temporarily increase erosion and sedimentation. Implementation of BMPs would reduce these impacts to less-than-significant.
- Pole installation could encounter shallow groundwater requiring dewatering. Excavated areas would be small, so dewatering would be minimal and impacts would be less-than-significant.

CUMULATIVE IMPACTS

- The project is not expected to contribute to indirect or direct impacts to water resources resulting from other projects; therefore, no cumulative impacts to water resources would occur.

NO ACTION ALTERNATIVE IMPACTS

- The No Action Alternative does not include substantial new infrastructure; therefore, no significant impacts would occur on stormwater runoff, surface water quality or quantity, or groundwater.
- PSE's maintenance activities would include vegetation removal, but ground clearing would be limited and erosion would not increase.

Mitigation Measures

- Comply with Partner Cities' critical areas regulations for wetland and buffer impacts.
- Comply with state and federal wetland and water quality regulations.
- Comply with Renton's Shoreline Master Program for the Cedar River.
- Comply with Partner Cities' stormwater regulations.
- Implement BMPs to reduce construction impacts.
- Develop and implement a Stormwater Pollution Prevention Plan, Temporary Erosion and Sediment Control Plan, and Spill Prevention, Control and Countermeasures Plan to minimize construction impacts to water quality.
- Comply with Redmond's and Renton's Wellhead Protection Zone construction standards to minimize impacts to drinking water sources.

Significant Unavoidable Adverse Impacts

- No significant unavoidable adverse impacts would occur because there would be no long-term impacts.

Plants & Animals

Great blue heron

Cedar River Valley

AFFECTED ENVIRONMENT

Vegetation cover types include herbaceous, scrub-shrub, forest, agricultural, and woody and herbaceous wetland vegetation. Upland and aquatic fish and wildlife species are present, frequently associated with stream, wetland, and critical habitats. Trees are present throughout the study area, including significant trees (defined as healthy evergreen or deciduous trees, typically 6 inches in diameter or greater, measured 4 feet above existing grade).

Kelsey Creek tributary, Bellevue

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- Minor disturbance or loss of habitat through routine vegetation and facility maintenance activities.
- Loss of wildlife habitat due to tree removal, trimming, and other management activities.
- Loss or degradation of fish habitat due to the removal of trees in critical areas and buffers.
- Operational impacts would be less-than-significant, as the basic character and functions of the habitat in the corridor would be maintained, and few protected wildlife species regularly occur in the study area.

CONSTRUCTION IMPACTS

- Loss or disturbance of plants and habitat during construction activities. Impact level depends largely on pole placement. Implementation of construction BMPs would result in less-than-significant impacts, and disturbed areas would be replanted with native vegetation.

CUMULATIVE IMPACTS

- Development increases the likelihood of impacts to fish and wildlife habitat. The project would contribute to urbanization through the removal of trees and a loss or degradation of fish and wildlife habitat. However, cumulative impacts would be less-than-significant as the overall habitat character and functions would be maintained.

NO ACTION ALTERNATIVE IMPACTS

- Pole maintenance, including replacement, and routine vegetation maintenance could cause habitat alteration or loss of existing plants and animals, and degradation of aquatic and upland habitat. However, compliance with environmental regulations and implementation of BMPs would result in less-than-significant impacts.

Mitigation Measures

- Minimize tree removal, trimming, and management activities to the extent practicable.
- Implement minimization measures: erosion control, spill prevention and control plans, and BMPs.
- Replant and stabilize disturbed construction staging areas with native trees, shrubs, and grasses that would meet powerline clearance requirements.
- Comply with existing regulations and operational management plans.
- Comply with critical area ordinances.

Significant Unavoidable Adverse Impacts

- No significant unavoidable adverse impacts would occur because there would be no significant long-term impacts.

Greenhouse Gases

Existing 115 kV transmission line in Redmond

Lakeside substation, Bellevue

Traffic on I-90 heading west

AFFECTED ENVIRONMENT

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because, like a greenhouse, they capture heat radiated from the earth. The accumulation of GHGs is a driving force in global climate change. Definitions of climate change vary among regulatory authorities and the scientific community. In general, however, climate change is the changing of the earth's climate caused by natural fluctuations and human activities that alter the composition of the global atmosphere. In emissions inventories, GHG emissions are typically reported in terms of metric tons of CO_2 equivalents (CO_2e). The GHG environment is the area where the project would directly or indirectly result in GHG emissions or a reduction of carbon sequestration. Carbon sequestration is a process that traps atmospheric CO_2 in plants or soil.

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- Removal of trees and vegetation would reduce carbon sequestration.
- Employee vehicle trips to maintain the new facilities would increase GHG emissions.
- Substations with equipment that use SF6 as an insulating gas could cause some fugitive emissions.

CONSTRUCTION IMPACTS

- Construction truck trips, off-road equipment, and worker trips would temporarily generate GHG emissions.

CUMULATIVE IMPACTS

- GHGs are a component of cumulative climate change impacts; both the construction and operational impacts reflect cumulative impacts.

NO ACTION ALTERNATIVE IMPACTS

- No new infrastructure improvements or utility yards.
- No changes to vegetation maintenance activities.
- No new employee vehicle trips.

Mitigation Measures

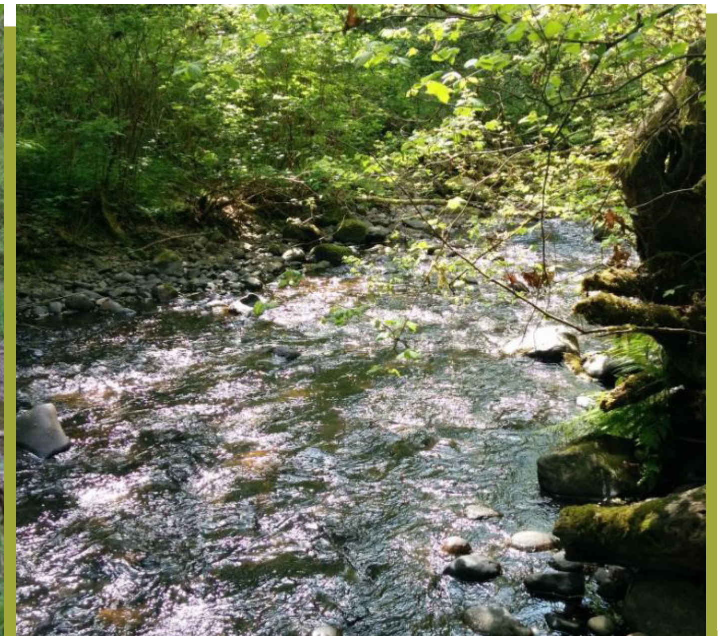
- Install SF6 equipment at substations with manufactured guaranteed leakage rate of 0.1 percent.
- Limit vegetation disturbance.
- Plant an equivalent number of trees to those removed for the project.

Significant Unavoidable Adverse Impacts

- None identified – greenhouse gases for the project would not create an increase that would be above the state reporting thresholds.

Recreation

Coal Creek Trail, Bellevue



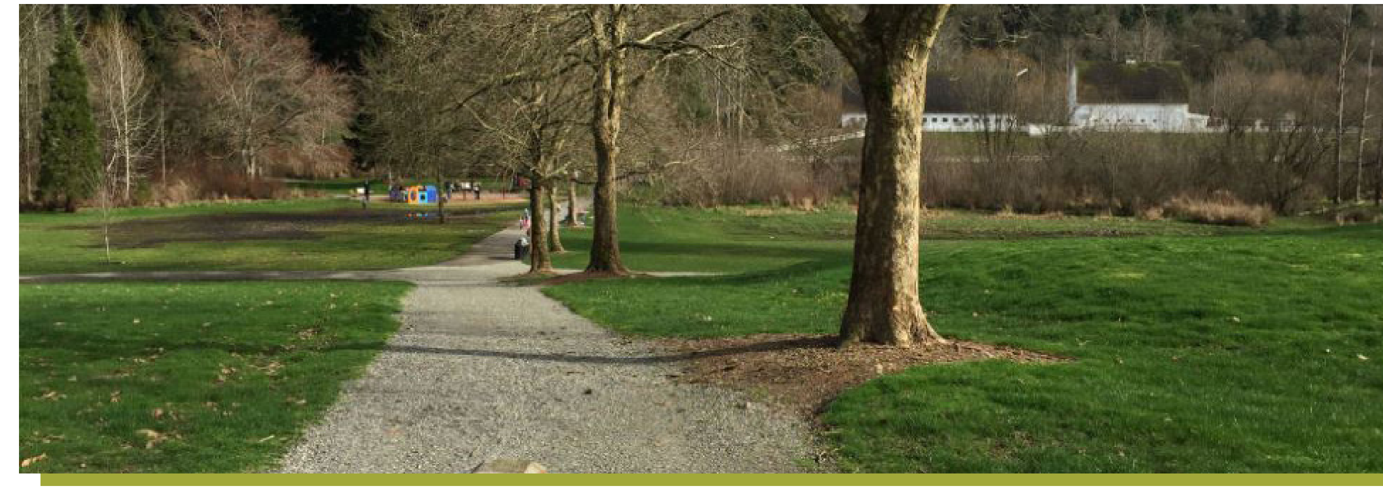
May Creek Natural Area, Newcastle

AFFECTED ENVIRONMENT

Recreation Study Area: PSE's existing corridor, and road corridors and parcels adjacent to PSE's Proposed Alignment.

Recreation Sites: Parks, natural areas, open spaces, trails, and playfields, as well as amenities such as community centers, playground equipment, and school playfields and private recreation clubs (such as golf clubs). The study area contains approximately 18 recreation sites plus many miles of trails. This encompasses approximately 475 acres in recreation sites owned and operated primarily by local governments, and includes four schools and two privately owned recreation clubs. The sites provide a variety of recreational opportunities, ranging from small neighborhood or "pocket" parks to large natural park areas and regional trails that extend across the study area. Recreation sites are used primarily by local residents, with the exception of the larger recreation areas and regional trails, which also draw visitors from neighboring communities. Hiking, walking, bicycling, enjoying playgrounds, and picnicking are the primary activities.

Informal Recreation: Activities outside of the designated recreation sites, such as bicycling on a street.



Kelsey Creek Park, Bellevue

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- Park user experience may change with replacement poles that are taller and/or in different locations than existing poles.
- Park user experience could be negatively impacted by tree removal in some recreation sites.
- Magnitude of impact varies depending on location of poles and number of trees removed, but impacts on park users would not be significant in any location.

CONSTRUCTION IMPACTS

- Temporary loss of the use of a recreation site during construction.
- Construction activities may decrease the enjoyment of a recreation site during construction.

CUMULATIVE IMPACTS

- In general, there is pressure on recreation areas from development and increased use. Impacts although less-than-significant to recreation sites from PSE's Proposed Alignment could contribute to the degradation of existing recreation resources and limit the ability for municipalities to provide additional recreation opportunities, unless mitigation is provided.

NO ACTION ALTERNATIVE IMPACTS

- No new utility infrastructure would be placed in or adjacent to recreation sites; therefore, no significant impacts would be created.

Mitigation Measures

- Avoid placing utility infrastructure within or adjacent to recreation sites where there is none currently.
- Adhere to restrictions that protect recreation land from conversion to other uses.
- Limit vegetation disturbance, both during construction and operation. Restore areas cleared for construction.
- Notify local jurisdictions, schools, or private owners in advance of work within recreation sites.

Significant Unavoidable Adverse Impacts

- None.

DSD 005429

Historic & Cultural Resources

115 kV wooden H-frame

Newcastle Cemetery

AFFECTED ENVIRONMENT

Study Area

Archaeological evidence indicates human activity in the Pacific Northwest and Puget Sound since at least 12,500 years ago. Within 2 miles of the Redmond Segment is an archaeological site that dates to the earliest known time period of human occupation in the region.

Historic Resources

There are five significant historic resources and hundreds of unevaluated historic resources in the study area. All segments and options contain portions of the Eastside Transmission Corridor, which has been recommended eligible for listing on the National Register of Historic Places. The other resources are the Somerset Neighborhood, Newcastle Cemetery, Mt. Olivet Cemetery, and the Twin Valley Dairy Barn at Kelsey Creek Farm Park.

Archaeological Resources

One protected archaeological resource is recorded within the study area (the Columbia & Puget Sound Railroad). In general, the study area has very low sensitivity for containing additional unrecorded archaeological resources, with the exception of the Kelsey Creek and Cedar River areas, which have a very high sensitivity.

Twin Valley Dairy Barn

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- Potential impacts to significant historic resources and protected archaeological resources could result from pole replacement, ground disturbance, demolition, relocation, or alterations to the visual setting of resources.
- Potential impacts to unevaluated historic resources will be determined when the historic property inventory is completed. Significant impacts to these resources could occur, although not all are likely to be eligible for listing.

CONSTRUCTION IMPACTS

- Construction impacts, due to their temporary nature, would be less-than-significant.

CUMULATIVE IMPACTS

- Development increases the potential for impacts to historic and cultural resources, if present where development could occur. Impacts to belowground archaeological resources could occur during ground disturbance. Impacts to historic resources could occur from demolition or alterations to the setting.

NO ACTION ALTERNATIVE IMPACTS

- Ground disturbance due to routine pole replacement has the potential to impact belowground archaeological resources, if present.
- Routine pole replacement would impact the Eastside Transmission Corridor, which has been recommended eligible for listing in the National Register of Historic Places.

Mitigation Measures

- Conduct a historic property inventory and belowground archaeological survey. This would document and prepare eligibility recommendations for all identified archaeological resources and unevaluated historic resources. PSE has conducted the historic property inventory, and will submit to DAHP for review. PSE is currently conducting phased belowground archaeological survey.
- Consult with the Department of Archaeology and Historic Preservation (DAHP) to obtain eligibility determinations for recommended eligible resources, including the Eastside Transmission Corridor.
- Consult with DAHP, King County Historic Preservation Program, municipal governments, affected Tribes, and other stakeholders as applicable to the resource to develop resource-specific mitigation measures.
- Apply for an archaeological excavation permit from DAHP if impacts to a protected archaeological resource cannot be avoided.
- Prepare an Inadvertent Discovery Plan prior to construction of the project.

Significant Unavoidable Adverse Impacts

- No significant unavoidable adverse impacts are anticipated as it is probable that all impacts could be mitigated through consultation with DAHP, King County Historic Preservation Program, municipal governments, affected Tribes, and other stakeholders.

Environmental Health
Electric & Magnetic Fields (EMF)


City of Bellevue, proposed transmission lines North Bellevue


City of Bellevue, existing transmission lines Tyee Middle School

AFFECTED ENVIRONMENT

Magnetic Fields in Study Area

Power-frequency EMF associated with transmission of electric power is present underneath and adjacent to PSE's existing 115 kV transmission lines and substations. In response to concerns expressed during the public scoping comment period, Power Engineers, a subconsultant to PSE, modeled magnetic field levels that would be associated with the No Action Alternative and PSE's Proposed Alignment.

Methods and Approach to Identifying Calculated Magnetic Field Levels

Power Engineers calculated potential magnetic fields at 35 representative locations along the transmission line corridor for the winter 2027/2028 and summer 2028 peak periods. Calculated magnetic field levels were computed as a function of distance away from the centerline of the existing transmission line corridor. The maximum magnetic field levels would typically occur within the corridor and drop in value at the edge of the right-of-way, and further drop in value at the outermost edge of the study area (defined as 250 feet from the centerline of the corridor).

EMF Exposure Guidelines

Reference guidelines for limiting EMF exposure have been adopted by three organizations. The Institute of Electrical and Electronics Engineers (IEEE) Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields sets limits of 9,040 milligauss (milligauss or mG is a commonly used unit of measurement of magnetic field strength) for the general public. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) recommends a limit of 2,000 mG for the general public. The American Council of Governmental Industrial Hygienists (ACGIH) sets limits of 10,000 mG for workers with cardiac pacemakers.


City of Renton, proposed transmission lines

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- All parts of the Energize Eastside project would have associated magnetic fields during operation, and would vary depending on the pole type and electrical load.
- Operation of the proposed transmission lines would result in a decrease of magnetic field levels for all segments and options.
- There are no known health effects from power frequency EMF. For all proposed segments and options, the calculated magnetic field levels would be well below reference guidelines. Therefore, under PSE's Proposed Alignment, impacts would be less-than-significant.

CONSTRUCTION IMPACTS

- Magnetic fields from construction equipment would be indistinguishable from background levels for the public outside of the construction site. Construction impacts would be less-than-significant.

CUMULATIVE IMPACTS

- The project would reduce magnetic fields along the existing corridor; therefore, there would be no cumulative effect.

NO ACTION ALTERNATIVE IMPACTS

- Operation under the existing 115 kV transmission lines would result in an increase in magnetic field levels during winter peak periods and a decrease during summer peak periods for segments south of the Lakeside substation (Bellevue South, Newcastle, and Renton Segments), and a decrease in magnetic field levels during winter and summer peak periods in the segments north of the Lakeside substation (Redmond, Bellevue North, and Bellevue Central Segments).
- There are no known health effects from power frequency EMF. The magnetic field levels indicate that the existing corridor under the No Action Alternative would have calculated magnetic field levels well below reference guidelines. Therefore, impacts would be less-than-significant.

Mitigation Measures

- No adverse impacts from magnetic fields are expected; therefore, no mitigation is proposed.

Significant Unavoidable Adverse Impacts

- No adverse impacts are likely from power frequency EMF at the levels of public exposure from the Energize Eastside project. It follows that no unavoidable significant impacts under SEPA would occur.

DSD 005431

Environmental Health Pipeline Safety

City of Newcastle, co-location with existing transmission lines

AFFECTED ENVIRONMENT

Pipelines in Study Area

The Olympic Pipeline system is located within the study area (defined as the transmission line corridor and the surrounding area that could be affected by an incident) and includes two pipelines. One or both pipelines are co-located with PSE's existing corridor within all of the segments; in the Renton Segment, they are co-located only in the north part of the segment. The pipelines carry diesel, jet fuel, and gasoline and operate about 95 percent of the time.

Potential for Pipeline Damage

The Energize Eastside project could increase the risk of damage to the Olympic Pipeline system. Although the probability of a leak or fire caused by the project is low, the potential damage from such an incident could be high, given the population density in the study area. The project could affect pipeline safety primarily in two ways: outside force/excavation, and/or electrical interference. These could cause unintentional releases from the pipeline, placing the public at risk.

Outside force/excavation could occur during construction of the transmission line. Excavation activities or surcharge loading from construction equipment could damage the pipeline.

Electrical interference could occur during normal transmission line operation, which could contribute to accelerated external corrosion damage on the pipeline, or as a result of fault conditions. Fault conditions involve elevated electric currents (typically caused by lightning, insulator failure, mechanical failure, or transformer failure) that can lead to fault damage or arcing damage to the pipeline.

Methods and Approach to Identifying Change in Risk

Risk = Event Probability (Likelihood) x Severity of Consequences (Impact)

EDM Services, a firm specializing in pipeline safety, conducted a pipeline risk assessment to determine if the project would change the risk of potential damage to the pipelines. Risk is presented as the probability that a specific consequence will occur within a specified time period. The severity of the impact depends on the nature and quantity of the substance released, as well as the proximity to people.

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- The probability of a pipeline incident such as damage to a pipe wall as a result of electrical interference could be slightly higher in some locations when compared with the No Action Alternative. In these areas, testing, monitoring, engineering analysis, and implementation of mitigation measures would lower these risks.
- The likelihood of a pipeline rupture and fire would remain low, and no substantial change in risk from existing conditions has been identified. As a result, the potential risk is not considered significant.
- In addition to the human safety risks, impacts to natural resources and other elements of the environment could be significant if an accidental release or fire were to occur. The extent of the damage would depend on various unpredictable factors and could cause significant impacts due to the sensitivity of resources in the study area. However, the likelihood of a pipeline rupture and release remains low, and mitigation measures would further reduce the probability of a pipeline incident occurring. As a result, the potential risk to natural resources and other elements of the environment is not considered significant.

CONSTRUCTION IMPACTS

- During construction, the Olympic Pipeline system would be exposed to an increased risk of damage by outside force/excavation.
- This change in risk is not substantial and therefore would not be considered a significant impact.

CUMULATIVE IMPACTS

- Activities by other parties (e.g., ground-disturbing activities), unrelated to the Energize Eastside project, may occur in the corridor on occasion. While these activities remain a source of potential pipeline safety risk in the corridor, the project would not contribute to adverse impacts resulting from these other activities; therefore, no cumulative impacts to environmental health from pipeline safety would occur.

NO ACTION ALTERNATIVE IMPACTS

- Based on the limited pipeline data available to the EIS team, it is not possible to calculate exact risks along the existing corridor. The risk of external corrosion and outside force/excavation is expected to stay the same under the No Action Alternative. As a result, impacts would be less-than-significant.
- Impacts to natural resources and other elements of the environment would be the same as for PSE's Proposed Alignment.

Pipeline warning sign in the existing corridor

Mitigation Measures

- To minimize the potential for electrical interference, PSE would initially operate both lines at 230 kV (rather than 230 kV/115 kV), minimize points of transmission line and pipeline divergence along the corridor, use a delta conductor configuration, and locate pole grounds away from the pipelines.
- To reduce the potential for external corrosion, PSE could model the final design for instances where additional protection is needed. The pipeline operator is responsible for field monitoring, testing, and providing additional mitigation (such as grounding mats) in accordance with federal requirements.
- To reduce the potential for outside force/excavation, PSE could field verify the distance between the pipeline and transmission line pole grounds prior to construction and ensure that Olympic representatives are on-site to monitor construction activities near the pipeline.
- Additional measures are found in Sections 4.9.7 and 5.9.4.

Significant Unavoidable Adverse Impacts

- Even with worst-case assumptions related to the increased risk during operation and construction, the likelihood of a pipeline release and fire would remain low, and no substantial increase in risk compared to the existing conditions was identified. It is expected that with the implementation of additional mitigation measures, any increase in risks within the corridor can be fully mitigated. As a result, no significant unavoidable adverse impacts have been identified.

DSD 005432

Economics

Trees in the study area provide ecological benefits and environmental values

Stormwater inlet

AFFECTED ENVIRONMENT

Although economic analysis is not a required element under SEPA, the Phase 2 Draft EIS evaluated three topics related to economics: (1) potential loss of property tax revenue; (2) cost to the local community of undergrounding a portion of the new transmission lines; and (3) the value of ecosystem services lost due to reduced tree cover along the project corridor. Results of the analysis of the first two topics have not changed since publication of the Phase 2 Draft EIS and are not presented in the Final EIS. Analysis of economics in the Final EIS focuses on the loss of ecosystem services associated with PSE's Proposed Alignment.

SUMMARY OF IMPACTS

OPERATIONAL IMPACTS

- Under PSE's Proposed Alignment, the project corridor would lose 410 tons of carbon stored in trees, and a loss of 13.3 tons of carbon sequestered per year.
- The project corridor would lose its ability to remove 0.43 ton of air pollutants annually, valued at $3,967 per year.
- Without tree canopy to reduce stormwater runoff volume, the municipalities within the study area must manage an additional 65,216 cubic feet of stormwater per year, valued at $4,358 per year.
- The total ecosystem services lost as a result of PSE's Proposed Alignment would constitute less than 0.2 percent of the services provided by urban tree cover, which is not considered to be a large amount. Based on this comparison, ecosystem services are not expected to be significantly impacted by the project.

Mitigation Measures

- Replace trees removed for the project based on tree protection ordinances and critical areas regulations in each jurisdiction; some of these trees would likely be planted off-site or, mitigated by paying into an in-lieu fee program.

Significant Unavoidable Adverse Impacts

- PSE's Proposed Alignment would require tree removal along the existing corridor; however, the value of total ecosystem services lost as a result of tree removal would be minimal.

Earth

Erosion hazard

AFFECTED ENVIRONMENT

The Phase 1 Draft EIS included an analysis of potential risks and impacts related to earth resources, including seismic activity, soils and geology, and associated geotechnical hazards. The Phase 1 analysis concluded that impacts under all alternatives would be less-than-significant, and earth resources were therefore not analyzed further in the Phase 2 Draft EIS. Based on comments received on the Phase 2 Draft EIS, the Partner Cities and the EIS Consultant Team decided that additional discussion of the risk of seismic activity at the project level should be provided in the Final EIS, especially regarding areas of seismic and liquefaction risk. The Final EIS analysis focuses on segment-specific locations of the Seattle Fault zone, other seismic hazard areas, and landslide hazard areas.

SUMMARY OF IMPACTS

OPERATIONAL AND CONSTRUCTION IMPACTS

- The Energize Eastside project would cross the same seismic and other geologic hazard areas as crossed by the existing transmission lines (i.e., No Action Alternative) and would be subject to the probability of future seismic activity. Seismic activity will likely occur during the life of the proposed transmission lines, and could result in ground rupture, liquefaction, and landslides.
- The short-term construction activities would not likely be subject to seismic hazards.

Mitigation Measures

- Have a Washington State-licensed geotechnical engineer conduct geotechnical hazard evaluations for all proposed elements.
- Monitor the project for changes in conditions such as cracking foundations, slumping slopes, or loss of vegetation cover.
- Comply with relevant state and local codes, including National Electric Safety Code (NESC) standards and local critical areas codes.

Significant Unavoidable Adverse Impacts

- With the implementation of the mitigation measures, regulatory compliance, and proper geotechnical design, impacts would be less-than-significant.

2

Project Alternatives

CHAPTER 2. PROJECT ALTERNATIVES

This chapter describes the alternatives considered in the EIS. The Phase 1 Draft EIS considered a No Action Alternative and three primary action alternatives, with several sub-options within those. The Phase 2 Draft EIS carried forward Alternative 1 from the Phase 1 Draft EIS for project-level EIS review, as well as the No Action Alternative. The Phase 2 Draft EIS action alternatives include a new substation and several alternatives for overhead 230 kV lines to supply the new substation.

The Final EIS adds to and refines the alternatives under consideration. PSE's Proposed Alignment, which was developed by PSE based on the project alternatives evaluated in the Phase 2 Draft EIS, includes adjustments to pole locations and types. PSE's Proposed Alignment also includes two design options within the Newcastle Segment. PSE selected its preferred alignment because it would attain the objectives defined in Chapter 1 (see Section 1.3) and would reduce some of the potential impacts associated with an overhead transmission line. PSE's Proposed Alignment described and evaluated in this Final EIS is not a new alignment, but rather a refinement of the designs evaluated in the Phase 2 Draft EIS.

The full range of alternatives under consideration therefore includes the following:

- No Action Alternative
- Alternative 1 (Components, Segments, and Options)
  - Richards Creek Substation and Improvements to Other Substations*
  - Redmond Segment*
  - Bellevue North Segment*
  - Bellevue Central Segment, Existing Corridor Option*
  - Bellevue Central Segment, Bypass Option 1
  - Bellevue Central Segment, Bypass Option 2
  - Bellevue South Segment, Oak 1 Option
  - Bellevue South Segment, Oak 2 Option
  - Bellevue South Segment, Willow 1 Option*
  - Bellevue South Segment, Willow 2 Option
  - Newcastle Segment, Option 1- No Code Variance
  - Newcastle Segment, Option 2- Code Variance*
  - Renton Segment*

*Included in PSE's Proposed Alignment for analysis in the Final EIS.

While the Final EIS focuses on PSE's Proposed Alignment and does not repeat information about other alignment options evaluated in the Phase 2 Draft EIS, the alternatives evaluated in the Phase 2 Draft EIS may still be considered by the Partner Cities in the permit review process. The Partner Cities have not identified a preferred alternative.

This chapter also identifies alternatives considered but not evaluated in the EIS. The Phase 1 Draft EIS described several programmatic-level alternatives that were considered and not carried forward and the reasons they were not. The Phase 2 Draft EIS describes alternatives that were not carried forward, either from the Phase 1 Draft EIS or from the scoping process, because they did not meet PSE's project objectives (see Section 2.2 of the Phase 2 Draft EIS). In this Final EIS, Section 2.2 summarizes the reasons that alternatives were not carried forward in the Draft EISs, and also describes alternatives considered after publication of the Phase 2 Draft EIS but were not carried forward.

As required by SEPA (Washington Administrative Code [WAC] 197-11-440), benefits and disadvantages of delaying PSE's project are also described at the end of this chapter (presented in Section 2.3).

The Phase 1 Draft EIS was published on January 28, 2016. It evaluated, at a programmatic level, the environmental impacts of alternative methods to address the electrical transmission capacity deficiency identified by PSE. The Phase 1 Draft EIS was programmatic in nature and addressed a broad range of potential alternatives. While not required under SEPA, the Partner Cities opted to provide the Phase 1 evaluation to ensure that the alternatives considered in the Phase 2 Draft EIS reflect the full range of feasible alternatives to meet PSE's project objectives. The Phase 1 Draft EIS broadly evaluates the general impacts and implications associated with a broad range of available technologies. Based on their analysis of their system and the findings of the Phase 1 Draft EIS, PSE determined that a wire-based solution was the only feasible and reasonable project alternative to meet their project objectives. The evaluation conducted during Phase 1 was also used by the Partner Cities to narrow the range of alternatives for consideration in the Phase 2 Draft EIS.

Project Terminology

The Final EIS uses the following terms:

PSE's Proposed Alignment – PSE's Proposed Alignment is composed of six transmission line segments: Redmond, North Bellevue, Central Bellevue, South Bellevue, Newcastle, and Renton. PSE's Proposed Alignment also includes the Richards Creek substation.

Segment – Segments are components of PSE's Proposed Alignment and include identified portions of the transmission line route, generally divided by city boundaries, except there are three segments for Bellevue. The Final EIS evaluates six distinct segments.

Option – Options are alternative pole configurations identified by PSE for specific segments, designed to address public comments or jurisdictional considerations. In addition to the options described in the Phase 2 Draft EIS, for the Final EIS analysis, two options have been identified for the Newcastle Segment: one that would not require a code variance (Option 1), and another that would require a code variance (Option 2).

Corridor, Route, Alignment – These are all general terms for the path travelled by the transmission line, and are essentially synonyms. Corridor generally refers to the entire length of the line, whereas route and alignment refer to a given portion of a segment or option.

PSE's Right-of-Way – Refers to the land over which PSE has a right to build and operate its transmission lines. PSE's right-of-way includes parcels owned outright by PSE, and parcels owned by others over which PSE owns an easement allowing the transmission lines. Portions of the transmission lines within public right-of-way are typically allowed through franchise agreements with the public entity that owns the right-of-way.

Easement – Refers to a formal legal agreement giving PSE the right to use the real property of another for a specific purpose, such as overhead transmission lines. An easement specifies the width and other dimensions over a given parcel. The easement is a real property interest, but legal title to the underlying land is retained by the original owner for all other purposes. PSE's Proposed Alignment would be located entirely within its existing easement. The typical easement width for existing corridor is 100 feet.

Informed by the Phase 1 analysis, the Phase 2 Draft EIS was project-specific and focused on PSE's then-preferred alignment of the new 230 kV transmission lines (with the available design details at the time of that analysis) and alternative alignment routes also called options. This Final EIS focuses on PSE's Proposed Alignment and includes updated design and route details, which differ in some aspects from the preferred alignment as presented in the Phase 2 Draft EIS. PSE also provided more specific information about pole types, heights, and locations for its Proposed Alignment, as well as additional information about construction timing that was not available for the Phase 2 Draft EIS.

The Phase 1 Draft EIS includes important information on project background and the regulatory context, which is not repeated in the project-specific Phase 2 Draft or Final EIS documents; the reader is referred to the Phase 1 Draft EIS for additional information on those topics, and cross-references are included in the Final EIS for convenience of readers.

The Final EIS is focused on the information needed to evaluate PSE's proposed project, at a level of detail sufficient for decision makers to comply with SEPA during permitting but is still based on design details that may be further refined during the permitting stages. Information on context is included as needed to provide a complete analysis for the project-level Final EIS, with more detailed supporting information incorporated by reference to the Phase 1 and Phase 2 Draft EIS documents and appendices. If information on existing resources in the study area (i.e., the affected environment) or regulatory context has not changed since publication of the Phase 2 Draft EIS, the information is not repeated in the Final EIS; rather, a cross-reference is provided, and this information is incorporated by reference. For all resources, however, the Final EIS includes a full analysis of the potential impacts of PSE's Proposed Alignment, generally by segment and option, even if the impact analysis has not changed since the Phase 2 Draft EIS.

To keep the information in Chapter 2 concise, some project details that relate to a specific element of the environment are presented in Chapter 4, *Long-term (Operation) Impacts and Potential Mitigation*, or Chapter 5, *Short-term (Construction) Impacts and Mitigation*. For example, while Chapter 2 includes general information on vegetation clearing zones associated with the project, further details about vegetation clearing (such as the number, location, and type of trees removed) are described and analyzed as appropriate in Sections 4.4 and 5.4, *Plants and Animals*. Similarly, information on pipeline safety, both during construction and operation, is presented in Sections 4.9 and 5.9, *Environmental Health – Pipeline Safety*. Chapter 2 focuses on the key components of PSE's Proposed Alignment at an appropriate level of detail to support the analysis presented in Chapters 4 and 5.

Project Area and Study Area

This Final EIS uses two related terms: "study area" and "project area." In general, "project area" refers to the lands crossed by the proposed transmission line corridor (both existing and new) and the substations, any properties with easements for the project, as well as the adjacent properties. In contrast, the term "study area" is used to describe the area associated with a specific resource element that could be affected by the project. The study area differs from element to element, depending on the spatial nature of the potential impacts. The study area for each resource element is defined in the introduction or methodology discussion in each Chapter 4 subsection, and often shown on a map for clarity. In addition, the study area as referred to in the Final EIS focuses on PSE's Proposed Alignment, which is entirely in the existing corridor (and differs from the Phase 2 study area in some cases).

2.1 FINAL EIS PROJECT ALTERNATIVES

This Final EIS evaluates PSE's proposed Energize Eastside project (PSE's Proposed Alignment), and a No Action Alternative (as required by SEPA, WAC 197-11-440). The No Action Alternative provides a benchmark against which the impacts of the project and other alternatives can be compared.

PSE's Proposed Alignment includes two main components:

1. **A new substation, called the Richards Creek substation,** adjacent to the existing Lakeside substation in Bellevue; and
2. **New 230 kV overhead transmission lines,** connecting the Richards Creek substation to both the Sammamish substation in Redmond and the Talbot Hill substation in Renton, through the cities of Redmond, Bellevue, Newcastle, and Renton.

The new Richards Creek substation and transmission lines would increase electrical capacity and improve electrical transmission grid reliability for Eastside communities. PSE has proposed a route alignment for the transmission lines, as described in Section 2.1.2. The Partner Cities, in cooperation with PSE, have determined that these route and pole options are reasonable alternatives that could attain or approximate PSE's objectives for the proposed project, and should be considered along with the other alternatives evaluated in the Phase 2 Draft EIS.

2.1.1 No Action Alternative

SEPA requires the analysis of the No Action Alternative in an EIS, against which an action alternative (e.g., PSE's Proposed Alignment or any other alternative) can be evaluated and compared. For the Final EIS, the No Action Alternative is defined as those actions PSE would undertake to maintain and operate the existing transmission system if the proposed project is not approved. The No Action Alternative represents the most likely outcome if the project is not implemented, and it is considered the baseline condition.

Under the No Action Alternative, PSE would continue to manage its system in largely the same manner as at present, with some exceptions. Specifically, PSE indicates it would be necessary to operate with additional Corrective Action Plans (CAPs) including load shedding plans as described in Section 1.3. These additional plans are not necessary at present but will become necessary as the electrical load continues to grow. Operation of the existing system includes maintenance programs to reduce the likelihood of equipment failure (including pole replacement), 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 supply 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.

2.1.2 PSE's Proposed Alignment: New Substation and 230 kV Transmission Lines

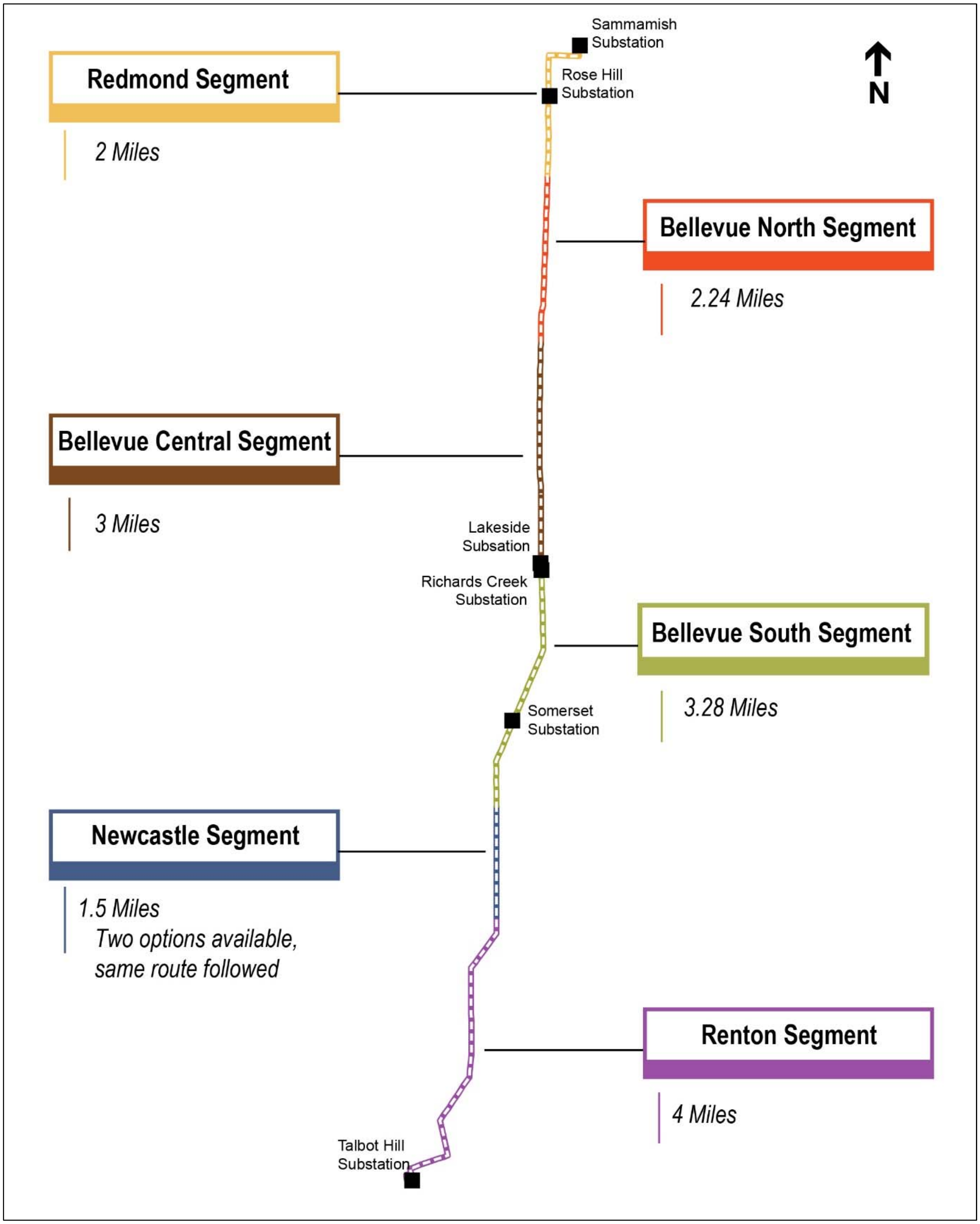
PSE's Proposed Alignment includes a new substation (Richards Creek) and approximately 16 miles of new 230 kV electrical transmission lines to connect two existing bulk energy systems (the Sammamish substation in Redmond, and the Talbot Hill substation in Renton). This alternative is a variant of Alternative 1 in the Phase 2 Draft EIS, and Option A under Alternative 1 in the Phase 1 Draft EIS. For the Final EIS, the proposed 230 kV transmission line corridor is divided into six main segments (with one of the segments containing two pole configuration options) to aid in the analysis and organize material for the decision-makers. To assist Bellevue and the other Partner Cities in evaluating the project during the decision-making process, the segments are organized primarily by city jurisdiction, from north to south: Redmond, Bellevue, Newcastle, and Renton. Because of the distance and previous route options that were studied in Phase 2, the route within Bellevue is separated into three segments (Bellevue North, Bellevue Central, and Bellevue South).

In the Bellevue Central and Bellevue South Segments, the Phase 2 Draft EIS analyzed options for routing the transmission lines along various corridors other than PSE's existing 115 kV corridor. These options are not PSE's preferred alignment, but they may still be considered by the jurisdictions in their permitting decisions.

In fall 2017, PSE submitted two permit applications, one to the City of Bellevue (extending from the Lakeside substation area to the southern city limit) and one to the City of Newcastle (PSE, 2017b and 2017c, respectively). Information in the two permit applications is generally at a finer scale than the design information available for analysis in the Phase 2 Draft EIS, including additional data on *critical areas* and project components, such as pole types and locations. Analysis in the Final EIS for PSE's Proposed Alignment reflects the refined design details presented in these permit applications where applicable. PSE continues to refine the project design to reduce potential impacts and address the technical requirements of the project as it prepares other permit applications. The Final EIS includes a new appendix (Appendix I) that compares the information used in the Phase 2 Draft EIS to what was used in the Final EIS.

Figure 2-1 lists the segments and options that comprise PSE's Proposed Alignment as presented in the Final EIS. To be viable, PSE's Proposed Alignment requires continuous transmission lines across all six segments. The segments are color-coded for reference throughout this Final EIS.

The Richards Creek substation is described first below, followed by information on the proposed 230 kV transmission lines. For the transmission lines, general information is first presented on shared components of the alternative, followed by information for each of the individual segments and options. Details on the construction of the lines are presented separately, in Section 2.1.3, *Construction*. This section describes the major components (substation equipment, pole design, vegetation management, etc.) of the alternatives. Potential significant environmental impacts and mitigation are identified in Chapter 4 *(Long-term [Operation] Impacts and Potential Mitigation)* and Chapter 5 *(Short-term [Construction] Impacts and Potential Mitigation)*.



Source: King County, 2015; Ecology, 2014; Open Street Map 2016.

Figure 2-1. PSE's Proposed Alignment: 230 kV Transmission Line Corridor Summary, by Segment (Conceptual)

2.1.2.1 New Richards Creek Substation and Improvements to Other Substations

PSE proposes to construct a new substation as part of the Energize Eastside project. The new Richards Creek substation would be immediately south of the existing Lakeside substation (see Figure 2-2) on parcels 102405-9083 and 102405-9130 in the City of Bellevue (see Figure 2-3). The total lot area for the substation site is 7.82 acres in size, and the fenced substation yard would cover approximately 2 acres within a fenced lot. The substation would include a new 230 kV transformer (see Figure 2-2) and associated electrical equipment such as circuit breakers, switches, electrical bus, and connections to the new transmission lines. The main function of the substation would be to house the transformer and related equipment needed 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.

Lakeside Substation (looking east)

230 kV Transformer

The substation would include the necessary foundations, access ways, stormwater drainage, a control house, and security fencing. The *dead-end towers* with ground wire mast, located within the fenced lot, would be approximately 70 feet tall. The new substation would be in approximately the same location as PSE's current pole storage yard (see Figure 2-3).

The existing driveway and access road from SE 30th Street to the substation entrance gate would be paved with asphalt, and the route would be reconfigured relative to the current alignment to allow the delivery of large equipment, such as the transformer (see Figure 2-2). The reconfigured driveway would be 24 feet wide at the corners and 20 feet wide at the straight sections. The driveway would include 2-foot shoulders on each side of the pavement. Appropriate drainage for the driveway would be included in the site design, and include replacing the existing culverts under the driveway adjacent to SE 30th Street. The existing unimproved, degraded road between the proposed Richards Creek substation site and existing Lakeside substation would not be removed as part of construction; however, it could be removed to facilitate critical areas mitigation.

In addition to the construction of the new Richards Creek substation, some construction would be needed for the planned upgrades to the Sammamish, Rose Hill, Lakeside, and Talbot Hill substations. In general, all upgrades to the existing substations are expected to occur within the existing footprint of these facilities. Work would include connecting the substation equipment to the new 230 kV transmission lines, including potential pole replacement and related grading and excavation. Specific upgrades to other substations that are not described here could require additional review under SEPA, as determined by the respective jurisdictions.

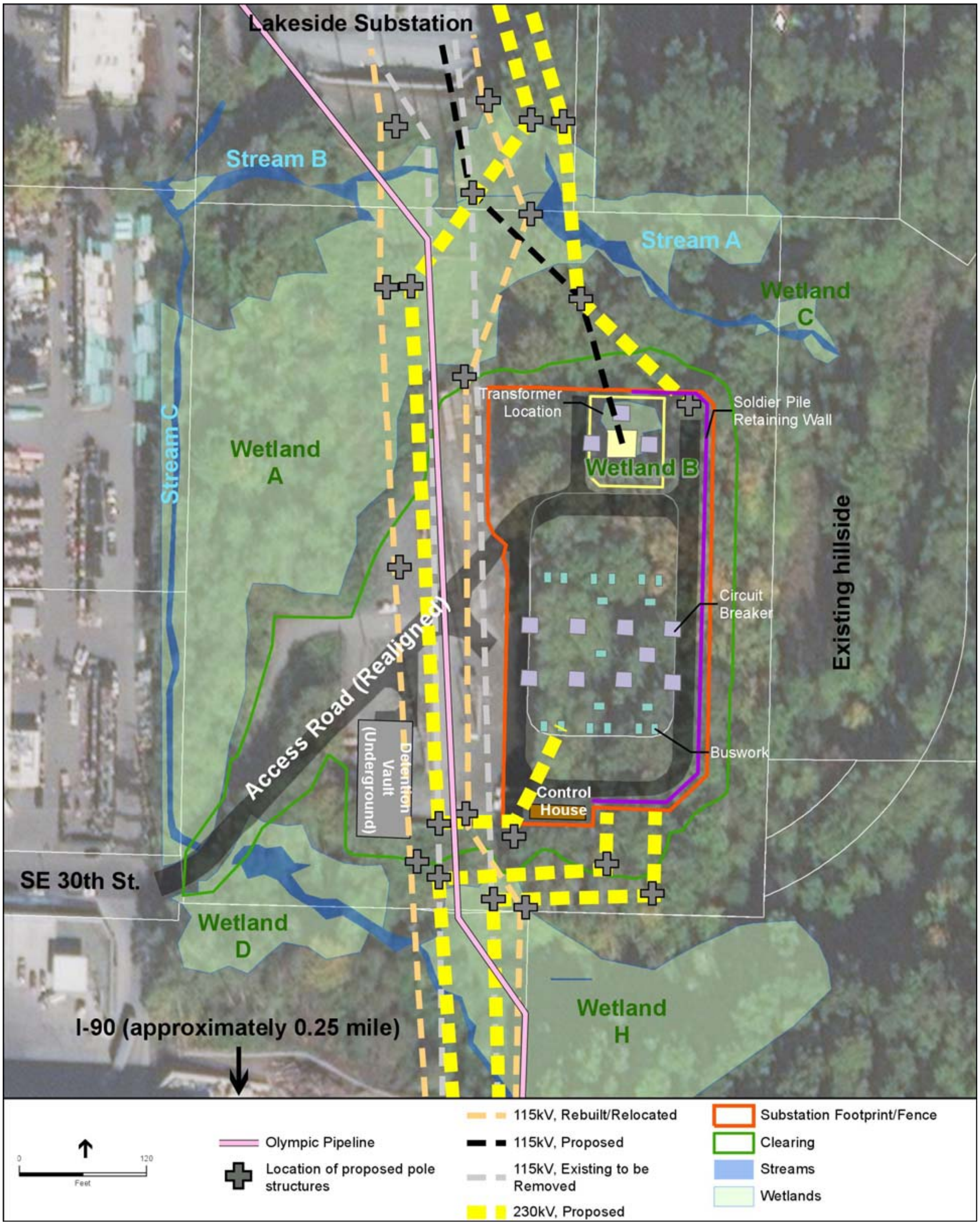


Figure 2-2. Conceptual Site Plan for the New Richards Creek Substation

Gravel Surface

Looking north to the Lakeside substation

View to SE 30th Street access

Vegetated hillslope of the east boundary

Figure 2-3. Existing Conditions at the New Richards Creek Substation

The yard surfacing inside the substation fence and for a perimeter 5 feet outside the fence would consist of well-drained insulating yard rock (3/4-inch crushed quarry rock), with interior driveways in the substation consisting of gravel surfacing (crushed surfacing top course). The retaining wall on the east side of the substation would be an approximately 25-foot-tall soldier- pile wall. The fence would be a 7-foot chain link fence with three strands of barbed wire on top.

Under the Bellevue Land Use Code (LUC), Electrical Utility Facilities require 15 feet of Type 1 Landscaping on all sides (LUC 20.20.520(F)(2)(a). In addition to retaining natural vegetation where feasible, additional landscaping would be installed along all substation boundaries.

The western boundary is made up of critical areas that would also be enhanced as part of the culvert replacement mitigation. PSE is planning to replace and upgrade the culverts carrying a small, perennial stream beneath the access road to the Richards Creek substation site. Two aging and undersized culverts (two side-by-side, 18-inch corrugated metal pipe culverts) are inadequate to carry the combined flow and sediment loading along the stream. The proposed project includes a new culvert crossing, and restoring and 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 the culvert replacement and stream realignment would temporarily disturb the stream, wetlands, and their associated buffers, but would result in net habitat benefits following project implementation. The culvert replacement and stream realignment would 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.

Natural resources on the site, including streams, wetlands, vegetation, and slopes, are described in Section 4.3, *Water Resources*, and Section 4.4, *Plants and Animals*.

Improvements to Existing Substations

In addition to the new Richards Creek substation, the proposed project requires upgrades to several existing substations in the study area, including the Sammamish, Rose Hill, Lakeside, and Talbot Hill substations. Substation locations are shown on Figures 1-1 and 2-1. In general, all upgrades to the existing substations are expected to occur within the existing footprint of these facilities, and no yard expansion is proposed at any of these substations. No significant impacts are anticipated for these substation upgrades; therefore, no further analysis of impacts to resource topics at these substations is included in the EIS. Under PSE's Proposed Alignment, no upgrades would be needed at the Somerset substation.

- At the Sammamish substation, PSE would add new 230 kV line bays. Additional equipment improvements (e.g., replacement switchgear, breakers, etc.) would also occur.
- At the Rose Hill substation, in order to operate both lines of the Energize Eastside project at 230 kV, PSE would rebuild the existing substation from a 115 kV to 12.5 kV substation to a 230 kV to 12.5 kV substation. This would entail installing a new transformer and other ancillary equipment. This work would take place within the existing fenced PSE property.
- At the Lakeside substation, PSE would install new lines to interconnect with the existing 115 kV system that serves the Eastside.
- At the Talbot Hill substation, PSE would add new circuit breakers, control equipment, and wires.
- At all substations, additional work may include installing conduits, cable trenches, grounding, security upgrades and/or drainage improvements. (As at all active substations, periodic equipment replacement and related work are also expected during operations.)

2.1.2.2 Overview of the New 230 kV Transmission Lines

The proposed project (PSE's Proposed Alignment) is to construct and operate two 230 kV transmission line circuits, from the Sammamish substation in Redmond to the proposed Richards Creek substation in Bellevue, and from Richards Creek substation to the Talbot Hill substation in Renton, a distance of approximately 16 miles. PSE's Proposed Alignment follows an existing 115 kV transmission line corridor from the Sammamish substation to Talbot Hill substation, which is referred to in this Final EIS as the "existing corridor." PSE's Proposed Alignment is entirely in the existing corridor, with no new corridor needed and no segments routed along existing roadways (as was the case for some of the options described in the Phase 2 Draft EIS). Although the Newcastle Segment in the Final EIS includes two options, these are not route options – rather, they differ in terms of pole type and width placement within the *right-of-way* of the existing corridor and in relation to easements for the Olympic Pipeline system.

Transmission Line Terminology

Transmission Line – A system of structures, wires, *insulators*, and associated hardware that carries electric energy from one point to another in an electric power system.

Wire – The cable component of the transmission line through which electricity flows. Also referred to as the conductor.

Circuit – In general terms, the pathway for an electrical current. For use in this EIS, circuit is used in the context of the number of circuits carried on a single pole or structure. A single-circuit line carries wires for only one circuit, and each pole would support three wires. A double-circuit line carries wires for two circuits, and each pole would support six wires.

Dead-end Tower – Structure used where the line ends, or turns with a high angle, or at major crossings (such as highways or rivers). Dead-end towers must be stronger than other poles because they are under tension from just one side. Often they have additional guy wires, are larger in diameter, and/or have larger footings than other poles.

The project would replace two existing 115 kV transmission lines in the existing corridor with two 230 kV transmission lines on new poles. The current plan for the Energize Eastside project is to operate both circuits at 230 kV. PSE proposes to power both transmission lines in the corridor at 230 kV instead of having one at 230 kV and one at high-capacity 115 kV (as was described in the Phase 2 Draft EIS). This would serve as mitigation to reduce *electric and magnetic fields (EMF*) caused by the transmission lines, and would result in lower risk of pipeline corrosion and *alternating current (AC) interference* (as described in more detail in Sections 4.8 and 4.9, respectively). Note that this design differs from the earlier plan as described and analyzed in the Phase 2 Draft EIS, which involved initially constructing a 230 kV line and a high-capacity 115 kV line (designed to be operable at 230 kV in the future).

The majority (approximately 95 percent) of the existing 115 kV transmission lines are strung on wooden H-frame structures; in a few locations (e.g., near substations or highway crossings), the existing lines are on other pole or structure types, such as single wood poles or steel monopoles.

The existing transmission line corridor was originally established in the late 1920s and early 1930s. The original power lines were upgraded to 115 kV in the 1960s. Maintenance has occurred over time, and in 2007, PSE replaced or reframed approximately 200 H-frame structures on the existing corridor. As part of the proposed Energize Eastside project, the existing, older H-frame structures would be replaced primarily with a combination of single-circuit and double-circuit steel monopoles, although some wood poles would remain, particularly near substations. The new poles would be taller in most cases than the existing H-frame structures. Along the corridor, the typical height of the existing single-circuit H-frame structures is 60 feet (ranging from 39 to 115 feet); the typical height of the proposed poles ranges from 50 to 99 feet, depending on type (ranging up 135 feet). In most locations, the existing 115 kV transmission lines are strung on two adjacent H-frame structures (i.e., typically four poles total) at a single location; the project would consolidate these lines onto one or two pole structures. In most cases, the new poles would be installed in approximately the same locations along the existing corridor (i.e., within 25 feet up or down the line) as the existing poles; in several locations, the new poles could be moved farther up or down along the line to avoid sensitive resources, such as wetlands, streams, or unstable slopes. In general, PSE's Proposed Alignment would result in fewer poles along the existing corridor, but the poles would typically be 35 feet taller than the existing structures; with taller poles, the wire attaching points would also be generally higher than at present. More details on pole designs, including illustrations and photographs, are presented below.

The existing 115 kV transmission line corridor contains two of several transmission lines in the developed and growing Eastside region. In most portions of the Energize Eastside project area, the existing two 115 kV H-frame structures are the only lines within the corridor. In some portions, such as in south Redmond and near substations, however, the line is co-located with other transmission and distribution line poles and structures. The lines also cross and/or run parallel to other transmission line corridors in several locations, including a 230 kV line owned and operated by Seattle City Light (SCL), supported on steel lattice towers, that crosses PSE's Proposed Alignment in Renton.

PSE's 115 kV lines and SCL's 230 kV line at 10120 126th Avenue SE, Renton

DSD 005446

Pole Design

The majority of the existing 115 kV transmission lines are strung on wooden H-frame structures, typically about 60 feet tall. PSE's project would generally replace these structures and use a variety of replacement pole types (Tables 2-1 and 2-2), including the following:

- One double-circuit steel monopole
- Two single-circuit steel monopoles

Different pole types, pole heights, and span lengths would be used to respond to topographic conditions and other landscape features, as well as to mitigate potential visual impacts within specific areas. Along most of PSE's Proposed Alignment, the new poles would be double-circuit steel monopoles with a typical height of 95 to 99 feet, although they could be taller in some locations (e.g., crossing major highways, ravines, or other transmission lines). The tallest poles would be near the Richards Creek substation and would be approximately 135 feet tall in order to cross over other transmission lines. Paired single-circuit monopoles (typically ranging in height from 50 to 96 feet) would be used in select locations in all of the segments, but particularly in the Redmond, Bellevue South, Newcastle, and Renton Segments. Pole type and placement are also influenced by right-of-way width, code requirements, and other site-specific factors, such as where PSE shares its right-of-way with the Olympic Pipeline system (operated by BP Pipelines-North America [BP]).

What Determines Pole Height?

Factors affecting pole height include the necessary ground clearance for the specific voltage of the lines, the total number of wires on the pole, and the separation required between wires. Ground clearance and separation between wires for 230 kV lines must be greater than for 115 kV. Poles that carry just one circuit have only three wires and can generally be lower than poles carrying two circuits, which typically requires six wires.

What Determines Pole Type?

Pole types are chosen to be cost effective, but other factors are also considered, including the number of circuits needed, concerns about height, and the width of available right-of-way. H-frame structures have lower profiles than many monopoles because wires are separated horizontally rather than vertically as they are on a monopole. However, if two circuits are needed in one corridor, there may not be enough horizontal clearance to allow two H-frames. If height of the poles is not a major concern, or if there is insufficient room for H-frames, monopoles can be used. Monopoles carrying a double-circuit can be constructed with the smallest overall footprint and are preferred for cost purposes over using pairs of monopoles in parallel. In some circumstances, however, pairs of monopoles may be used to limit the overall height and thus reduce visual impacts.

PSE's Proposed Alignment would have slightly different conductor supports than shown in the Phase 2 Draft EIS. The proposed supports are shown in Table 2-1, and have a slightly narrower profile than those shown in the Phase 2 Draft EIS. These narrower supports mean that the managed right-of-way can be slightly narrower, which would reduce the extent of tree removal and trimming necessary to maintain safe clearance from the lines (as described in more detail in Section 4.4, *Plants and Animals*). This design also reduces the amount of pole hardware required.

To meet *National Electric Safety Code* (NESC), FERC, and North American Electric Reliability Corporation (NERC) requirements to prevent contact with the lines, adequate clearances must be maintained between each wire, the ground, adjacent buildings, and trees. Pole height therefore would vary depending on the number of circuits, the arrangement of the circuits on the poles, pole location, topography, and adjacent uses.

Specific pole locations would be determined based on site engineering but would generally be within 25 feet of the existing H-frame structures in most locations along the existing corridor. Therefore, pole span (i.e., the spacing between poles) would be approximately the same as the existing lines, typically 575 to 700 feet. Spacing can range from 125 to 1,550 feet, depending on site-specific constraints. Pole locations would generally be based on tensioning needs for the wire (including where turns are needed along the route), underground obstacles at pole foundation locations, and allowable structural heights, all while attempting to use as few poles as possible. PSE would also avoid placing poles in environmentally critical areas like wetlands, streams, and on unstable slopes to the greatest extent feasible.

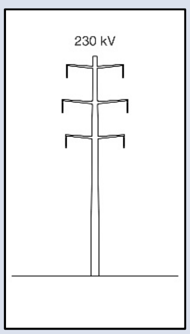
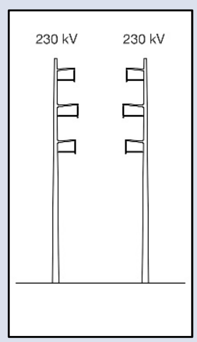
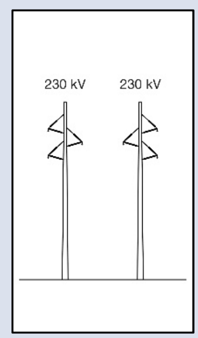
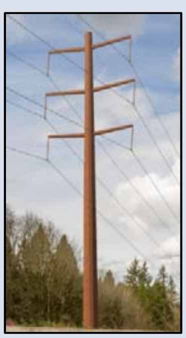
The diameter of the poles depends on height, as well as loading, and would be greatest at the base. Typical (*tangent) poles* would be 2.5 to 6 feet at the base (not including the foundation). Tangent poles are poles that are in a straight line with other poles. *Dead-end poles* and angle poles (poles where the transmission line changes direction) need to be larger than tangent poles to handle the asymmetrical weight and tension from the lines they are holding.

An additional shield wire would be installed on top of the new poles to reduce the impact and/or magnitude of ground faults (such as from lightning or system faults). The shield wire would include a fiber-optic cable inside (optical ground wire, or OPGW), which is used solely by PSE and the BPA for transmission system communications purposes. Shield wires are shown in the visual simulations in the Phase 2 Draft EIS as well as in this Final EIS and can be seen at top of each pole.

In addition to the height and diameter of the poles, the diameter of the conductor (i.e., wire) would also increase. The wire on the existing 115 kV transmission lines is currently 1.063 inches in diameter; the wire diameter of the proposed new wires would be 1.545 inches to accommodate the increased load on the higher voltage 230 kV lines.

The main characteristics of the various pole types are summarized and illustrated in Table 2-1 and Table 2-2 (showing typical and atypical pole types, respectively). A pole that is used throughout a segment is considered a "typical" pole. Poles that are used infrequently for special situations are referred to as "atypical." Atypical poles include terminus poles at substations, corner poles, and poles used to cross major roads, for example. PSE's Proposed Alignment would include poles that could have various finishes, including galvanized (light gray), self-weathering (reddish brown), or painted (powder coat). Finishes could be specified by location to better blend with the background or sky, and are listed and described as a potential mitigation measure for long-term scenic view and aesthetic impacts in Section 4.2.6, *Mitigation Measures*."

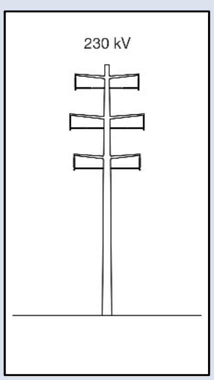
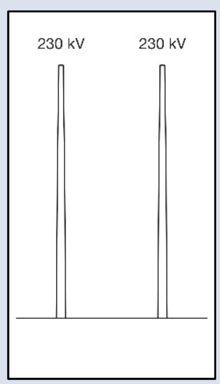
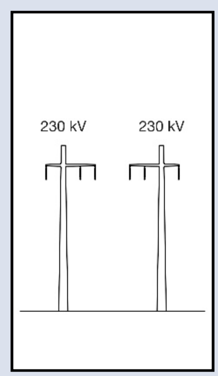
Table 2-1. Summary of Proposed Typical Pole Types

	One Double-Circuit Monopole	Two Single-Circuit Monopoles	Two Single-Circuit Monopoles
Line Configuration[1]	Six wires total, three on each side of the pole	Three wires stacked vertically on each pole	Three wires stacked in a delta configuration (shown below)
Typical Height[2]	95 feet	93 feet	83 feet
Pole Replacement	Replaces four existing poles (two H-frame structures) with one pole in most areas	Replaces four existing poles (two H-frame structures) with two poles in some areas	Replaces four existing poles (two H-frame structures) with two poles in some areas
Segments (and options) using this pole type	Redmond, Bellevue North, Bellevue Central, Bellevue South, and Renton Segments. Generally placed in the center of the corridor.	Newcastle (Option 1). Placed on the outer edge of the right-of-way on each side of the Olympic Pipeline system.	Redmond, Bellevue South, Newcastle (Option 2), and Renton Segments. Placed on the outer edge of the right-of-way on each side of the Olympic Pipeline system.
Diameter (at base)	Typically 4.5–6 feet	Typically 3.5–5.5 feet	Typically 2.5–5.5 feet
Diagram	 [C-1 pole]	 [C-2 poles]	 [C-16 poles]
Simulation			

[1] An additional shield wire would be installed on top of the new poles for fault and lightning protection. For more information, see Section 2.1.2.2.

[2] Typical heights presented here are for all segments across the 16-mile line. Typical pole heights vary depending on the segment and can be taller than the typical heights presented for the whole project. Site-specific pole heights are used for some areas of the analysis where individual pole configurations are described.

Table 2-2. Summary of Proposed Atypical Pole Types

	One Double-Circuit Monopole	Two Single-Circuit Monopoles	Two Single-Circuit Monopoles
Line Configuration[1]	Six wires total, three on each side of the pole	Three wires stacked vertically on each pole	Three wires arrayed horizontally on each pole
Typical Height[2]	99 feet	98 feet	50 feet
Pole Replacement	Replaces four existing poles (two H-frame structures) with one pole in most areas	Replaces four existing poles (two H-frame structures) with two poles in some areas	Replaces four existing poles (two H-frame structures) with two poles in some areas
Segments using this pole type	Proposed for use in the Redmond, Bellevue North, Bellevue Central, Bellevue South, and Renton Segments.	Proposed for use in the Redmond, Bellevue North, Bellevue Central, Bellevue South, Newcastle, and Renton Segments.	Proposed for use in the Renton Segment.
Typical location	In areas where a C-1 pole would not work best because of topography, curvature of the transmission line, or a roadway crossing. Generally placed in the center of the corridor.	At substations, freeway crossings, and changes in direction. Generally used on either side of the Olympic Pipeline system when the pipeline is the center of the corridor.	At the SCL transmission line crossing.
Diameter for typical poles (at base)	Typically 4.5–6 feet	Typically 3.5–6.5 feet	Typically 3–5 feet
Diagram	 [C-1B pole]	 [C-18 poles]	 [C-17 poles]

[1] An additional shield wire would be installed on top of the new poles for fault and lightning protection (see Section 2.1.2.2.)

[2] Typical heights presented here are for all segments across the 16-mile line. Typical pole heights vary depending on the segment and can be taller than the typical heights presented for the whole project. Site-specific pole heights are used for some areas of the analysis where individual pole configurations are described.

Note: Simulations of C-1B and C-18 pole configurations are provided in Appendix C.

DSD 005450

Olympic Pipeline System

The Olympic Pipeline system is an underground petroleum pipeline system that is co-located with the existing PSE 115 kV transmission line corridor throughout the entire Energize Eastside project area, except in the central portion of the Renton Segment. The Olympic Pipeline system is a 400-mile interstate pipeline system that runs from Blaine, Washington to Portland, Oregon. The system transports gasoline, diesel, and jet fuel through two pipelines – one 16 inches and one 20 inches in diameter. In the Energize Eastside project area, the pipelines are generally co-located with PSE's transmission line within all of the segments, although in the Renton Segment it only co-located in the north portion of the segment (although it crosses the corridor in the southern portion of the segment). The transmission line corridor predates the pipeline by approximately three decades. In most of the segments, the pipeline system is along either the east or west side of the PSE right-of-way, crisscrossing the right-of-way from east or west in numerous locations. In parts of the corridor (especially the Newcastle Segment), however, the pipeline system is buried in the center of the right-of-way. BP is the operator of the Olympic Pipeline system, and partial owner of the Olympic Pipe Line Company, with Enbridge, Inc. (Olympic Pipe Line Company, 2017). Typically, the proposed poles would be located at least 13 feet from the Olympic Pipeline system where it is co-located with the transmission lines to reduce the need for additional arc shielding protection.

Sign marking location of the Olympic Pipeline system in existing corridor (foreground); telecom equipment mounted on existing poles (background)

Due to the level of public concern expressed during scoping for both Phase 1 and Phase 2 regarding the potential risk of a leak, fire, or explosion that could occur as a result of constructing or operating the transmission lines in the same corridor as the Olympic Pipeline system, the pipeline safety issue is addressed specifically as one of two environmental health issues. Information on pipeline safety, both during construction and operation, is presented in Sections 4.9 and 5.9, *Environmental Health – Pipeline Safety*.


Utility pole carrying transmission wires (top section), distribution wires (middle section), and telecom wires (lower section)

Telecommunications Equipment and Other Underbuild Components

Along portions of the transmission lines, telecommunications (telecom) equipment, distribution lines, and cellular equipment is attached to PSE's existing poles, collectively referred to as "*underbuild*."

PSE hosts *telecommunications* (telecom) equipment, which is owned and operated by other providers. The telecom companies' attachments to transmission facilities are regulated by state law (specifically, House Bill [HB] 2886 and Revised Code of Washington [RCW] Chapter 80.54); PSE and the Partner Cities have limited authority over the telecom underbuild equipment. In general, telecom equipment that is on an existing pole could be relocated to a new pole in the same general location, but existing attachments to poles cannot remain with just telecom equipment on it once the electric distribution lines have been removed.

In the Energize Eastside project area, cellular equipment is co-located along the existing corridor in eight locations:

- Overlake (13460 NE 40th Street, Bellevue)
- Kelsey Creek (13601 SE 10th Street, Bellevue)
- Tyee Middle School (3858 136th Avenue SE, Bellevue)
- Somerset substation (5200 Coal Creek Parkway SE, Bellevue)
- Somerset Recreation Center (4445 136th Place SE, Bellevue)
- Newport Hills (12843 SE 60th Street, Bellevue)
- Newcastle Way (12833 Newcastle Way, Newcastle)
- 4th Street (old Cemetery Road) (3205 NE 4th Street, Renton)

PSE would allow cellular equipment on poles proposed to be replaced by the Energize Eastside project to be relocated to new structures if requested by individual carriers. As of the writing of the Final EIS, telecom equipment at all locations except at Newport Hills is expected to be relocated to the new poles; the Newport Hills equipment would be decommissioned. If cellular equipment is relocated to the new 230 kV poles, PSE will work with the telecom companies to reinstall the equipment onto the new poles, per local jurisdiction regulations and Chapter 80.54 RCW.

If distribution lines are present with communication underbuild, the opportunity of placing communications equipment underground would be discussed with the various providers. Parallel distribution underbuild would not be used on the 230 kV poles.

Additional information on the co-located telecom equipment and distribution lines is included in Sections 4.2, *Scenic Views and the Aesthetic Environment*.

Vegetation Management and Maintenance

> **Managed Right-of-Way**
>
> To ensure safe and reliable operation of overhead transmission lines, the NESC specifies minimum horizontal and vertical clearances between the transmission lines and vegetation, buildings, and the ground. Trees and overhanging branches must be managed or removed to maintain appropriate clearances. For more details, see Section 4.4, *Plants and Animals*.

PSE's Proposed Alignment includes both initial vegetation clearing to accommodate the more restrictive standards associated with the 230 kV transmission lines, as well as ongoing vegetation maintenance along the corridor to keep tall vegetation (trees and shrubs) and noxious weeds from growing within the transmission line right-of-way (as now occurs on the existing corridor). For vegetation clearing, it is assumed that all species within the managed right-of-way with a mature height of more than 15 feet will be removed and could be replaced with 230 kV-compatible vegetation. (In some circumstances, PSE can modify this requirement, in consultation with property owners and site-specific features.) Additional details on vegetation management are presented in Sections 4.4 and 5.4, *Plants and Animals*, including information on the number, species, and location of trees that could be removed for PSE's project. In the context of this EIS analysis, "vegetation management" refers to initial clearing or removal of trees and shrubs to construct the new transmission lines or substation, whereas "vegetation maintenance" refers to the long-term trimming or pruning of vegetation to maintain adequate line clearance and safety.

Access Roads

In some locations, additional access roads (either temporary or permanent) would be required to reach the transmission line corridor. Preliminary access plans have been developed for each structure location. For additional information on access roads, see Section 2.1.3, *Construction*, and Appendix A-2. In general, PSE will maintain existing access routes; however, new access routes that are developed for the Energize Eastside project are expected to be removed following construction and the area restored to its previous condition.

2.1.2.3 Transmission Line Segments

The following sections describe each of the segments and options of PSE's Proposed Alignment, from north (Redmond) to south (Renton), including sample visual simulations of the proposed transmission poles. (Additional simulations for the segments are found in Section 4.2, *Scenic Views and Aesthetic Environment.*) Throughout the EIS analysis, the Richards Creek substation site (as described in Section 2.1.2.1) is addressed separately from the transmission line segments. These sections provide a conceptual explanation of the typical pole designs used along portions of the segment. In many cases, different pole types are proposed in site-specific locations, some of which are not shown at this scale. Generally, the segment sheets that follow show where double-circuit vs. single-circuit (paired) poles are located. For most elements of the environment, site-specific pole configuration information did not need to be considered, beyond pole location and number of poles, because that level of detail would not change the findings of the analysis. However, for the visual and recreation analysis, atypical pole configurations are called out as necessary to inform the visual and recreation analyses, which describe pole configurations in greater detail. More detail is also available on the website as a Google Earth KMZ file, or in Appendix A-2, which both show the pole types used in specific locations. In particular, the Google Earth KMZ file enables the user to zoom in to specific pole locations at a finer scale possible than a printed document or PDF file to view the data used for this analysis.

For the Newcastle Segment, two options are analyzed in this Final EIS. The No Code Variance Option (Option 1) is similar to what was evaluated in the Phase 2 Draft EIS. The Code Variance Option (Option 2) is PSE's preferred option in this segment, because the poles can be shorter and can be set farther away from homes. (More details on the Code Variance Option for the Newcastle Segment are provided in the Land Use analysis; see Section 4.1.5.8.)

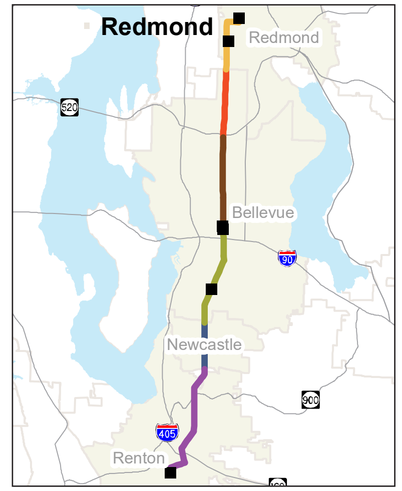
Redmond Segment

DESCRIPTION

PSE's Proposed Alignment

Start: Sammamish Substation

End: Redmond-Bellevue Boundary



PROPOSED POLES & LOCATION

1 Single-Circuit Steel Pairs

- Approximately 13 wooden H-frames replaced with 6 single-circuit pairs.
- Height:
  - 91' (typical); (existing: 61')
  - 118' (maximum); (existing: 79')

2 Double-Circuit Steel Monopole

- Approximately 30 wooden H-frames replaced with approximately 15 double-circuit, 230 kV steel monopoles.
- Height:
  - 102' (typical); (existing: 61')
  - 109' (maximum); (existing: 79')

QUICK FACTS

Jurisdiction: Redmond

Segment Length: 2 miles

Easement / Property Acquisition

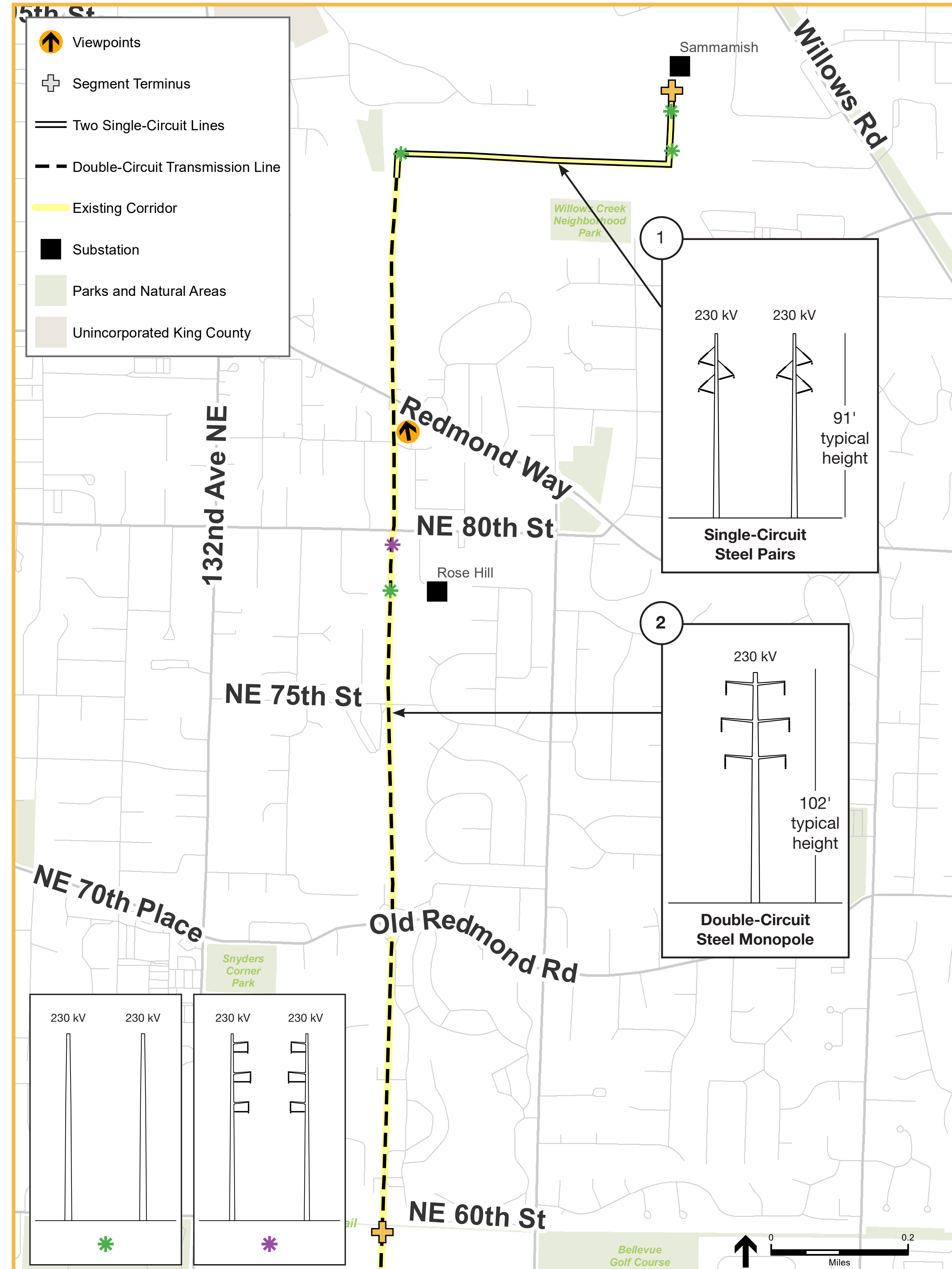
- Entirely in PSE's existing 100-foot corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in existing corridor; pipelines buried on either side (east or west) of corridor.
- Poles would be placed in the center of the corridor.

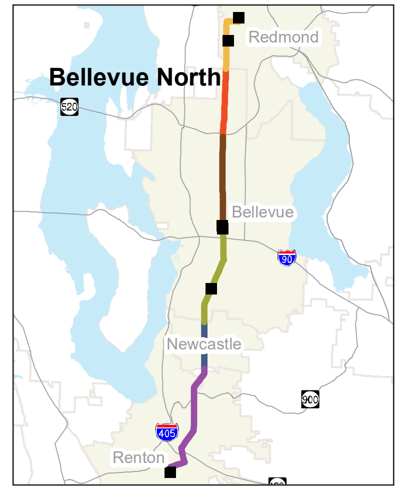
From Redmond Way looking north (existing conditions)

Simulation of proposed project (Power Engineers, 2017)



DSD 005455

Bellevue North Segment



DESCRIPTION

PSE's Proposed Alignment

Start: Redmond-Bellevue Boundary
End: Northup Way/NE 20th St

PROPOSED POLES & LOCATION

- Approximately 38 wooden H-frames replaced with approximately 17 double-circuit, 230 kV steel monopoles.
- Height:
  - 93' (typical); (existing: 54')
  - 100' (maximum); (existing: 70')

QUICK FACTS

Jurisdiction: Bellevue

Segment Length: 2.2 miles

Easement / Property Acquisition

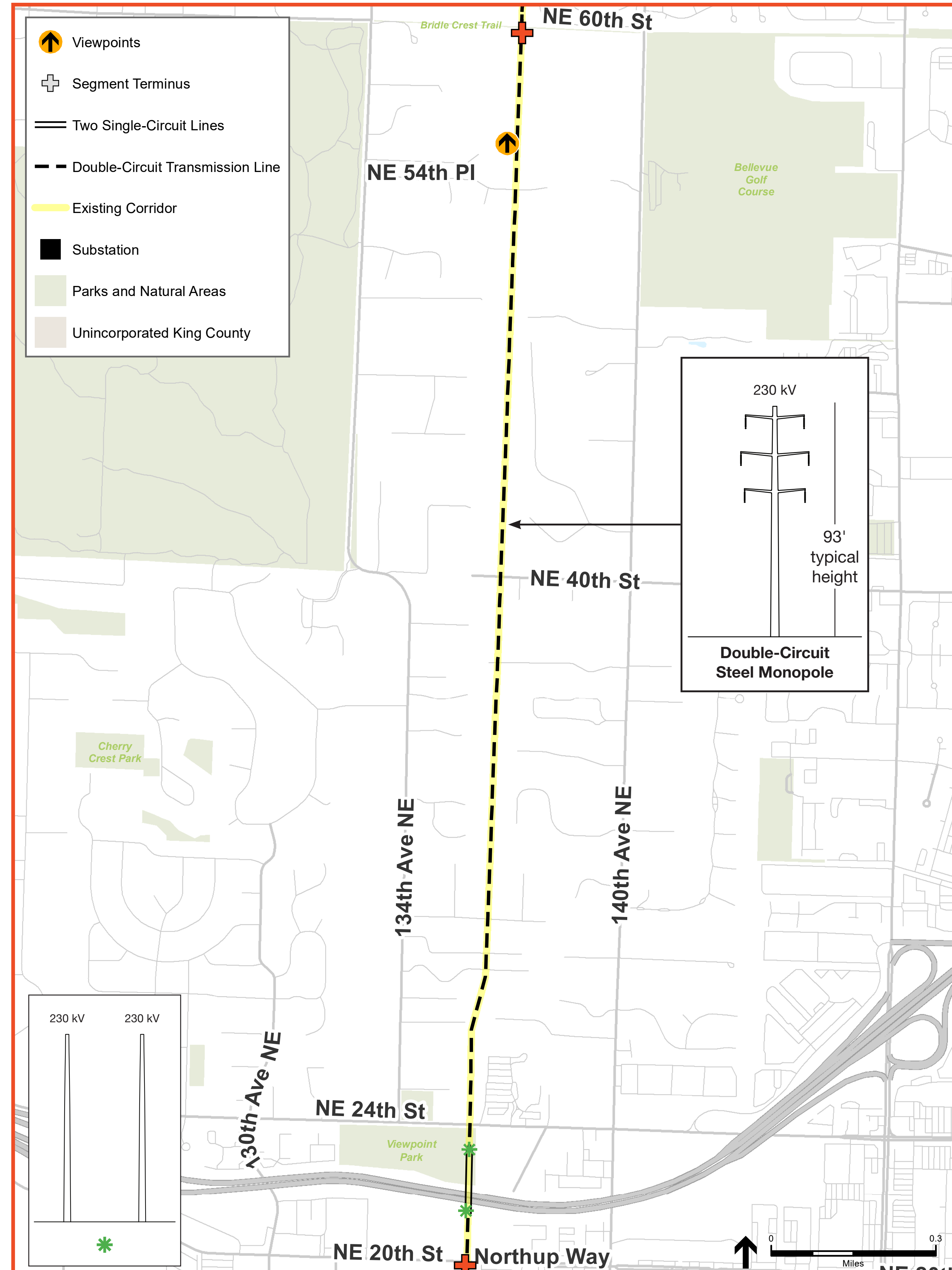
- Entirely in PSE's existing 100-foot corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in existing corridor; pipelines buried on either side (east or west) of corridor.
- Poles would be placed in the center of the corridor.

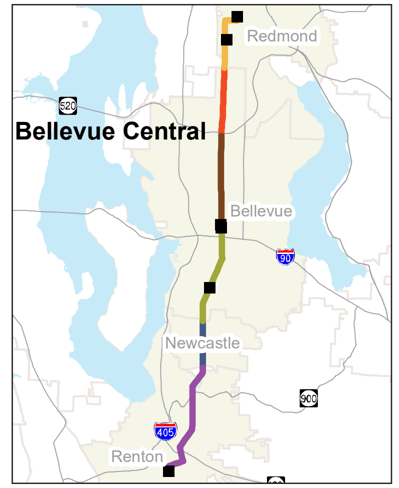

From NE 54th Pl looking north (existing conditions)


Simulation of proposed project (Power Engineers, 2017)



DSD 005456

Bellevue Central Segment



DESCRIPTION

PSE's Proposed Alignment

Start: Northup Way/NE 20th St

End: Richards Creek Substation (New)

PROPOSED POLES & LOCATION

- Approximately 49 wooden H-frames replaced with approximately 24 double-circuit, 230 kV steel monopoles.
- Height:
  - 96' (typical); (existing: 56')
  - 113' (maximum); (existing: 79')
  - Substation poles may be taller

QUICK FACTS

Jurisdiction: Bellevue; East Bellevue Community Council also has jurisdiction between NE 8th St and SE 12th St for some permitting decisions.

Segment Length: 3 miles

Easement / Property Acquisition

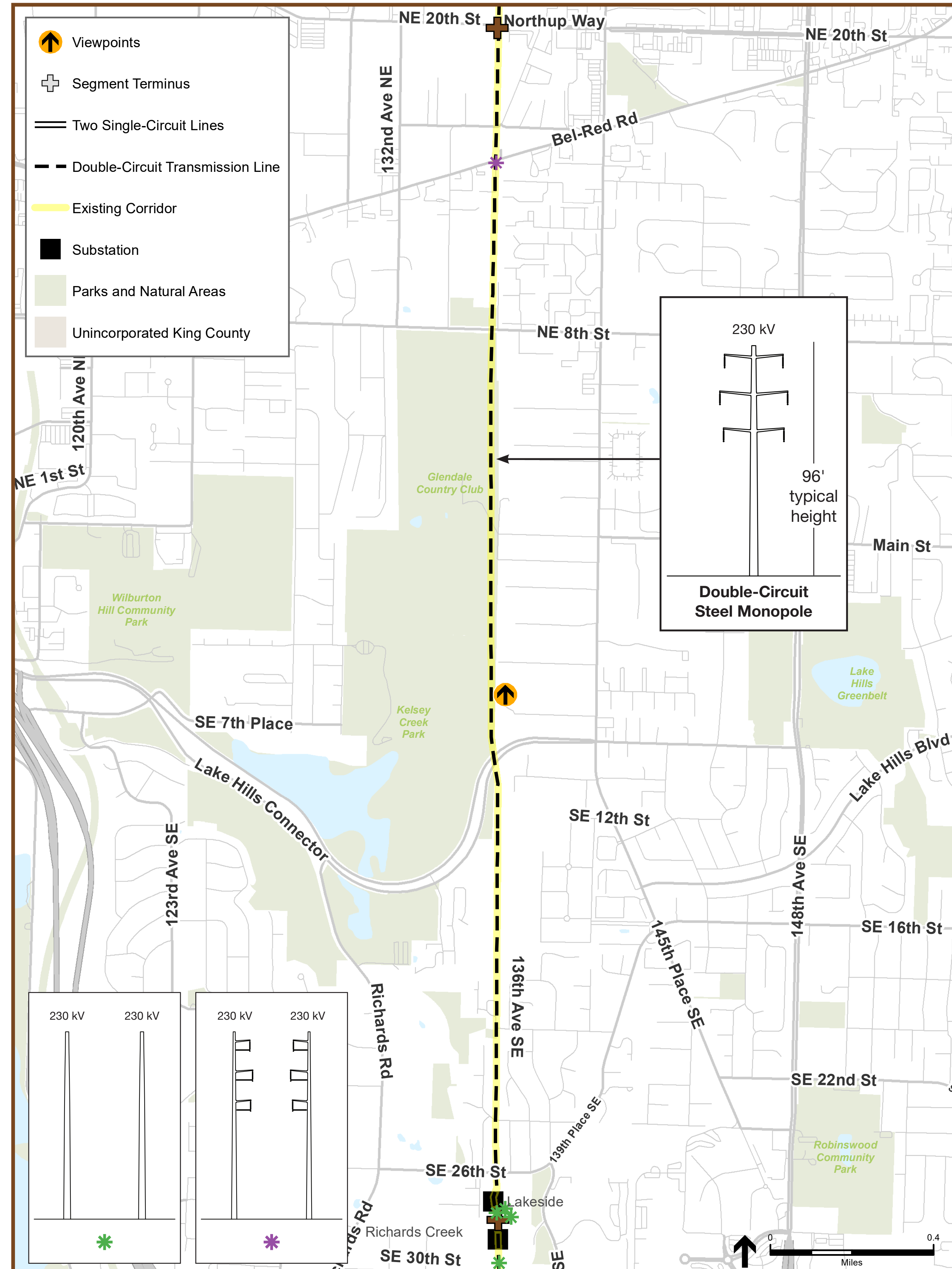
- Entirely in PSE's existing 100-foot corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in existing corridor; pipelines buried on either side (east or west) of corridor.
- Poles would be placed in the center of the corridor.

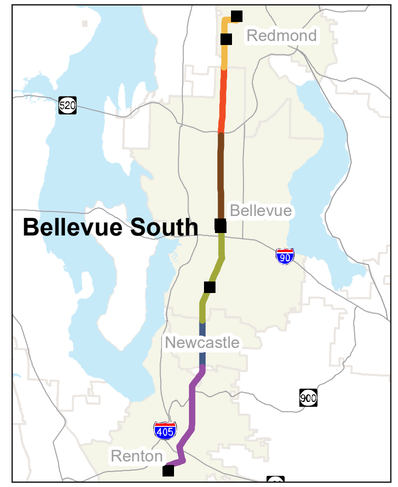
From SE 5th Street looking north (existing conditions)

Simulation of proposed project (Power Engineers, 2017)



DSD 005457

Bellevue South Segment



DESCRIPTION

PSE's Proposed Alignment

Start: Richards Creek Substation (New)
End: Bellevue-Newcastle Boundary

PROPOSED POLES & LOCATION

1 Double-Circuit Steel Monopole

- Location: Existing corridor north of SE Newport Way and between Somerset Substation and SE 60th St.
- Approximately 22 wooden H-frames replaced with approximately 16 double-circuit 230 kV steel monopoles.
- Typical height = 92'; (existing: 60')
- Maximum height = 109'; (existing: 90')

2 Single-Circuit Steel Pairs

- Location: Existing corridor south of SE 60th St. and between SE Newport Way and Somerset substation.
- Approximately 26 wooden H-frames replaced with approximately 26 pairs of single-circuit 230 kV steel monopoles.
- Typical height = 80'; (existing: 60')
- Maximum height = 91'; (existing: 90')

QUICK FACTS

Jurisdiction: Bellevue

Segment Length: 3.3 miles

Easement / Property Acquisition

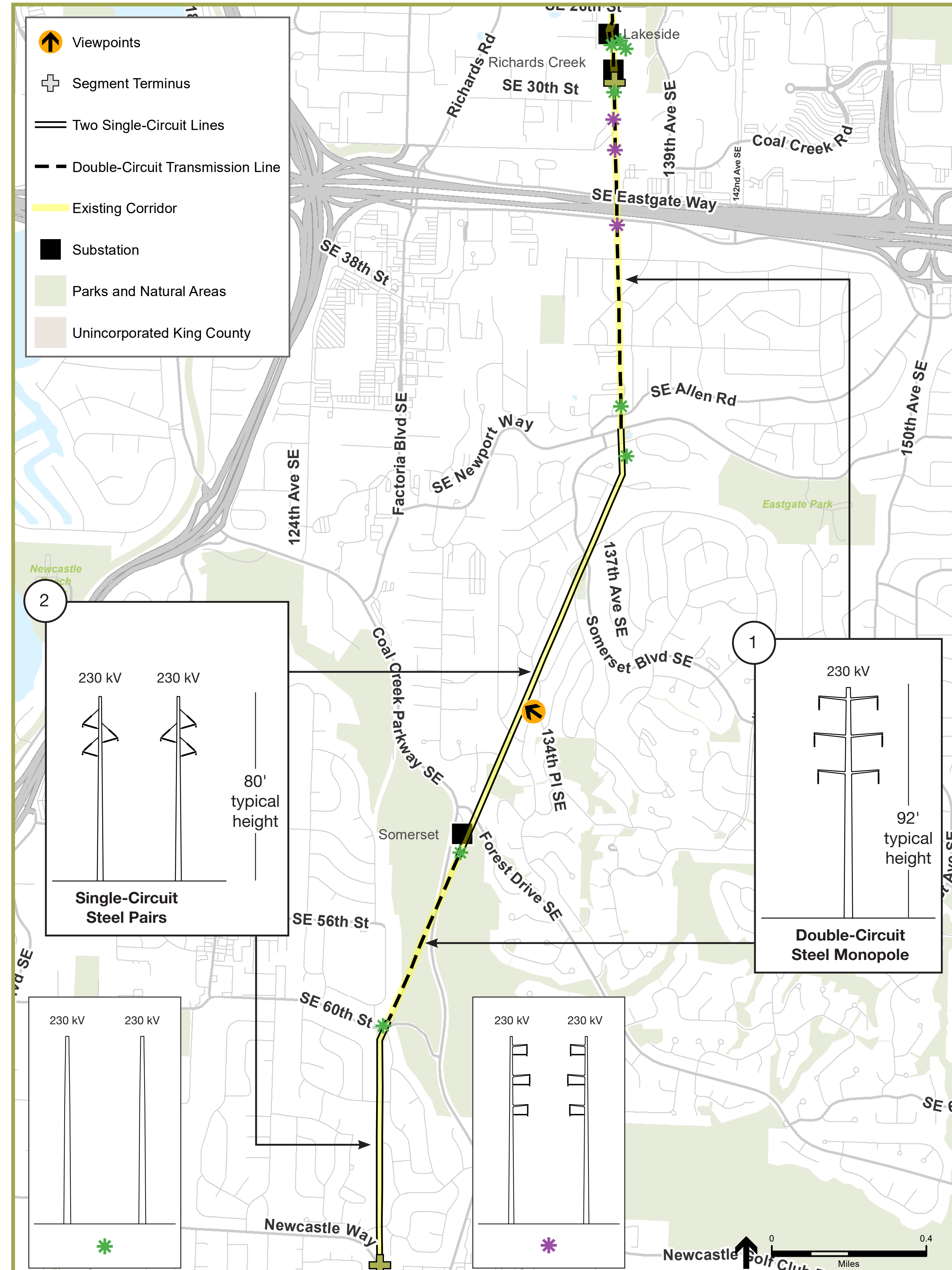
- Entirely in PSE's existing 100-foot corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

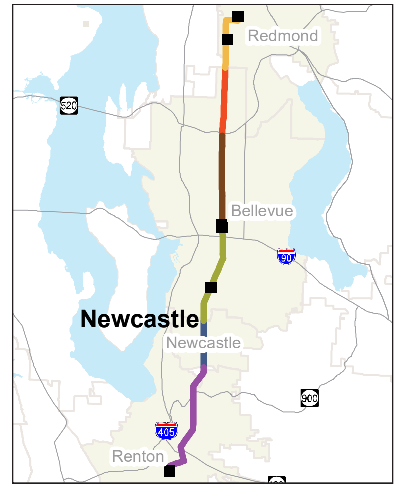
- 16" pipeline uses existing corridor (often in the center); poles would be placed on either side.
- 20" pipeline uses existing corridor south of Somerset.

From 134th Pl SE looking west (existing conditions)

Simulation of proposed project (Power Engineers, 2017)



Newcastle Segment



NO CODE VARIANCE

PSE's Proposed Alignment

DESCRIPTION

Start: Bellevue-Newcastle Boundary

End: Newcastle-Renton Boundary

PROPOSED POLES & LOCATION

- Approximately 24 wooden H-frames (50 poles) replaced with approximately 12 pairs of single-circuit, 230 kV steel monopoles that are located near the outer edges of the right-of-way.
- Height:
  - 95' (typical); (existing: 55')
  - 109' (maximum); (existing: 75')

QUICK FACTS

Jurisdiction: Newcastle

Segment Length: 1.5 miles

Easement / Property Acquisition

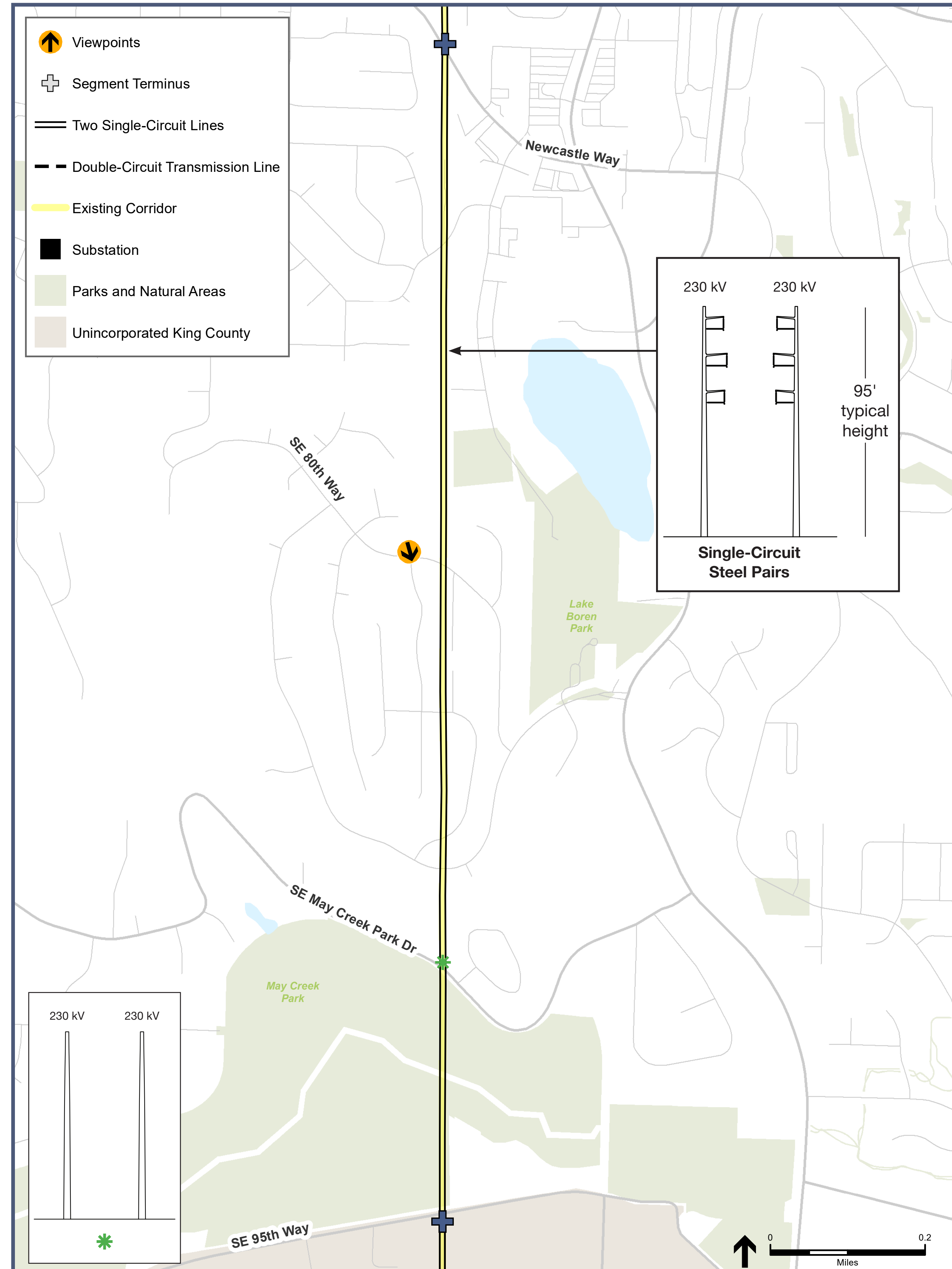
- Entirely in PSE's existing 100-foot corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in existing corridor; pipelines buried in the center of corridor.
- Poles would be placed with one on either side of the pipelines.

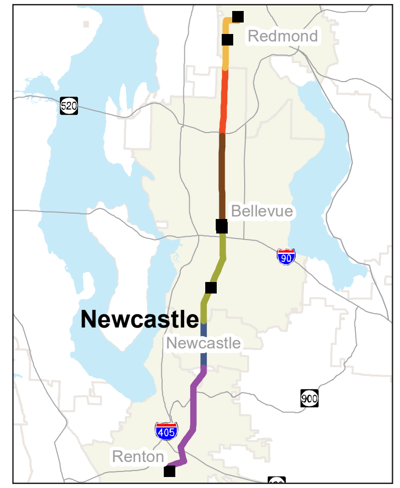
From SE 80th Way looking southeast (existing conditions)

Simulation of proposed project (Power Engineers, 2017)



DSD 005459

Newcastle Segment



CODE VARIANCE
(PSE'S PREFERRED OPTION)

PSE's Proposed Alignment

DESCRIPTION

Start: Bellevue-Newcastle Boundary
End: Newcastle-Renton Boundary

PROPOSED POLES & LOCATION

- Approximately 24 wooden H-frames (50 poles) replaced with approximately 12 pairs of single-circuit, 230 kV steel monopoles that are located near the center of the right-of-way.
- Height:
  - 81' (typical); (existing: 55')
  - 92' (maximum); (existing: 75')

QUICK FACTS

Jurisdiction: Newcastle

Segment Length: 1.5 miles

Easement / Property Acquisition

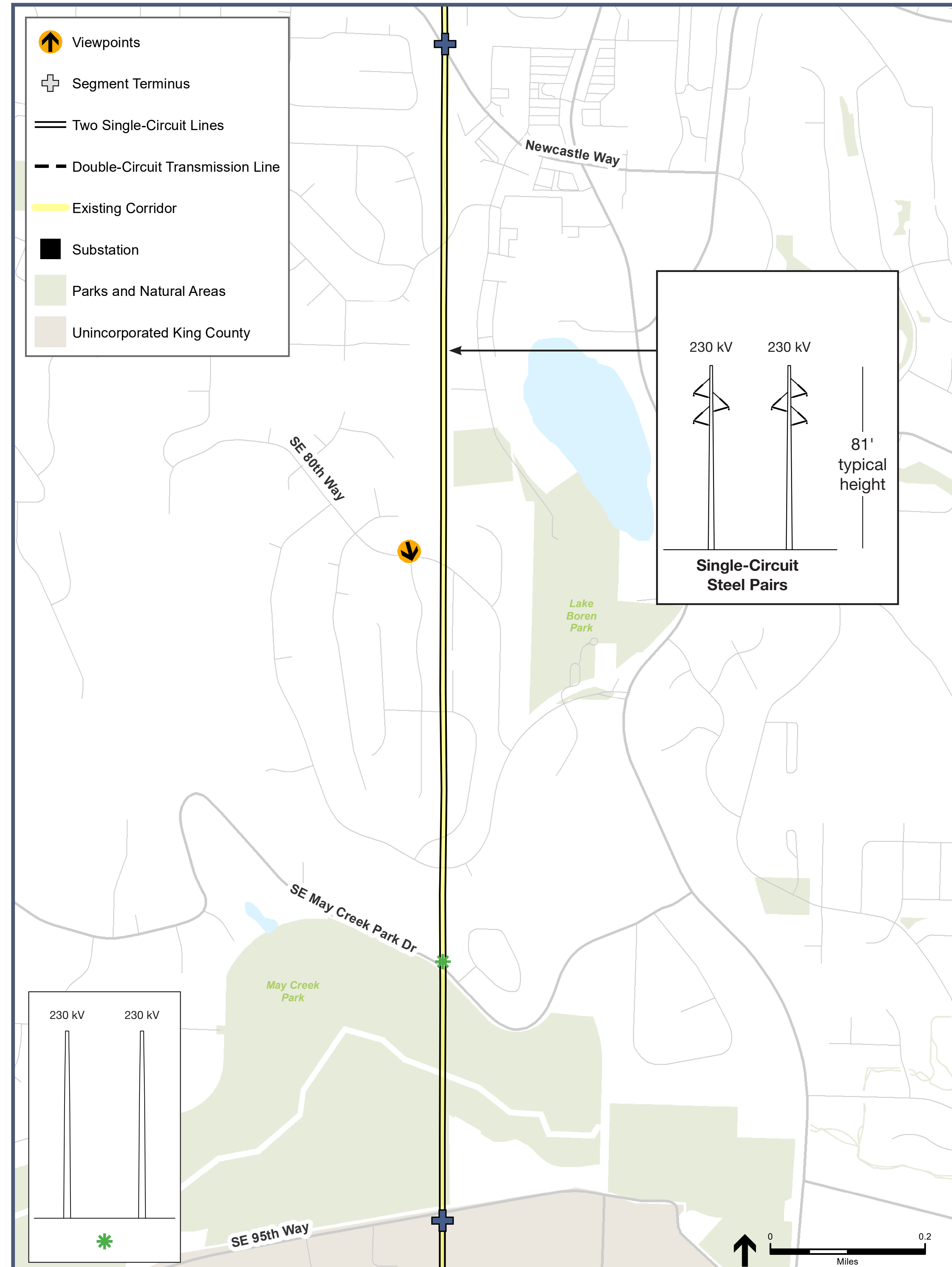
- Entirely in PSE's existing 100-foot corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in existing corridor; pipelines buried in the center of corridor.
- Poles would be placed with one on either side of the pipelines.

From SE 80th Way looking southeast (existing conditions)

Simulation of proposed project (Power Engineers, 2017)



DSD 005460

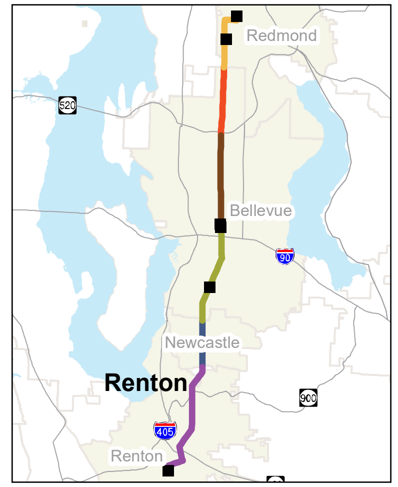
Renton Segment

DESCRIPTION

PSE's Proposed Alignment

Start: Newcastle-Renton Boundary

End: Talbot Hill Substation



PROPOSED POLES & LOCATION

1 Single-Circuit Steel Pairs

- Location: Existing corridor north of Honey Creek Open Space.
- Approximately 22 wooden H-frames replaced with approximately 11 pairs of single-circuit 230 kV steel monopoles.
- Typical height = 50-84'; (existing: 55')
- Maximum height = 50-94'; (existing: 93')

2 Double-Circuit Steel Monopole

- Location: Existing corridor south of Honey Creek Open Space.
- Approximately 48 wooden H-frames replaced with approximately 27 double-circuit 230 kV steel monopoles.
- Typical height = 94'; (existing: 55')
- Maximum height = 118'; (existing: 93')
- Two poles required at Talbot Hill substation for dead-end structures.

QUICK FACTS

Jurisdiction: Renton

Segment Length: 4 miles

Easement / Property Acquisition

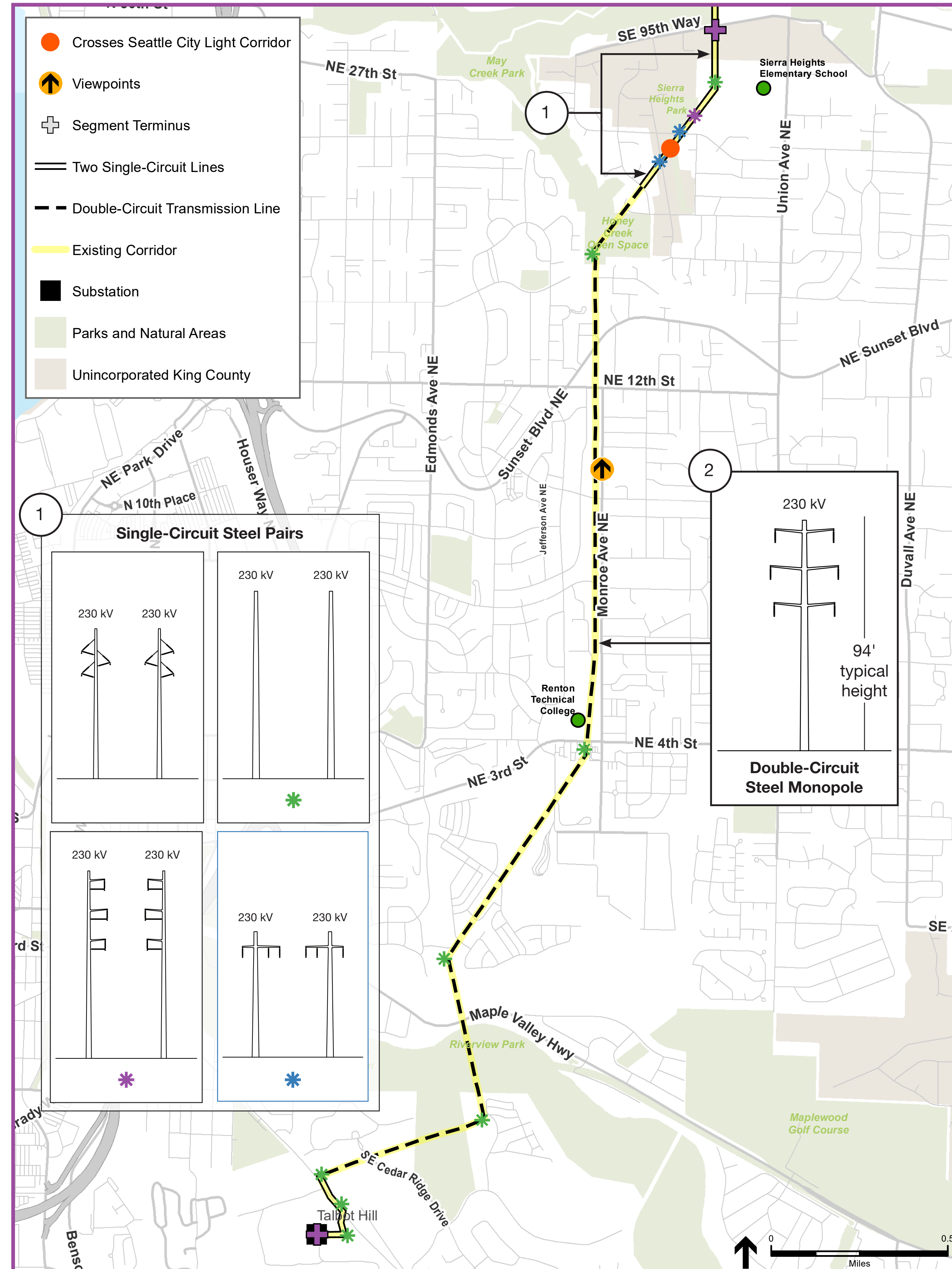
- Entirely in PSE's existing 100-foot corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in northern portion of existing corridor; pipelines buried in the center of corridor.
- Poles would be placed with one on either side of the pipelines.

From Monroe Ave NE looking north (existing conditions)

Simulation of proposed project (Power Engineers, 2017)



DSD 005461

2.1.3 Construction

Construction activities associated with the Energize Eastside project are summarized below, both for the No Action Alternative and for PSE's Proposed Alignment. The description of project construction is organized by its two main components (the Richards Creek substation and the 230 kV transmission lines), because these differ in associated activities. Construction of the 230 kV transmission lines would involve similar activities regardless of segment or option; therefore, that discussion is not presented or organized by segment. In addition, the project as analyzed in this Final EIS is still in design development. Although more information is presented in the Final EIS relative to the design details analyzed in the Phase 2 Draft EIS, PSE continues to refine the project design; therefore, the Final EIS continues to consider a range of options and to evaluate the worst-case consequences of that range of options. PSE and its contractors will continue to refine site-specific construction plans throughout the permit process. Site-specific construction impacts associated with the project (e.g., impacts to a particular element of the environment) are described as appropriate in Chapter 5.

As described earlier, because of public concern during the scoping process regarding pipeline safety, a detailed analysis of issues associated with the presence of the Olympic Pipeline system, especially in the context of construction, is included in the Final EIS. Construction-related information associated with the pipeline system is noted in general here, but the full analysis is presented in Chapter 5, Section 5.9 (*Environmental Health – Pipeline Safety*).

More details on the construction methods, equipment used, and sequencing for the Energize Eastside project is included in Appendix A-1.

2.1.3.1 No Action Alternative

Under the No Action Alternative, no construction activities would occur. Occasional pole, wire, and related equipment replacement or repair are considered to be maintenance activities, and therefore are evaluated for long-term (operation) impacts.

2.1.3.2 PSE's Proposed Alignment

Substation and transmission line construction would occur simultaneously. The substation would not be operational until at least one of the new 230 kV transmission lines was completed, connecting the substation to the regional transmission grid.

New Richards Creek Substation and Improvements to Other Substations

Construction of a new substation would require clearing and grading to create a level area for the new transformer and supporting equipment. This would require installation of an approximately 25-foot high soldier-pile retaining wall on the east. The preliminary grading quantities provided by PSE are an estimated 27,480 cubic yards of excavation and 8,000 cubic yards of fill. Approximately 3,550 truck trips would be associated with excavation. Most excavated material would be removed, but some could be used to backfill and restore grades.

The drainage control system would require *trenching*, placement of pipes, and connection to the City storm drainage system. The culvert replacement on the access road would be constructed in accordance with aquatic permit requirements, including limits on the timing for construction, protection of water quality, and other measures to protect stream and wetland habitat.

Access to the substation site is via SE 30th Street. The existing driveway and access road would be reconfigured. The access road would be paved and be approximately 20 feet wide, and approximately 24 feet wide at corners. The access road would include 2-foot shoulders on each side of the pavement. Asphalt paving equipment would be used to construct the access road to the substation. The substation yard would be paved with crushed rock. Concrete foundations would be poured to support the transformer and supporting equipment (circuit breakers, electrical buswork, control house, and connections to the new transmission lines), designed in accordance with regulatory requirements and industry standards. All disturbed areas that are not paved would be planted to control erosion and meet landscaping requirements.

Construction equipment would include, among other things:

- Specialized oversize trucks and trailers
- *Backhoes* or *excavators*
- Pile driver
- Concrete trucks
- Cranes or other specialty equipment to place transformers

Delivery of the transformer and poles to the site would require oversize trucks. Use of oversize trucks could be restricted to certain hours to avoid or minimize traffic impacts. Additional information on construction equipment and sequencing is included in Appendix A-1. Construction of the substation could take up to 18 months to complete all aspects, including landscaping and final site restoration. However, the substation could be energized before all site improvements were completed.

Construction of the new substation would not likely require the use of a temporary staging area. If equipment storage is required prior to installation, it would likely be stored at a PSE-owned facility or a temporary storage area.

Night construction work would not be needed for the new substation, with the possible exception of delivery of oversize equipment, such as a transformer. For example, the transformer might be delivered to the site at night because of highway restrictions for oversize loads. Extended construction hours may be necessary to meet system operational windows or permit conditions. Road closures are not expected to be necessary for substation construction.

The size and type of crews used to develop the substation would vary over time as the station is built. Each crew could have between two and five vehicles to support their various activities. Vehicles associated with electrical assembly work would primarily be smaller vehicles, such as personal vehicles and work trucks. The actual number of vehicles used depends on the contractor's approach to construction and what is necessary to meet contractual schedule obligations. The control house is a pre-fabricated structure that would be delivered to the site on a trailer and then set on the foundation with a crane. Trucks would also deliver equipment and materials to the substation site. Heavy equipment would be employed primarily during civil construction work, including shoring, grading, and drainage installation. Equipment such as cranes would be used to set electrical equipment on foundations.

PSE will prepare the area for foundations to support the new control house, transformer, and associated electrical equipment in accordance with regulatory requirements and industry standards.

Construction noise would be generated by the installation of appurtenant utilities, such as, natural gas, water, and sewer pipelines, as well as transmission lines (if necessary).

As described in Section 2.1.2.1, in addition to the construction of the new Richards Creek substation, some construction would be needed for the planned upgrades to the Sammamish, Rose Hill, Lakeside, and Talbot Hill substations.

Construction of the 230 kV Transmission Lines

The new transmission lines would be constructed within PSE's existing 115 kV transmission line corridor. Most of the corridor can be accessed via the highly developed road system in the project area, although temporary access roads will need to be constructed in some locations.

Construction methods along road rights-of-way and along the existing corridor would be similar in nature. Common elements of anticipated construction activities are summarized below.

Coordination with Olympic Pipe Line Company. For portions of the corridor, construction of the new 230 kV transmission lines poses potential risks of interaction with or disruption to the Olympic Pipeline system, necessitating particular attention to these risks. Extensive coordination with the Olympic Pipe Line Company (Olympic) would be required during project design and construction to avoid disruption to the pipelines. For details about construction considerations associated with the presence of the pipelines, see Chapter 5, Section 5.9 (*Environmental Health – Pipeline Safety*).

Coordination with Seattle City Light. For portions of the corridor where the proposed transmission lines cross or run parallel to the existing 230 kV line owned and operated by SCL, PSE would coordinate with SCL during project design and construction to avoid disruption to the line.

Construction Phasing and Schedule. Construction of the transmission lines would typically take approximately 12 to 18 months (over two construction phases) and would be constructed concurrently with construction of the Richards Creek substation. Under certain conditions, construction can be accelerated or slowed down depending on the number of crews working at the same time. The project is expected to be built in phases, with the south end (from the Talbot Hill substation to the proposed Richards Creek substation) being the first phase, followed by the north phase as soon as design, permitting, and energization of the south phase would allow. The project needs to be built in two construction phases to keep the Lakeside substation energized, thereby keeping the transmission system on-line to serve customers. During the construction of the south phase, the Lakeside substation will be served from the north and likewise, once the south phase is complete, it will be used to serve the Eastside while the north half is constructed.

The schedule for construction of PSE's project depends on the completion and outcome of the environmental review process, including the duration of regulatory agency reviews and timing of permit approvals. If the project is approved and implemented, construction would likely begin by mid-2018. Construction work would be done in phases, with construction occurring on more than one structure at a time in different parts of the transmission line right-of-way. PSE estimates that the south phase of the transmission line would take approximately 9 months, as would construction of the substation, not including final site restoration. PSE estimates that the north phase would take an additional 9 months, as would final site restoration at the substation. However, additional construction crews may be used to reduce the construction window. Based on this, project completion would be late 2019 at the earliest.

The installation schedule for poles depends on whether a given pole is placed on a foundation or is a directly embedded pole. Poles on foundations take longer. At a given location, typically, the foundation for a steel transmission line pole involves work at a site for 1 to 3 days; setting the pole occurs in 1 day; and stringing the wires across the pole occurs over 1 or 2 days. These three stages of work can be separated by up to 1 month or more. Therefore, in any given location, construction activity would take place over 3 to 14 days within a period of approximately 2 months. For direct embed steel poles, no foundation is set. Typically, the hole is prepared and the pole is set in a single day, with the wires installed up to a month later. The sequence of construction activities is illustrated in Figure 2-4.

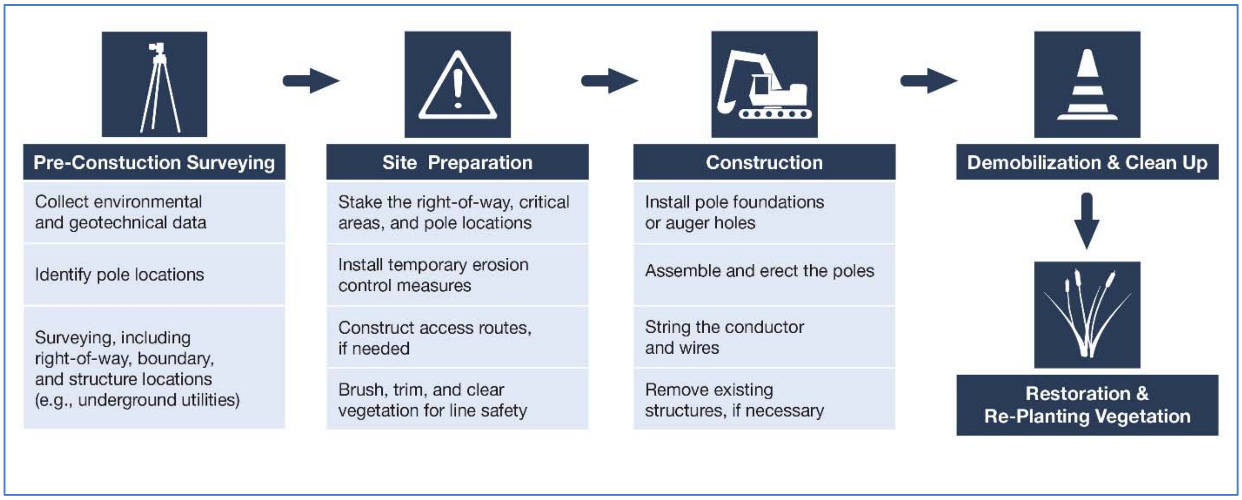


Figure 2-4. Construction Sequencing

The overall construction would be a combination of linear progression and grouping of similar size structures. Construction of foundations requiring similar size equipment (e.g., *augers* and cranes) would be one construction sequence, while poles not requiring foundations would be another sequence. As the foundations cure and become ready for pole installation, the pole and wire crews come through and install the poles. Once all of the poles are installed in a stringing section, the line crews can install the new conductor.

Construction Activities and Equipment. A typical construction crew for a transmission line installation project consists of 10 to 40 people, including transmission line and road construction workers, inspectors and administrative personnel, surveyors, and other support personnel. Construction equipment required for construction of the overhead transmission lines would include the following:

- Bulldozers
- Backhoes
- *Trackhoes*
- Trucks to transport bulldozers, backhoes, trackhoes, cranes
- Bucket trucks
- *Auxiliary rubber tire vehicles*
- Auger or vacuum trucks
- Dump trucks
- Concrete trucks or *concrete pump trucks*
- Cranes
- *Line trucks*
- Wire reel trailer for hauling conductor reels
- *Tensioner* for applying tension to the wire coming off reels during pull
- *Puller* for pulling rope/hard line with attached wire

DSD 005465

Clearing and Grading. Trees and vegetation would be removed within the right-of-way following PSE's vegetation management requirements to facilitate project construction and to ensure the safe operation of the line. Grasses, shrubs, and saplings would be trimmed or cleared in areas subject to ground-disturbing activities. All areas disturbed by tree clearing within the managed right-of-way would be revegetated following construction (incorporating property owner input where feasible), and trees within the tensioning sites outside of the PSE right-of-way would be allowed to regrow. For more information on tree clearing, see Sections 4.4 and 5.4, *Plants and Animals*.

Disturbance of site soils would be necessary for clearing and grading to prepare foundation pads, as well as potential temporary staging areas and equipment access depending on the location of the proposed transmission line. Construction would require temporary construction access roads in some locations. Typical structure removal and installation activities would disturb an area about 50 feet by 50 feet (0.06 acre). In some areas, the disturbance area may need to be larger (e.g., where the terrain is more difficult). Conversely, it may be possible to reduce the disturbance area in other locations to minimize impacts to sensitive resources, such as wetlands. The appropriate *best management practices (BMPs)* will be used to minimize impacts on sensitive resource.

Access Roads. Along the existing corridor, PSE has existing access roads and will use these pathways to the greatest extent possible. At some sites, access roads may need to be improved to accommodate construction equipment. Improvements may include vegetation clearing, widening, or laying gravel. As there are many road crossings, the use of an access road for the project would likely be limited to the installation of nearby poles and wire installation (i.e., pulling and tensioning). Typically, an access road would be used to access two to five pole sites. Construction BMPs will be used to control stormwater run-off. Access roads will be restored to their previous condition or to NESC vegetation specifications when within the managed right-of-way. Maps showing preliminary access road locations are provided in Appendix A-2. These maps reflect probable access routes identified by PSE prior to individual property owner consultation that was ongoing during the preparation of this Final EIS.

Pole Installation. Pole installation methods along road right-of-way and along the existing transmission line corridor are similar. Along roadways, it is often necessary to temporarily close a lane of traffic when moving in equipment, delivering materials, setting foundations, and placing poles. PSE would obtain street use permits when this work is performed, which include traffic control plans and construction windows. Traffic controls with caution signs, flaggers, and cones are used to direct and control traffic around the work area to allow for the safe handling and placement of both equipment and materials. If necessary, sidewalk access would be blocked off and pedestrian traffic would be detoured. Similarly, if parking spaces are in the work area, they may be temporarily coned off to preserve the space needed to complete the work. Work in the road right-of-way can be limited to specific working hours as established by the permit. For this reason, pole installation along roadways may require additional working days if the daily working times are limited.

The methods used to install new steel poles will depend on the type of pole used and both its physical and functional location. Poles can be directly embedded in the ground (similar to a wood pole). Such poles do not require a foundation and are installed using a vacuum truck or, when safe, an auger to excavate the hole, which typically results in less surface area disturbance than other equipment (such as a backhoe or drill). PSE has completed site-specific engineering and has determined that approximately 60 percent of the poles would be directly embedded.

Vacuum truck in the existing corridor in Newcastle excavating a hole for installation of a replacement transmission pole.

For some poles, drilled pier foundations would be necessary, which involves setting the anchor bolts in a poured column of concrete. Drilled pier foundations for new 230 kV poles are typically augered (drilled) 4 to 8 feet in diameter with steel reinforcements that could extend 25 to 50 feet deep depending on the structure type and soil conditions. The hole is filled with concrete and allowed to cure (harden) for several days. Once the foundation concrete has cured properly, poles are set and anchored to the foundations. For the remaining 40 percent of pole locations, concrete pole foundations would need to be installed. The actual number of each pole type will be determined during final design. PSE is refining the transmission line design to reduce ground disturbance, including the number of poles that require engineered foundations. Engineered foundations are typically required at angle and dead-end poles, so they cannot be eliminated.

Steel poles would typically be delivered to the site in 30- to 50-foot sections, and assembled in the field. The delivery would require one or two vehicle trips per pole. The base is installed first, as described above; once the base is installed, the subsequent sections are added. Typically, no welding is required, as the ends of the segmented poles are tapered, designed to overlap using slip joints or connected with flange joints.

PSE does not generally anticipate the need for homeowners to vacate their homes during pole installation. However, in locations where site access by vehicles is difficult, PSE has suggested that cranes or helicopters could be used to lift poles sections over a building, in order to reduce impacts from creating temporary access. In such cases, residents would likely be asked to vacate the premises for a couple of hours to ensure their safety. This type of construction is not proposed in any specific location by PSE at this time, but is listed and described as a potential mitigation measure for construction phase land use impacts in Section 5.1.3, *Mitigation Measures.*

Temporary Stringing/Pulling Sites. To replace the transmission conductor, stringing and tensioning equipment will be staged near new steel poles at an estimated eight to ten locations along the corridor. The disturbance area associated with the stringing sites will avoid sensitive resources (such as wetlands, streams, and unstable slopes) to the extent feasible. Each stringing site will be approximately 7,500 square feet in area (e.g., 87 feet by 87 feet). Pulling sites would typically be 2 to

3 miles apart along the right-of-way, with specific sites determined close to the time the stringing activity takes place. Similar to work areas for pole construction, the shape of the stringing site will depend on the presence of adjacent critical areas, existing land conditions, and area needed for equipment staging based on the angle needed to string the conductor. Stringing sites are expected to largely overlap other work areas (e.g., for pole replacement, access, and vegetation management) and are not expected to require additional tree removal. Any additional impacts resulting from stringing sites will be temporary in nature; temporary impact areas will be re-vegetated and left to return their natural state or enhanced following construction. It may be more efficient and less disruptive to adjacent property owners in some locations to use a helicopter for stringing. This is identified as a mitigation measure in Section 5.1.3, *Mitigation Measures,* as well as in Appendix M.

Transmission Line (Wire) Installation. Once the poles are set in place and stringing sites established, the transmission line conductor (wire) is installed (Figure 2-5). The wire-stringing operation requires equipment at each end of the section being strung, with the establishment of the temporary pulling or tensioning sites. Wires are pulled between these pulling sites through pulleys affixed to each pole structure. Once the wire is strung, the pulleys would be removed and the wire clipped into its final hardware attachment. Following the installation of wires, surfaces around the new poles and in work areas would be restored.

For safety, the NESC has established minimum wire clearances (i.e., the wire height above the ground). PSE has designed 230 kV transmission lines for the Energize Eastside wires to be 28 feet or more from the ground under maximum sag conditions, which meets or exceeds NESC’s minimum conductor wire height. Additional clearance would be provided over roadway and highway crossings.

Removal of Existing Poles: After installation of the new poles and transmission lines, including wire installation and energization, the existing poles and wires would be removed. After energization and successful testing of the new fiber optic communications lines, the old poles and lines would be removed within a few days to a few months. For poles with cellular equipment, transfer from the old pole to the new one would occur within approximately 90 days, and would have to occur before the affected poles could be removed. Because the existing wood poles are treated with a preservative, they are regulated as hazardous waste; the removed poles would be disposed of at an approved landfill in compliance with state and federal regulations.

Interstate 90 (I-90) and State Route 520 (SR 520) Crossings. The Bellevue North Segment crosses SR 520 and the Bellevue South Segment crosses I-90. Poles installed at these crossing locations would need to be 10 to 15 feet taller than the other nearby poles, although the existing topography at both of these crossing sites limits the need for taller structures. When stringing the transmission lines at the highway crossings, PSE would work with the Washington State Department of Transportation to determine appropriate times to conduct the work and related safety factors. Construction and stringing may require rolling slowdowns along the highway (with the use of flaggers), as well as some night work. Also, dead-end structures would be installed in the vicinity of the I-90 and SR 520 crossings for line stability.

Worker rebuilding a transmission line

Workers connecting a transmission line to insulators

Stringing a transmission line

Installing a steel monopole with pulleys attached

Figure 2-5. Transmission Line Pole and Wire Installation

Staging Areas. Staging areas and a construction field office would be required along the project corridor during construction. Specific staging sites would be determined by PSE and its contractor after final design has been approved. In most instances, staging sites are located on properties that have already been developed, such as parking lots or graded lots. For a project of this scope, PSE would identify sites near the corridor with good access. Some staging sites are for short-term use (less than 3 months), while others may be used for the entire duration of the project (greater than a year). Short-term sites are used to accept delivery of materials (e.g., pole sections, insulators, conductors, and associated hardware). Longer term sites can be used for temporary construction offices (e.g., trailers) in addition to material storage. The longer term sites are often larger and used to accommodate parking for construction vehicles in addition to material storage. To the extent possible, PSE locates and uses staging area sites on properties that it already owns or leases, that are already paved, and that are close to the transmission line corridor. It is possible that recreation sites or facilities may be used for temporary construction staging (as described in Section 5.6.2). PSE would work with the appropriate cities to identify suitable locations for staging that would have minimal adverse impacts to recreation. Following construction, PSE would restore staging areas if any ground disturbance had occurred.

Other Activities. Installation of the new overhead transmission lines would require other construction activities that may include additional boring holes for geotechnical investigations, or relocating existing distribution and telecommunications facilities.

Demobilization and Restoration. Areas temporarily disturbed by construction activities will be restored to pre-project conditions. Site restoration includes removal of temporary erosion control measures and temporary access roads, ground level regrading, revegetation, wetland mitigation (if needed), and other activities. Restoration will be coordinated with the property owner and relevant permitting agencies.

2.2 ALTERNATIVES CONSIDERED BUT NOT INCLUDED

2.2.1 From the Phase 1 Draft EIS

The Phase 1 Draft EIS considered a range of programmatic alternatives, some of which were not included in the analysis. The following alternatives were considered but not included in the Phase 1 Draft EIS:

- Use Existing BPA High Power Transmission Line.
- Upgrade/Adjust the Existing Electrical System.
- Larger Generation Facilities.
- Submerged 230 kV Transmission Line in Lake Sammamish.
- Other Approaches such as phasing, combining partial solutions, changing a transmission line from AC to direct current (DC), limiting the flow of power from sources outside of the Eastside, and limiting the scope of potential to Bellevue only.

The reasons each of these suggestions were not included in the EIS analysis are described in Section 2.4 of the Phase 1 Draft EIS.

2.2.2 From the Phase 2 Draft EIS

The Phase 2 Draft EIS considered a range of project-level alternatives, some of which were not included in the analysis. The following alternatives were considered but not included in the Phase 2 Draft EIS:

- Seattle City Light Transmission Line
- Underground Transmission Line
- Underwater Transmission Line in Lake Washington
- New 115 kV Transmission Line
- Seattle Public Utilities Water Line Corridor
- Other Routes and Options
- Alternative 2 and “Alternative 2B”

The reasons each of these suggested alternatives were not included in the EIS analysis are described in Section 2.2 of the Phase 2 Draft EIS.

2.2.3 For the Final EIS

During the comment periods on the Phase 1 Draft EIS and Phase 2 Draft EIS, comments were submitted that debate the reasons given for the elimination of some of the alternatives listed above. The responses to comments in Chapter 6, Appendix J, and Appendix K of this Final EIS address these comments. These are not further discussed in this chapter. For the Final EIS, one additional alternative for the Newcastle Segment was considered and not included: undergrounding a portion of the transmission line in Newcastle, as described below.

2.2.3.1 Underground a Portion of the Transmission Line in Newcastle

Undergrounding a portion of the transmission line was listed as a potential mitigation measure in the Phase 2 Draft EIS. After publication of the Phase 2 Draft EIS, the Partner Cities considered whether there should be an alternative in any of the segments that would travel underground. In Newcastle specifically, there were potential significant impacts on the *aesthetic environment,* but no feasible alternate routes had been identified, so the possibility of an underground alternative was discussed. The Phase 1 Draft EIS describes the problems with placing the transmission line underground generally within the existing corridor, due to the presence of the Olympic Pipeline system. In Newcastle, the Olympic Pipeline system occupies the center of the corridor, making it impossible to place an underground transmission line where it would not interfere with the pipelines. For these reasons, an underground option would need to use City road right-of-way. Selecting a feasible route for an underground segment involves a number of technical steps, such as determining where connections can be made to the overhead portion, and examining potential utility conflicts. PSE indicated that, under its tariff, any such design request must be paid for by the requesting party. PSE also indicated that the time it would take to design and install an underground segment could delay the project several years. Lacking a design, it is not possible to prepare a project-level analysis. The delay involved in developing a design could also have an adverse effect on the reliability of the electrical transmission system on the Eastside. After careful consideration, this alternative was not carried forward for analysis in the Final EIS.

2.3 BENEFITS AND DISADVANTAGES OF DELAYING THE PROJECT

PSE has identified the need to provide additional capacity by the winter of 2017–2018 to comply with its anticipated capacity requirements. PSE's objectives for the project, and criteria for evaluating options to meet its objectives, are described in detail in Section 2.2 of the Phase 1 Draft EIS. The impacts and potential benefits of a conservation-focused non-transmission alternative are evaluated as part of Alternative 2 in the Phase 1 Draft EIS, including a number of potential combinations of approaches.

Delaying the project for 1 to 2 years would have the benefit of avoiding the impacts in the near future for the action alternative described in the Phase 2 Draft EIS and the Final EIS. It is possible that by delaying the project, some of the expanded conservation measures described in the Phase 1 Draft EIS would be incorporated into development, reducing energy demand further than PSE has projected. However, as noted by the EIS Consultant Team in their independent review of PSE load projections and needs assessments (Stantec, 2015), PSE has assumed high levels of conservation in its estimates of load projection. Under the No Action Alternative, the Final EIS assumes that PSE would continue to achieve 100 percent of the company's conservation goals as outlined in its 2017 Integrated Resource Plan (PSE, 2017d), systemwide and for the Eastside, which means that a very aggressive campaign would be needed to exceed these goals. Conservation goals are achieved through a variety of energy efficiency improvements implemented by PSE and its customers, largely through voluntary participation. Additional conservation could have the benefit of reducing greenhouse gas generation from electrical consumption on the Eastside. Under WAC 480-100-238, however, PSE "has the responsibility to meet its system demand with a least cost mix of energy supply resources and conservation." Accordingly, PSE's ability to fund conservation and new technologies is limited to those that are cost-effective. Delaying the project could allow technological advancements to occur in areas such as battery storage or generation, providing additional feasible alternatives to increased transmission capacity in the near term; however, identifying a time frame when these advancements could occur is speculative. At this time, there are no currently known, widely accepted technologies that PSE would employ that could feasibly and reliably address the transmission capacity deficiency on the Eastside. Under the No Action Alternative, however, PSE would not be precluded from seeking out new technologies. For example, if the project were delayed, PSE could explore the possibility of using battery technology to address the near-term problem. Impacts associated with battery technology are described in the Phase 1 Draft EIS. Aside from the concerns about reliability of this relatively new technology, impacts were not considered significant.

The disadvantages of delaying the project are that the risks of power outages (described in Chapter 1 of the Phase 1 Draft EIS) associated with the No Action Alternative could develop over time. PSE's customers could respond with increased energy conservation during peak periods to avoid outages, but PSE could not rely on voluntary conservation during such periods unless they have control over customers' rates of consumption. This type of demand reduction is technically feasible, but PSE cannot compel customers to adopt it, and few have shown willingness to employ that option under its current conservation program. Therefore, PSE would still be faced with creating temporary outages to protect the regional grid. Given the lack of certainty regarding potential effectiveness of conservation measures, project delay would likely fail to achieve the project objectives. It is also possible that the awareness of the risk of outages could discourage development within the Eastside, which would place the Partner Cities at an economic disadvantage to other jurisdictions in the region. A declining reliability of the electrical power supply on the Eastside would be inconsistent with local planning policies.

3

Errata

energize EASTSIDE EIS

CHAPTER 3. ERRATA

This chapter identifies errors and corrections to the text of the Phase 1 Draft EIS and Phase 2 Draft EIS. Potential errors in the Draft EIS documents were identified based on comments received during both Phase 1 and Phase 2, as well as through additional analysis that occurred throughout preparation of the EIS documents. Information in this chapter is focused on factual errors in the two Draft EIS documents and is organized by phase, chapter or section, and page number. The Phase 1 Draft EIS is a programmatic document, and therefore the need for more specific information was not considered to be an error unless it changed the significance findings. In general, comments received that provided clarification regarding particular issues or topics did not necessitate Errata entries; rather, such information was incorporated as appropriate into the new analysis in the Final EIS, and/or acknowledged in the response to comments (see Chapter 6, Appendix J, and Appendix K of this Final EIS).

3.1 PHASE 1 DRAFT EIS ERRATA ITEMS

Page	Location	Change
Chapter 1 – Introduction and Summary		
Page 1-2	Paragraph 2, Lines 11–12	The reference to Figure 1-1 incorrectly states that there is no 230 kV transmission line that reaches the center of the Eastside area. The reference should read that there is no 230 kV transmission line that provides the necessary capacity to the center of the Eastside area.
Page 1-3	Figure 1-1	The legend should read “Customers potentially affected by rotating outages” rather than “Customers affected by rotation outages.”
Page 1-5	Paragraph 1, Line 7	Incorrect reference to Appendix A. The information referred to is in the Stantec memo Energize Eastside Project Memorandum from Keith DeClerck to Mark Johnson, dated July 31, 2015, and is not in any appendix. This memo is available on the EIS project website.
Page 1-6	Paragraph 4, Lines 6–7	The text incorrectly states that “once equipment is in an overload condition the options are to let it fail or take it out of service.” NERC requires that utilities prevent overloads of bulk transmission elements such as lines and transformers.

DSD 005474

Page	Location	Change
Page 1-31	Paragraph 2	PSE has stated that HPFF would not be used in underground lines. Therefore, the following text: “Hazardous materials are likely in electrical infrastructure (e.g., oil-containing transformers, High Pressure Fluid-Filled (HPFF) power lines used in some underground lines)” should have stated “Hazardous materials are likely in electrical infrastructure (e.g., oil-containing transformers).”
Page 1-32	Bullet One	PSE has stated that their transformers would not use SF_6. Therefore, the following text: “use vegetable-based oil for transformers rather than petroleum based oil or SF_6,” should have said “use vegetable-based oil for gas-insulated circuit breakers rather than petroleum-based oil or SF_6.”
Page 1-50	Table 1-2	This summary table incorrectly states that there would be “Minor to Moderate” construction impacts to Historic and Cultural Resources under the No Action Alternative. Table 1-2 should have said there would be “Negligible” impacts to reflect the findings of the Historic and Cultural chapter.
Page 1-51	Table 1-2	Construction impacts to historic and cultural resources for the Energy Storage and Peak Power Generation components should have been classified as "Minor to Significant" as both of these components have the potential for minor impacts to historic properties and significant impacts to archaeological resources, if present.
Page 1-54	Table 1-3	Impacts to Recreation under most Alternative 2 components were incorrect and should have been stated as “Minor to Moderate” to reflect the findings of the recreation chapter. Impacts for peak power generation for Alternative 2 should have been “Minor to Significant.”
Chapter 2 – Description of Project and Alternatives		
Page 2-40	Paragraph 2	When using the term "storing," the text should have referred to the MWh rating (225.6), rather than the power rating of 121 MW.
Page 2-41	Headings	The heading numbering scheme for the Peak Generation Plant Component and Construction subsections is incorrect. The headings should have been numbered as “2.3.3.1 Peak Generation Plant Component” and “2.3.3.3 Construction” to “2.3.3.5 Peak Generation Plant Component” and “2.3.3.6 Construction,” respectively.

Page	Location	Change
Chapter 3 – Earth		
Page 3-2	Paragraphs 2–4	It should have been noted that Washington State Building Code exempts electrical transmission equipment and structures in a utility right-of-way from its requirements. Section 4.11 of the Final EIS provides an expanded discussion of applicable standards (see Section 4.11.1).
Page 3-11	Paragraph 1	"Section 3.3.3.1, Other Hazards," should have been called "Section 3.3.3.5, Other Hazards."
Page 3-11	Paragraph 1	Renton should have been included in the following sentence: "Other hazards could include coal mining areas and tunnels such as those present in southern Bellevue and Newcastle." Although there are no active coal mines in Renton, there are four mapped abandoned coal mines, and smaller unmapped mines may also exist. Historical coal mining areas in Renton are primarily in the vicinity of South Puget Drive, Renton Hill, south of Cedar River Park, and east of Benson Drive (City of Renton Hazard Mitigation Plan, April 2010).
Page 3-16	Paragraph 2, Lines 3–4	This section should have stated that water and sewer pipelines may also need to be provided. The statement "Depending on location, this could include replacing major gas mains to increase natural gas supply capacity" should have been "Depending on location, this could include replacing major gas mains (to increase natural gas supply capacity) and providing water and sewer pipelines."
Page 3-17	Paragraph 5, Lines 5–7	The text incorrectly states that "PSE would be required to retain a Washington-licensed geotechnical engineer to design the project facilities to withstand probable seismically induced ground shaking at each location." PSE would be required to retain a system designer that would integrate information and recommendations prepared by a geotechnical engineer to ensure that appropriate design considerations are made. The geotechnical engineer would provide the foundation design of the project facilities.
Page 3-17	Paragraph 5, Lines 8–12	The text incorrectly referred to seismic requirements of the Washington State Building Code and any local building code amendments as "recommendations."

Page	Location	Change
Page 3-17	Paragraph 5	Section 3.7.1.3, Seismic Hazards, does not discuss the fact that the existing 115 kV transmission line and Olympic Pipeline system cross the Seattle Fault Zone. A major earthquake of the magnitude expected on the Seattle Fault could cause pipeline rupture in certain areas on the Eastside (Earthquake Engineering Institute and Washington Military Department Emergency Management Division, 2005). This is evaluated further in Section 4.11.3 of the Final EIS.
Page 3-22	Paragraph 2	The following mitigation measures should have been listed: • Use appropriate stormwater management (detention) facilities to reduce stream flow velocities and flooding. • Conduct additional seismic engineering.
Chapter 4 – GHG		
Page 4-12	Paragraph 4, Lines 1 and 2	The text incorrectly states that: "Using an existing 115 kV corridor for Alternative 1, Option A could require up to an additional 50 feet of lateral clearing along the length of the alignment." The text should have said: "Using an existing 115 kV corridor for Alternative 1, Option A could require up to a 120 to 150 foot wide corridor (approximately 30 to 40 feet wider than a 115 kV line)."
Chapter 5 – Water		
Page 5-3	Table 5-1	WAC 173-201A should have been included under "State Regulatory Program or Policies." It includes the rules for how to implement RCW 90.48.
Chapter 6 – Plants and Animals		
Page 6-10	Paragraph 1, Line 4	The text should have included amphibians as a class of animal that utilizes aquatic systems in the Eastside.
Page 6-11	Paragraph 2	The text should have included amphibians and reptiles as classes of animals that utilized forest habitat in the Eastside.
Page 6-12	Paragraph 3	The following species of local importance should have been noted under the "City of Bellevue's Land Use Code 20.25H.150" bullet: Western big-eared bat, Keen's myotis, long-legged myotis, and long-eared myotis.

Page	Location	Change
Page 6-14	Paragraph 4, Lines 1–2	Figure 6-6 (now Figure 6-7) should not have been referenced when referring to PSE's Vegetation Management Program for the No Action Alternative. In addition, PSE's Vegetation Management Program removes mature trees equal or greater than 25 feet, not 15 feet. The statement: "PSE's Vegetation Management Program would continue under the No Action Alternative (Figure 6-6). This program includes removal of mature trees greater than 15 feet tall that are located within the transmission right-of-way (typically including the area directly under the wires (the wire zone), and 10 feet from the outer transmission wires (border zones)" should have stated: "PSE's Vegetation Management Program would continue under the No Action Alternative. This program includes the removal of mature trees equal to or greater than 25 feet in height that are located within the transmission right-of-way, typically including the area directly under the wires (the wire zone), and 10 feet from the outer transmission wires (border zones)."
Page 6-15	Figure 6-6	Figure 6-6 "PSE Vegetation Management Program Zones" should have been numbered as Figure 6-7 and should have been located in Section 6.6.3. In addition, Figure 6-6 as cited on page 6-16 should have been cited as Figure 6-7.
Page 6-17	Paragraphs 4 and 5	Approximately 9 miles of additional 230 kV line would need to be reconductored north of the Sammamish substation as part of Alternative 1, Option B (SCL Corridor), which could include clearing associated with construction access. This was not evaluated in the Phase 1 Draft EIS.
Chapter 8 – Environmental Health and Safety		
Chapter 8	Use of SF6 (throughout Chapter 8)	It was incorrectly assumed that PSE uses SF6 (a gas sometimes used for insulation of electrical equipment) in transformers. SF6 is used by PSE in high-voltage circuit breakers, which are designed to protect an electrical circuit from damage caused by overcurrent/overload or short circuit.
Page 8-9	Sidebar	The text incorrectly states that SF6 is a highly toxic gas. However, it is a contributor to GHG emissions and is further evaluated in that respect in the Phase 2 and Final EIS documents.
Page 8-11	Paragraph 2, Line 1	from the text incorrectly references "Section 8.1.1." "Section 8.3.1" should have been referenced.
Page 8-35	Paragraph 5, Line 3	The text incorrectly states that NESC guidelines direct PSE how to shield lines with lightning protection.

Page	Location	Change
Page 8-40	Paragraph 3, Lines 6–8	The text incorrectly states that: "state public utility commission has adopted seismic standards that utilities must follow, with structural requirements for poles that would be sufficient to resist anticipated earthquake ground motions." PSE would meet the structural requirements set by the IBC, ASCE, and ACI.
Chapter 9 – Noise		
Chapter 9	Use of "maintenance yards" (throughout Chapter 9)	Throughout the chapter, the term "maintenance yards" should be "utility yards." Utility yards is the more commonly used term.
Page 9-8+	Paragraph 2, Lines 1-2; Page 9-15, Paragraph 2, Lines 1–2; Page 9-17, Paragraph 2, Lines 4–5; and Page 9-17, Paragraph 4, Line 1	The text incorrectly states that: "electrical substations are exempt from the maximum permissible noise levels established in Chapter 173-60 of the Washington Administrative Code." According to WAC 173-60-040(2)(b), electrical substations are subject to the state noise limits between the hours of 10:00 PM and 7:00 AM; however, they are not subject to the 10 dBA reduction.
Page 9-16	Paragraph 5, heading	Heading "9.6.4.1 Peak Generation Plant Component" should have been "9.6.4.5 Peak Generation Plant Component."
Page 9-16	Paragraph 5, Lines 7–10	The text incorrectly says that: "…local noise levels could be elevated, especially during nighttime hours, and represent a moderate noise impact." The text should have said that under such conditions the peak generation plant component could result in a significant noise impact.
Chapter 10 – Land Use		
Page 10-5	Figure 10-2	Figure incorrectly labels most of the park lands and open space (including Lake Sammamish State Park, Squak Mountain State Park and Natural Area, and Cougar Mountain Regional Wildland Park, among others) as planned "institutional lands."
Page 10-13	Figure 10-5	Figure mislabels the Issaquah Highlands, the area surrounding the Lake Tradition substation, and the parklands on Cougar and Squak as vacant land.

Page	Location	Change
Page 10-20	Paragraph 4	The text states that "PSE confirms that due to safety regulations, transmission lines would never be placed directly over homes (Strauch, telephone conversation)." PSE asserts in a letter that occupied structures have been constructed under the existing 115 kV transmission lines. While no homes are under any of the existing lines, the EIS text should have mentioned that up to three non-residential structures appear in aerial photos to be under the existing lines, all of which appear to be commercial or agricultural uses.
Page 10-24	Paragraph 1, Lines 1–2	The text incorrectly states that PSE would need to purchase the land adjacent to the Lakeside substation if the Lakeside site were chosen. PSE owns the land that would be used for the Lakeside substation expansion. However, PSE would need to develop the land.
Page 10-26	Paragraph 1, Table 10–2	The Newcastle Use Restriction information was incorrect. Utility facilities would be allowed in mixed use, urban residential, and neighborhood business zoning districts.
Page 10-27	Paragraph 3, Lines 1–3	It is unknown whether or not introducing a 230 kV line would be considered a new hazardous use if lower voltage transmission lines already exist. The following sentences have been deleted: "This option would have some of the same zoning consistency issues as Option A (Table 10-2) including potential for co-location with a high consequence land use, since it also crosses the OPL Company (OPLC) pipeline in places and is parallel to it in other locations."
Page 10-30	Paragraph 2, Line 6	The text incorrectly states that PSE would need to acquire additional property for the expansion of the substations under Alternative 3. It is possible that no additional property acquisition would be required.
Chapter 11 – Views and Visual Resources		
Page 11-20	Paragraph 3, Lines 2–5	Based on research conducted by the EIS Consultant Team, the section states that 12.5 kV lines are commonly on wood poles up to approximately 60 feet tall. PSE has since provided locally specific information. On the Eastside, 12.5 kV lines are commonly on wood poles up to approximately 34 to 40 feet tall.

Page	Location	Change
Page 11-20	Paragraph 4, Lines 1–3	Based on research conducted by the EIS Consultant Team, the section states that 115 kV lines are suspended on single wood poles and are generally 70 to 90 feet above ground. PSE has since provided locally specific information. On the Eastside, 115 kV lines are suspended on single wood poles and are generally 60 to 80 feet above ground.
Page 11-21	Paragraph 4, Line 2	The text incorrectly refers to Westminster substation as an existing substation. It is a proposed substation.
Page 11-37	Paragraph 4, Line 4	The text incorrectly states that SCL has one 230 kV line within its existing transmission corridor. SCL has two 230 kV lines in its existing corridor.
Chapter 12 – Recreation		
Page 12-2	Table 12-1	Table 12-1 should have included Redmond's Transportation Master Plan (2013) under "Parks and Recreation Plans for Study Area Communities." This plan includes pedestrian and bicycle system plans.
Page 12-15	Paragraph 1, Lines 1–3	The text incorrectly states that vaults and permanent access roads would be located on the shoreline every 1,500 to 2,500 feet to provide access for maintenance and repair of the underwater cables. Vaults and access roads would only be required at the entrance and exit points to the lake.
Chapter 13 – Historic and Cultural Resources		
Page 13-11	Paragraph 4, Lines 4–5	The section incorrectly states that: "no ground disturbance is expected under the No Action Alternative..." Ground disturbance would occur under the No Action Alternative as part of routine pole replacement activities, and over time all of the poles along the existing Sammamish to Talbot Hill 115 kV corridor would be replaced again. This has been clarified in Section 3.7.4 of the Phase 2 Draft EIS.
Chapter 14 – Transportation		
Page 14-13	Paragraph 6	The text incorrectly states that a few hundred truck trips per day would be required if petroleum products needed to be transported by vehicle, rather than the pipeline. This is corrected in Section 4.9.6 of the Final EIS.

Page	Location	Change
Chapter 15 – Public Services		
Page 15-13	Paragraph 1, Lines 1–2	Text does not note that water and sewer pipelines may also need to be extended to the peak generation plants.
Chapter 16 – Utilities		
Page 16-12	Paragraph 3, Line 1	An outdated franchise agreement with OPLC was cited. The most recent agreement between the City of Bellevue and OPLC is from 2016.
Page 16-16	Last paragraph, Line 1	The text incorrectly states that two substations may be needed. It should have stated that two transformers may be needed.
Page 16-17	Paragraph 1, Lines 4–5	Reference to the Bothell-SnoKing double-circuit 230 kV line should be to the Maple Valley-SnoKing double-circuit 230 kV line.
Page 16-20	Paragraph 4, Lines 1–2	The text incorrectly implies that the Westminster and Vernell substations are existing facilities.
Page 16-20	Paragraph 5, Line 3	The text incorrectly limits the discussion of foundations to just transformer foundation.
Page 16-32	Paragraph 2, Line 1	The text incorrectly states that an additional 230 kV transmission line would be located along SCL's easement. Under Alternative 1, Option B, the new PSE 230 kV transmission lines would replace the existing SCL 230 kV transmission lines.
Appendix B – Potential Construction Equipment		
Table B-1	Alternative 1 (Options A and B) and Alternative 3, removal of existing wooden poles	Cranes and helicopters should have been listed as equipment being considered for Alternative 1 (Options A and B) and Alternative 3 for the removal of existing wooden poles.

3.2 PHASE 2 DRAFT EIS ERRATA ITEMS

Page	Location	Change
Fact Sheet		
Page III	Under the "Federal" heading	The following should have been listed: "Coastal Zone Management Consistency Determination under the federal Coastal Zone Management Act, Washington State Department of Ecology." This information has been added to the Final EIS (under the State heading).
Chapter 2 – Alternatives		
Pages 2-2 to 2-3	Section 2.1.1	The text incorrectly states that the No Action Alternative would not require issuance of state or local permits. The text should have described the No Action Alternative as: "those actions PSE would undertake to maintain the existing line if the proposed project is not approved." See Section 2.1.1 of the Final EIS.
Page 2-7	Figure 2.1-2	The "Proposed 115 kV Corridor" should be labeled "Existing 115 kV Corridor." See Figure 2-2 in the Final EIS for a revised site plan for the Richards Creek substation site based on refined design details.
Section 3.1 – Land Use		
Page 3.1-45	Section 3.1.5.15	The *Existing Land Use Pattern and Neighborhood Character* bullet for the Renton Segment analysis should have included vacant land as not being impacted (in addition to single-family residential, as listed). This land use has been added to the Final EIS.
Page 3.1-3	Section 3.1.1	A discussion about NMC 18.44.052.C.1 and 18.44.052.D should have been provided. Text has been added to the Final EIS (see Section 4.1.1 of the Final EIS).
Section 3.2 – Scenic Views and the Aesthetic Environment		
Page 3.2-3	Paragraph 2, Line 2	The text incorrectly states that for the Energize Eastside project, the study area is defined as the area within 0.25 mile from the edge of the existing and new corridor. It is from the centerline of the existing and new corridor. This statement has been corrected in the Final EIS.
Page 3.2-38	Paragraph 5, Line 2	The text incorrectly states that the multi-family housing would be 700 feet from the new substation. It would actually be approximately 450 feet. This has been rectified in Section 4.2.5.2 of the Final EIS.
Page 3.2-77	Paragraph 1, Line 4	Text incorrectly states that the poles would be closer to neighboring residences. Text has been revised in the Final EIS (see Section 4.2.5.7 of the Final EIS).

Page	Location	Change
Page 3.2-80	Figure 3.2-22	Figure 3.2-22 shows an outdated pole configuration. The updated pole configuration simulation is provided in the Final EIS (see Figure 4.2-18).
Page 3.2-82	Paragraph 3	There is only one SCL crossing in the Renton Segment, just south of the intersection of 126th Ave SE with NE 25th St. The approach used in the Phase 2 Draft EIS conservatively portrays impacts as further engineering is required to determine if the project would require raising the existing SCL towers. A revised discussion is provided in Section 4.2.5.9 of the Final EIS.
Page 3.2-87	Section 3.2.6.1	Revised text to include regulatory requirements from Newcastle that would need to be complied with (NMC 18.44.052.C.1 and 18.44.052.D). See revised discussion in the Final EIS (see Section 4.2.6).
Section 3.3 – Water		
Page 3.3-12	Section 3.3.4	The discussion of the No Action Alternative should have acknowledged impacts associated with pole replacement. This discussion has been added to Section 4.3.4 of the Final EIS.
Page 3.3-14	Section 3.3.5.2	The information presented for the Richards Creek substation site is incorrect. It was based on preliminary, reconnaissance-level work. The Final EIS presents information based on a formal wetland delineation conducted in June 2017. Therefore, the wetland data presented in the Final EIS (e.g., names, locations, acreages, etc.) are different than what was presented in the Phase 2 Draft EIS. See Section 4.3.5.2 of the Final EIS.
Pages 3.3-19, 20, and 21	Tables 3.3-3 and 3.3-4	Tables 3.3-3 and 3.3-4 present incorrect numbers for the number of "Category I" wetlands impacted under each option. The numbers presented in the bulleted text for each option (see Sections 3.3.5.5 through 3.3.5.7 and Sections 3.3.5.9 through 3.3.5.12 of the Phase 2 Draft EIS) are correct and should have been used for the tables.
Page 3.3-27	Section 3.3.5.14	Text incorrectly states that "No poles would be located in wetlands or buffers…" Although PSE's design did place all of the new poles along the corridor (excluding substation site) out of wetlands, a few poles would be in buffers.
Section 3.4 – Plants and Animals		
Page 3.4-8	Paragraph 3, Line 7	The term "Managed Right-of-Way" was misused when referring to tree removal. The text should have said "The Watershed Company 100-foot study area."
Page 3.4-9	Paragraph 1, Line1	Same as above regarding the term "Managed Right-of-Way."

Page	Location	Change
Page 3.4-9	Figure 3.4-5	Same as above regarding the term "Managed Right-of-Way."
Throughout	Throughout	Some of the tree numbers presented in the Phase 2 Draft EIS were incorrect because they were based on a mixture of data sources that were generated at different points in the analysis, including reports prepared by The Watershed Company and georeferenced tree data points, and errors in data processing. The corrected numbers for options not carried forward into this Final EIS are listed in the table below. Section 4.4 of the Final EIS provides corrected numbers for the Redmond, Bellevue North, and Renton Segments. The analysis in Section 4.4 for the remaining segments includes revised tree numbers based on information in the permit applications submitted to the Cities of Bellevue and Newcastle. Appendix L provides corrected numbers for the Richards Creek Substation, Bellevue Central, Bellevue South, and Newcastle Segments (see Phase 2 Draft EIS column).

Option	Trees Subject to Removal	Significant Trees Subject to Removal	Total Trees Surveyed	% of Trees Removed	Trees Removed Per Acre	Significant Trees Removed Per Acre	Trees Removed From Critical Habitat	Trees Removed From Critical Habitat Buffers
Existing Easement	599	232	753	80%	17.6	6.8	50	152
Bypass Option 1	1,767	1,216	3,034	58%	38.4	26.4	241	920
Bypass Option 2	1,171	859	2,234	52%	21.5	15.7	172	604
Oak 1 Option	1,069	656	1,594	67%	24.5	15.0	2	74
Oak 2 Option	1,215	727	1,805	67%	15.0	9.0	2	74
Willow 1 Option	1,032	449	1,385	75%	25.8	11.2	4	76
Willow 2 Option	1,696	904	2,584	66%	25.4	13.6	4	81
Newcastle	301	33	366	82%	16.6	1.8	2	57

Section 3.5 – Greenhouse Gases

Page 3.5-8	Table 3.5-1	The table incorrectly states that under Bypass Option 2 there would be 39 MT CO_2e/year loss of GHGs from sequestration. There would be 40 MT CO2e/year loss of GHGs from sequestration under the Bypass 2 Option.
Page 3.5-9	Table 3.5-2	The table incorrectly states that under the Oak 2 Option there would be 28 MT CO_2e/year loss of GHGs from sequestration. There would be 29 MT CO_2e/year loss of GHGs from sequestration under the Oak 2 Option.

Page	Location	Change
Section 3.7 – Cultural and Historic Resources		
Page 3.7-3	Figure 3.7-1	The Safeway Distribution Center is in the wrong location on the figure. It should be located at intersection of 124th Ave NE, Bel-Red Road, and NE 12th St. This site is not adjacent to PSE's Proposed Alignment, so it is not shown in the Final EIS.
Section 3.8 – EMF		
Section 3.8	Throughout	The text throughout incorrectly references "industry guidelines" when the term that should have been used was "reference guidelines." This has been revised in Section 4.8 of the Final EIS.
Page 3.8-10	Paragraph 1, Lines 9-13	The text incorrectly uses the word "conductors" when the word "structures" should have been used.
Section 3.9 – Pipeline Safety		
Pages 3.9-12 to 3.9-14	Figure 3.9-1	Newport High School is incorrectly located on the Figure 3.9-1 series from pages 3.9-12 to 3.9-14. It is actually located west of the intersection of SE Newport Way and Factoria Blvd SE. This has been rectified in Chapter 4.9 of the Final EIS.
Page 3.9-48	Paragraph 4	The text incorrectly said that diesel, jet fuel, and gasoline would evaporate in a few days. While gasoline breaks down very quickly, usually lasting only days to weeks in the environment, jet fuel usually lasts days to weeks in the environment, and diesel fuel is somewhat persistent lasting 1 month to 1 year in the environment. This has been stated in Section 4.9 of the Final EIS.
Section 3.10 – Economics		
NA	Section 3.10	Tree numbers presented in the Phase 2 Draft EIS have been revised to reflect The Watershed Company's 100-foot study area as used elsewhere. Section 4.10 of the Final EIS provides corrected numbers for the Redmond, Bellevue North, and Renton Segments. The analysis in Section 4.10 for the remaining segments includes revised tree numbers based on information in the permit applications submitted to the Cities of Bellevue and Newcastle. Appendix L provides updated numbers for the Richards Creek substation, Bellevue Central, Bellevue South, and Newcastle Segments (see Phase 2 Draft EIS column).

Page	Location	Change
Chapter 6 – Significant Unavoidable Adverse Impacts		
Page 6-2	Paragraph 4, Line 7	The text incorrectly states that the poles in the Newcastle Segment would be closer to residential streets and homes. This has been rectified in Chapter 8 of the Final EIS.
Appendix A – Construction		
Page A-5	Paragraph 2, Line 5	The Phase 2 Draft EIS text incorrectly states that the depth of the holes for pole installation would be typically 10 percent of the pole height plus 2 feet. PSE subsequently clarified that it typically would be 10 percent of the pole height plus 4 feet. This has been rectified in Appendix A-1 of the Final EIS.
Page A-12	Preliminary Construction Access Routes – Renton Segment Map	The existing corridor line connects to the substation in the wrong location. The map shows the 230 kV entering Talbot Hill substation on the 115 kV (western) side of the substation instead of the 230 kV (eastern) side. This has been rectified in Appendix A-2 of the Final EIS, as well as other maps throughout the Final EIS.
Appendix C – Scenic Views and Aesthetic Environment Methodology		
Page C-3	Paragraph 3, Line 1	The text incorrectly states that for the Energize Eastside project, the study area is defined as the area within 0.25 mile from the edge of the existing and new corridor. It is from the centerline of the existing and new corridor. This statement has been corrected in the Final EIS.
Page C-29	Table C-9	Newcastle Municipal Code 18.44.052.C.1 and 18.44.052.D should have been included in Table C-9 under “Guidance for Reducing Visual Impacts.” These have been included in the Final EIS (see Appendix C, Table C-10 of the Final EIS)
Appendix I – Pipeline		
Page 57	Paragraph 1, Line 5	Reference to the “10 amps per square meter threshold” should have been to the “20 amps per meter threshold.”
Page 89	Section 9.3.7	Radius of impact area around each pole is shown in the Draft EIS as being 25 feet; however, based on information received from PSE, the impact area could be greater.

DSD 005487

4

Long-Term (Operation) Impacts and Potential Mitigation

energize EASTSIDE EIS

CHAPTER 4. LONG-TERM (OPERATION) IMPACTS AND POTENTIAL MITIGATION

This chapter describes the affected environment, potential long-term (operational) impacts, and mitigation measures for each element of the environment. Long-term impacts are defined as impacts that will be present after the project is built. These impacts could occur during construction of the project or during operation of the project, or in some cases, during both construction and operation of the project. For example, the project would require tree removal to ensure that the transmission lines maintain a certain clearance that is free of vegetation. The tree removal would occur during construction. However, because the trees removed would not be allowed to grow back after construction, tree removal is considered a long-term (operational) impact and is addressed in this chapter. Trees that are removed to make room for temporary access roads for purposes of constructing the project would be allowed to grow back after the access roads are removed and construction is complete. Tree removal for this type of activity is considered temporary and is addressed in Chapter 5, *Short-term (Construction) Impacts*. For the purposes of this Final EIS, impacts associated with routine maintenance of the existing transmission lines under the No Action Alternative (e.g., occasional replacement or repair of poles, wires, and related equipment) are considered an operational impact and addressed in Chapter 4.

The analysis in the Final EIS (as presented in both Chapters 4 and 5) is based on the most recent design details provided by PSE at the time the Final EIS was being prepared. In several areas the design has refined since publication of the Phase 2 Draft EIS. New information on pole types and locations was provided throughout the corridor, and more detailed information was provided in some areas where the design was more advanced.

In particular, in summer 2017, PSE provided its Proposed Alignment, including new details on pole locations and types for the entire corridor. In fall 2017, PSE submitted two permit applications, one to the City of Bellevue (extending from the Lakeside substation area to the southern city limit) and one to the City of Newcastle (PSE, 2017b and 2017c, respectively). Information in the two permit applications is generally at a finer scale than the design information available for analysis in the Phase 2 Draft EIS, and includes additional data on streams, wetlands, critical areas, vegetation clearing, and project components such as proposed pole locations. Impact analyses in the Final EIS for PSE's Proposed Alignment reflect the refined design details as presented in the permit applications, where available; however, PSE continues to refine the project design to reduce potential impacts and address the technical requirements of the project as it prepares other permit applications. Information on all permit applications is available through the respective City departments.

The impact analyses in the EIS (both for the Draft and Final versions) provide a "worst-case" analysis for decision-makers to consider when evaluating the proposal, based on the information available at the time of the analysis. As design is refined, it is anticipated that impacts would be equal to or less than the impacts described in the EIS. In addition, the Final EIS includes a new appendix (Appendix L) that presents a "cross-walk" comparison of the data sources used for the Phase 2 Draft EIS relative to those used for the Final EIS, organized by element of the environment as presented in Chapters 4 and 5.

4.1 LAND USE AND HOUSING

This section provides a project-level analysis of potential impacts to land use, Shorelines of the State (shorelines), and housing. The study area for the land use and housing analysis in the Final EIS contains parcels that are included in or abutting PSE's Proposed Alignment, as well as parcels in close proximity to the right-of-way (see Figure 4.1-1). This study area was selected because properties in close proximity to the right-of-way would have the greatest potential to be impacted by the project, including changing a property to a utility land use or intensification of the existing utility land use, and possible associated removal or relocation of minor structures within the existing utility right-of-way. For a more detailed description of the methodology used to determine the study area for the land use analysis, please see Appendix B-1.

Key Changes from the Phase 2 Draft EIS

- Updated the analysis to reflect PSE's Proposed Alignment.
- Added analysis of the new Newcastle Option 2 route.
- Added information on new sections in the Newcastle Municipal Code.
- Made minor clarifications throughout based on comments received, (including information on Essential Public Facilities and Conditional Use Permits).

The EIS analysis examined land uses, zoning districts, and comprehensive plan land use designations in the study area, as well as broader land use patterns. The analysis considered unique land uses in the study area that were identified during scoping and the course of this analysis. Unique uses are those that may be more significantly affected by the project or those that are used by large numbers of people and include the following:

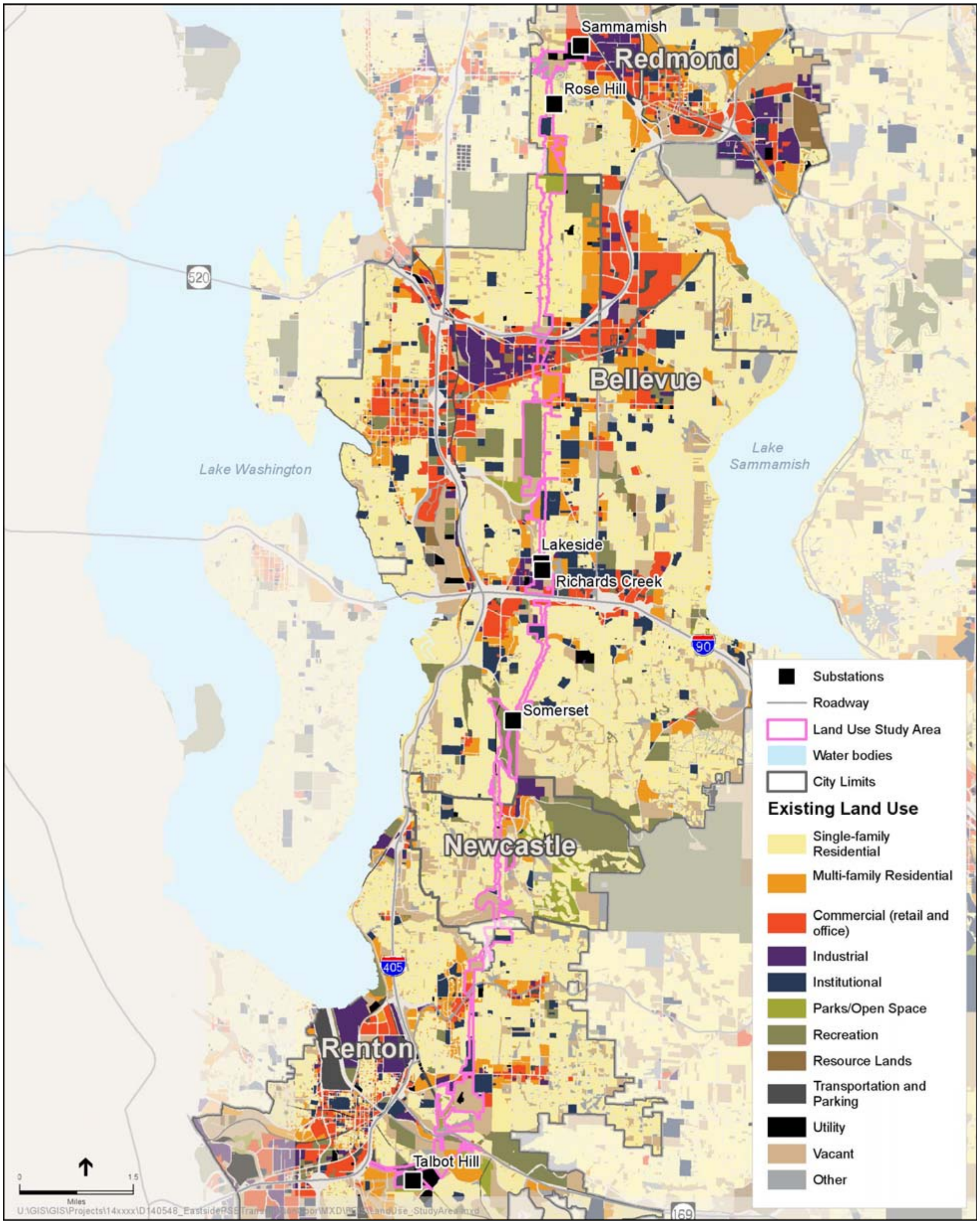
- Schools
- Religious institutions
- Hospitals
- Libraries
- Parks, recreational areas, or other public gathering places
- Commercial or retail areas
- Transportation or other infrastructure

Areas adjacent to or close to the study area that are zoned or planned for higher intensity uses such as commercial or industrial were also examined. The EIS analysis considered the number and type of residential properties in the study area, including the number of single-family and multi-family residential units adjacent to the project corridor.

Methods for Studying Affected Environment

Information on land use and housing was obtained primarily from data maintained by the King County Assessor. Zoning, shoreline designations, and comprehensive plan data were obtained from the Partner Cities.

A general study of the impact of the project on property values in the City of Bellevue is found in the Phase 1 Draft EIS. Further analysis on the potential impact on property values for a smaller jurisdiction, the City of Newcastle, is found in Section 3.10, *Economics,* of the Phase 2 Draft EIS and is incorporated by reference.



Source: King County, 2015; WA Ecology, 2014.

Figure 4.1-1. Study Area for Land Use and Housing

4.1.1 Relevant Plans, Policies, and Regulations

Development within the study area must comply with a variety of policy documents and regulations adopted by local municipalities, including comprehensive plans, subarea plans, shoreline master programs, and land use standards. Development in proximity to utility infrastructure must also comply with PSE guidelines, which are shaped by National Electrical Safety Code (NESC) standards. These plans, policies, and regulations are covered in Section 3.1.1 of the Phase 2 Draft EIS and included in Appendix B-3.

Two new code sections from Newcastle that are relevant to determining land use impacts for the project were not included in the Phase 2 Draft EIS analysis. An additional Conditional Use Permit decision criterion for utility facilities in Newcastle Municipal Code (NMC) 18.44.052(C)(1) states that the City must determine whether the impact of the utility facility on the city and environment has been minimized. Additionally, NMC 18.44.052(D) establishes that the City has the right to impose conditions on the facility in regards to location, development, design, use, or operation to mitigate impacts.

4.1.2 Land Use and Housing in the Study Area

The 16-mile corridor would extend from Redmond to Renton and also passes through the cities of Bellevue and Newcastle and a small portion of King County. See Figure 4.1-1 for a map of existing land uses. Based on a linear-feet breakdown of the study area for PSE's Proposed Alignment, the most common existing land uses include:

- Residential (single-family and multi-family) (49 percent)
- Vacant land (17 percent)
- Industrial (9 percent)
- Institutional (9 percent)

Refer to Section 3.1.2 of the Phase 2 Draft EIS for a summary of the land use and housing in the study area. These classifications of land use are based on King County Assessor's data. It should be noted that some of the land classified by the assessor as vacant includes portions of public parks. This information has not changed since the publication of the Phase 2 Draft EIS and is incorporated by reference in the Final EIS.

4.1.3 Long-term (Operation) Impacts Considered

4.1.3.1 Methods for Analyzing Long-term Impacts

This section evaluates the consistency of the project with the general regulatory framework, including applicable land use and shoreline goals and policies, zoning districts, and shoreline environment designations for each segment and option.

As part of the Phase 1 Draft EIS, the EIS Consultant Team examined potential changes in land use related to transmission lines and other utility components. Information was obtained from land use studies and an interview with a local assessor's office (FCS Group, 2016). This section verifies that those findings apply to the alternatives considered in the Phase 2 Draft EIS and this Final EIS.

The potential for the project to convert existing non-utility land uses to a utility use was considered. The evaluation included the potential for the project to physically separate existing neighborhoods. The potential for a loss of housing due to property acquisition was also considered.

Cellular phone transmitters affixed to existing poles would be removed with the existing poles. PSE would allow these transmitters to be replaced on the new poles, so no impacts are expected, either from the loss of such facilities or from the addition of any new ones. Whether a transmitter is replaced on the new poles, however, is subject to permit approval for the wireless facility and the ability to meet carrier coverage objectives in the new location. The land use code in each jurisdiction requires permits for any new facilities, but would not necessarily restrict them from being placed on the proposed poles in the future, subject to permit approval.

This analysis considered the potential for the presence of the new utility infrastructure to affect existing or future uses adjacent to the utility corridor. This included a review of PSE guidelines for high-capacity transmission lines and how they may affect new mid- or high-rise structures.

This section broadly evaluates the potential impacts that the new utility infrastructure could have on the character of neighborhoods near the corridor. Additionally, it describes mitigation measures to minimize or eliminate project impacts to land use and housing.

4.1.3.2 Magnitude of Impact

The following defines project-level long-term (operational) impacts to land use (existing and future), neighborhood character, zoning, and housing. The project would have an adverse impact on these elements if it caused a substantial disruption or change to existing or future land uses, neighborhood character, or housing stock. The magnitude of the potential land use impacts is classified as less-than-significant or significant, defined as follows:

- **Less-than-Significant**–Changes to the current conditions could result in a material change to study area land uses, or the overall land use pattern or neighborhood character. However, these changes would be considered less-than-significant if the changes are either supported by plans and policies, or can be mitigated adequately to avoid significant changes.
- **Significant**–Changes in study area land uses, the overall land use pattern, or the neighborhood character would be inconsistent with existing plans and policies, and cannot be mitigated. Housing impacts would also be significant if the current housing stock of the study area would be diminished substantially, or changes in land use would not allow for planned growth or suitable housing.

4.1.4 Long-term Impacts: No Action Alternative

Under the No Action Alternative, the project would not be constructed and no impacts to land use and housing in the study area would occur from the proposed project.

However, as summarized in the Phase 1 Draft EIS, the declining reliability of electric power supply that could result from the No Action Alternative could be inconsistent with the *Washington State Growth Management Act (GMA)* and various City policies that state the need to provide a balanced but reliable electrical utility infrastructure. Please see Sections 10.2.1 and 10.7.2 of the Phase 1 Draft EIS for further discussion on the Growth Management Act and its tie-in with land use considerations.

4.1.5 Long-term Impacts: PSE's Proposed Alignment

4.1.5.1 Impacts Common to all Components

Under PSE's Proposed Alignment, the entire project would utilize PSE's existing 115 kV transmission line corridor. No new property or easements would be acquired for PSE's Proposed Alignment.

Although PSE plans to remove and replace the existing wooden 115 kV H-frame structures, this planned pole replacement would not change the existing or future land uses, zoning designations, or housing stock since the land is already in use as a transmission line corridor and does not require additional easements or property acquisitions. Section 4.2.3 of this Final EIS addresses potential impacts to scenic views and the aesthetic environment that may result from replacing the existing poles with taller pole types, including consistency with the comprehensive plans of the Partner Cities in regards to *visual resources* and neighborhood character.

The project is considered either an allowed use or conditional use in all of the zones that it would cross within the study area. A conditional use requires a different procedural review process than an allowed use to ensure that the proposed use is compatible with the land use district and surrounding properties. No houses would need to be condemned or demolished, but there might be impacts to *ancillary structures* such as sheds or garages. Because the project would not result in the removal of existing housing, the impacts to housing would be less-than-significant.

One of the major elements the EIS Consultant Team used to determine the level of impact is the project's consistency with applicable plans and policies, including the city comprehensive plans and any subarea policies in the study area. A statement that the project is consistent with applicable plans and policies means that the project does not violate any of the policies outlined in the city comprehensive plan or any subarea plans that would apply to the study area. For example, several applicable subarea plans have statements that require or encourage the undergrounding of utility distribution lines, but do not specifically address the undergrounding of transmission lines. PSE's Proposed Alignment would not change any distribution lines and would therefore be consistent with the subarea plans in regards to their approach to undergrounding of distribution lines. While the project would not be in direct violation of the policies in the comprehensive and subarea plans, some policies indicate that the project could potentially have an impact on future development in some way (see Appendix B-3). These were analyzed on a case-by-case basis to determine the level of significance. An example of this would be a policy that encourages the co-location of utilities.

Land use is closely tied to several other environmental resources, such as scenic views and aesthetic environment as well as recreation. While PSE's Proposed Alignment could result in significant impacts to some of these resources within certain route sections, the impacts are not anticipated to change the land use of the study area. For a detailed analysis of impacts related to scenic views and the aesthetic environment, please refer to Section 4.2.5. For a detailed analysis of the impacts to recreation resources, please see Section 4.6.5.

The following pages summarize the potential impacts on land use for PSE's Proposed Alignment, presented for the Richards Creek substation and by segment. For the Redmond, Bellevue North, Bellevue Central, and Renton Segments, the analysis included a review of refined project design details for PSE's Proposed Alignment, with results revised relative to the Phase 2 Draft EIS to reflect the new information. For these segments, the new information and analysis have not altered the conclusions presented in the Phase 2 Draft EIS regarding significant impacts on land use.

For the Richards Creek substation site and the Bellevue South and Newcastle Segments, the analysis included a review of the project design as presented in the permit applications submitted to Bellevue and Newcastle (PSE, 2017b and PSE, 2017c, respectively). The results below have been revised relative to the Phase 2 Draft EIS, incorporating the more detailed information in the permit applications on pole locations and critical areas (including wetlands, streams, and their buffers). The conclusions regarding significant impacts on land use, however, are the same as presented in the Phase 2 Draft EIS.

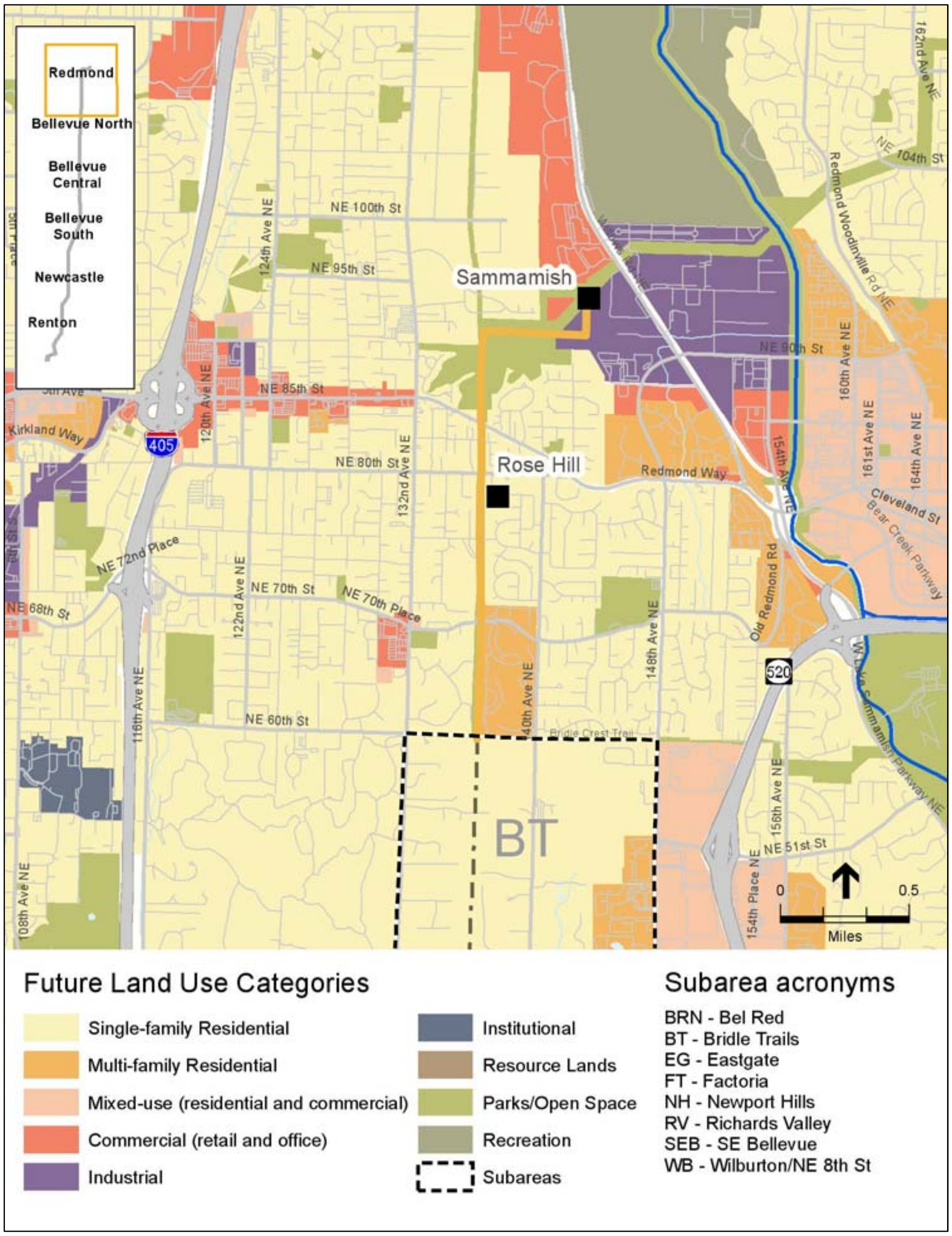
4.1.5.2 New Richards Creek Substation

There 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. In addition, the site is owned by PSE and has been used for storage or equipment and vehicles; the construction and operation of a new substation will not represent a substantive change to the existing conditions. In addition, the Richards Creek substation is consistent with the future land use designation of light industrial from the Bellevue Comprehensive Plan (City of Bellevue, 2015), and the Bellevue City Code (BCC 20.20) allows development of "utility facilities" under a Conditional Use Permit.

The Chestnut Hill Academy is adjacent to the existing Lakeside substation, approximately 300 feet north of the proposed Richards Creek substation site. A wooded area separates the school from the site of the proposed substation. The Richards Creek substation would not cause any housing impacts because no housing sites are on or adjacent to the proposed substation site.

4.1.5.3 Redmond Segment

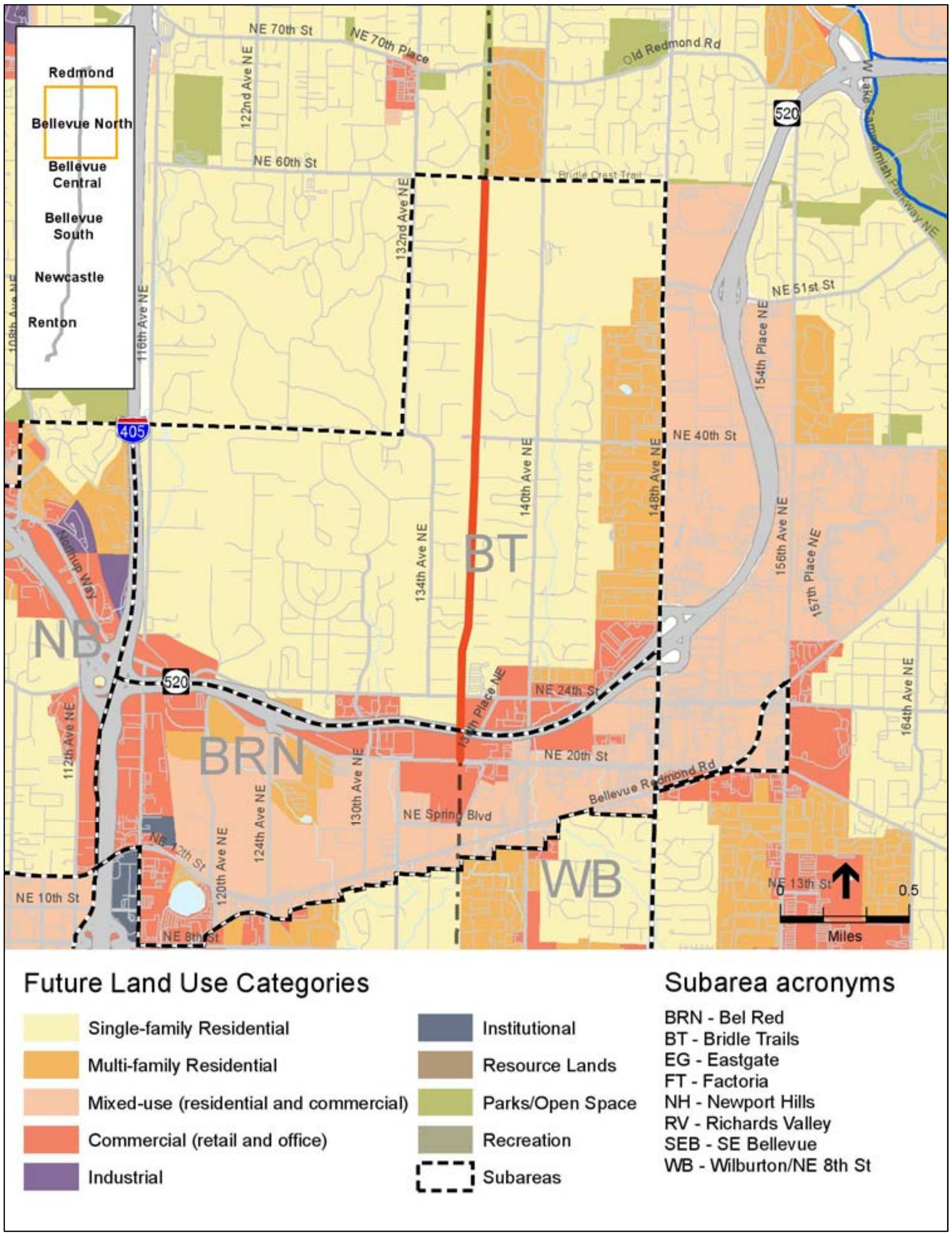
Potential types of new uses and development along the Redmond Segment are regulated by the City of Redmond Zoning Code (RZC) (Redmond Municipal Code Title 21). The potential impacts to land use and housing for the Redmond Segment would be less-than-significant because the project is consistent with City and subarea plans, and would not adversely affect existing or future land use patterns. The impacts are summarized below.



- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Redmond Comprehensive Plan (City of Redmond, 2011) and the Grass Lawn and Willows Rose Hill Subarea policies. Zoning districts in the study area allow electrical utility facilities as a conditional use.
- **Existing Land Use Pattern and Neighborhood Character:** The project would not impact the existing land use pattern of single-family and multi-family residential. The project would use an existing utility corridor and not require any new easements from adjoining properties.
- **Future Land Use Pattern:** The project would not impact future land uses, which are projected to continue to be mostly single-family and multi-family residential, and parks/open space. The project would use an existing utility corridor and would not interfere with planned development.
- **Shorelines:** There are no designated shorelines in this segment.

4.1.5.4 Bellevue North Segment

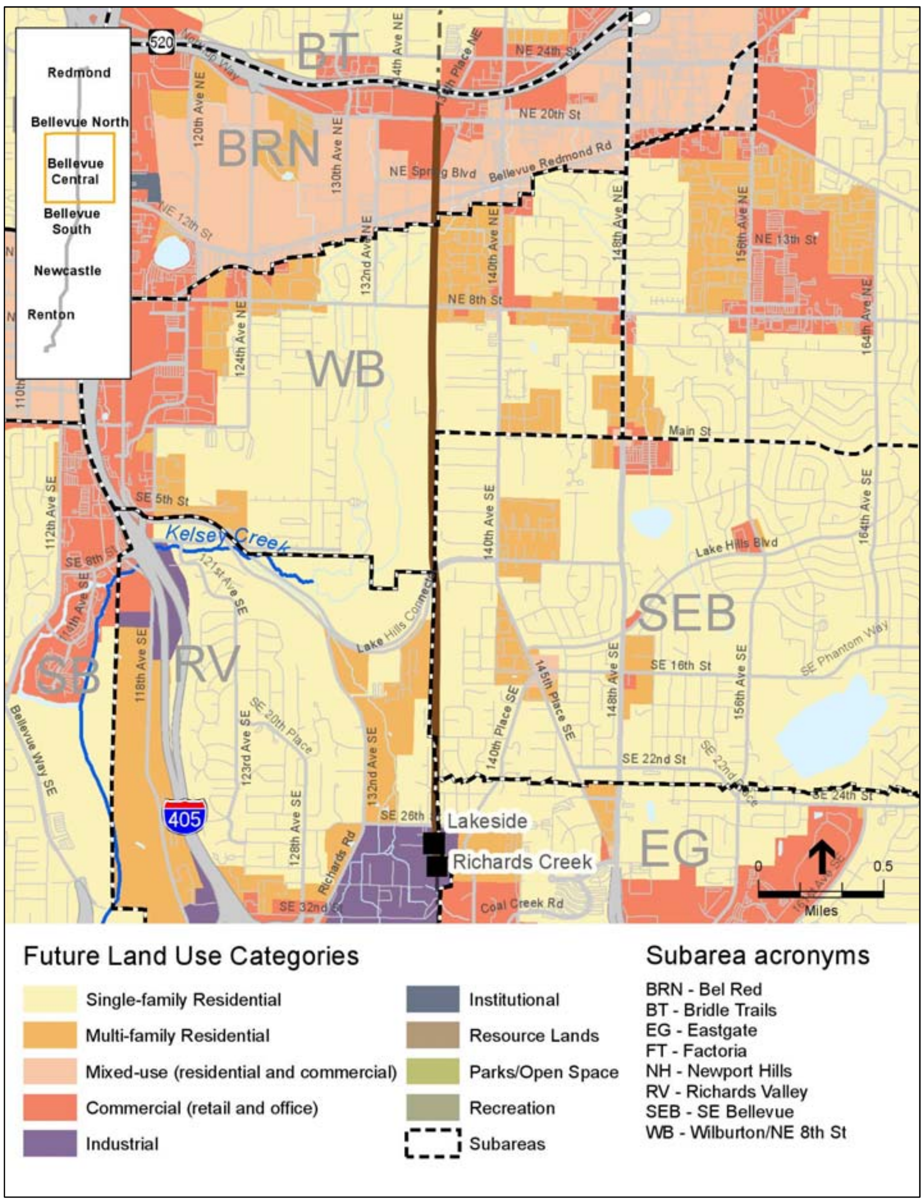
Potential types of new uses and development along the Bellevue North Segment are regulated by the City of Bellevue City Code (BCC, Title 20). The potential impacts to land use and housing for the Bellevue North Segment of the project would be less-than-significant because it is consistent with City and subarea plans, and would not adversely affect existing or future land use patterns. The impacts are summarized below.



- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Bellevue Comprehensive Plan and Bridle Trails and Bel-Red Subarea policies. Zoning districts in the study area allow electrical utility facilities as a conditional use.
- **Existing Land Use Pattern and Neighborhood Character:** The project would not impact the existing land use pattern of single-family residential north of SR 520, or the commercial area south of SR 520. The project would use an existing utility corridor and not require any new easements from adjoining properties.
- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be mostly single-family residential. The project would use an existing utility corridor and would not interfere with planned development.
- **Shorelines:** There are no designated shorelines in this segment.

4.1.5.5 Bellevue Central Segment (Revised Existing Corridor Option)

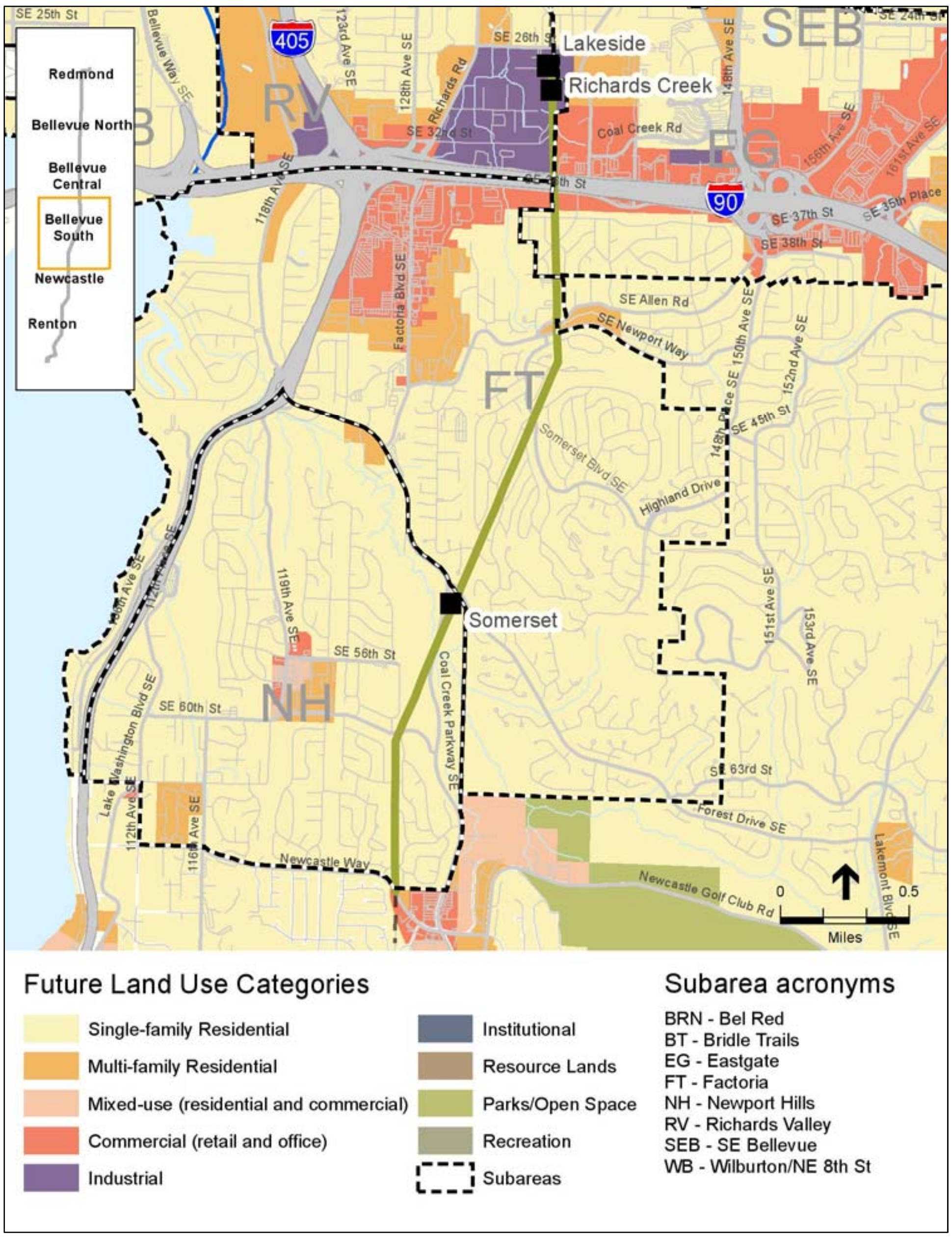
PSE's Proposed Alignment for the Bellevue Central Segment follows the route of the Existing Corridor Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. Potential types of new uses and development along the Bellevue Central Segment are regulated by the City of Bellevue City Code (BCC, Title 20). The East Bellevue Community Council (EBCC) also has approval-disapproval authority over certain land use actions, including conditional use permits, within a portion of this segment. The potential impacts to land use and housing for the Bellevue Central Segment of the project would be less-than-significant because it is consistent with City and subarea plans, and would not adversely affect existing or future land use patterns. The impacts are summarized below.



- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Bellevue Comprehensive Plan and Bel-Red, SE Bellevue, Wilburton/NE 8th Street, and Eastgate Subarea policies. The Richards Valley Subarea Plan includes a policy of co-locating utility and transportation rights-of-way and states that "common corridors" (areas that already contain power lines) should be used to reduce visual impacts. Zoning districts in the study area allow electrical utility facilities as a conditional use.
- **Existing Land Use Pattern and Neighborhood Character:** The project would not impact the existing land use pattern of mostly single-family residential south of Bel-Red Road, or the mixed-use commercial area north of Bel-Red Road. The project would use an existing utility corridor and not require any new easements from adjoining properties.
- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be mostly single-family and multi-family residential. The project would use an existing utility corridor and would not interfere with planned development.
- **Shorelines:** There are no designated shorelines in this segment.

4.1.5.6 Bellevue South Segment (Revised Willow 1 Option)

PSE's Proposed Alignment for the Bellevue South Segment follows the route of the Willow 1 Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. Potential types of new uses and development along the Bellevue South Segment are regulated by the City of Bellevue City Code (BCC, Title 20). The potential impacts to land use and housing for the Bellevue South Segment would be less-than-significant because it is consistent with City and subarea plans, and would not adversely affect existing or future land use patterns. The impacts are summarized below.

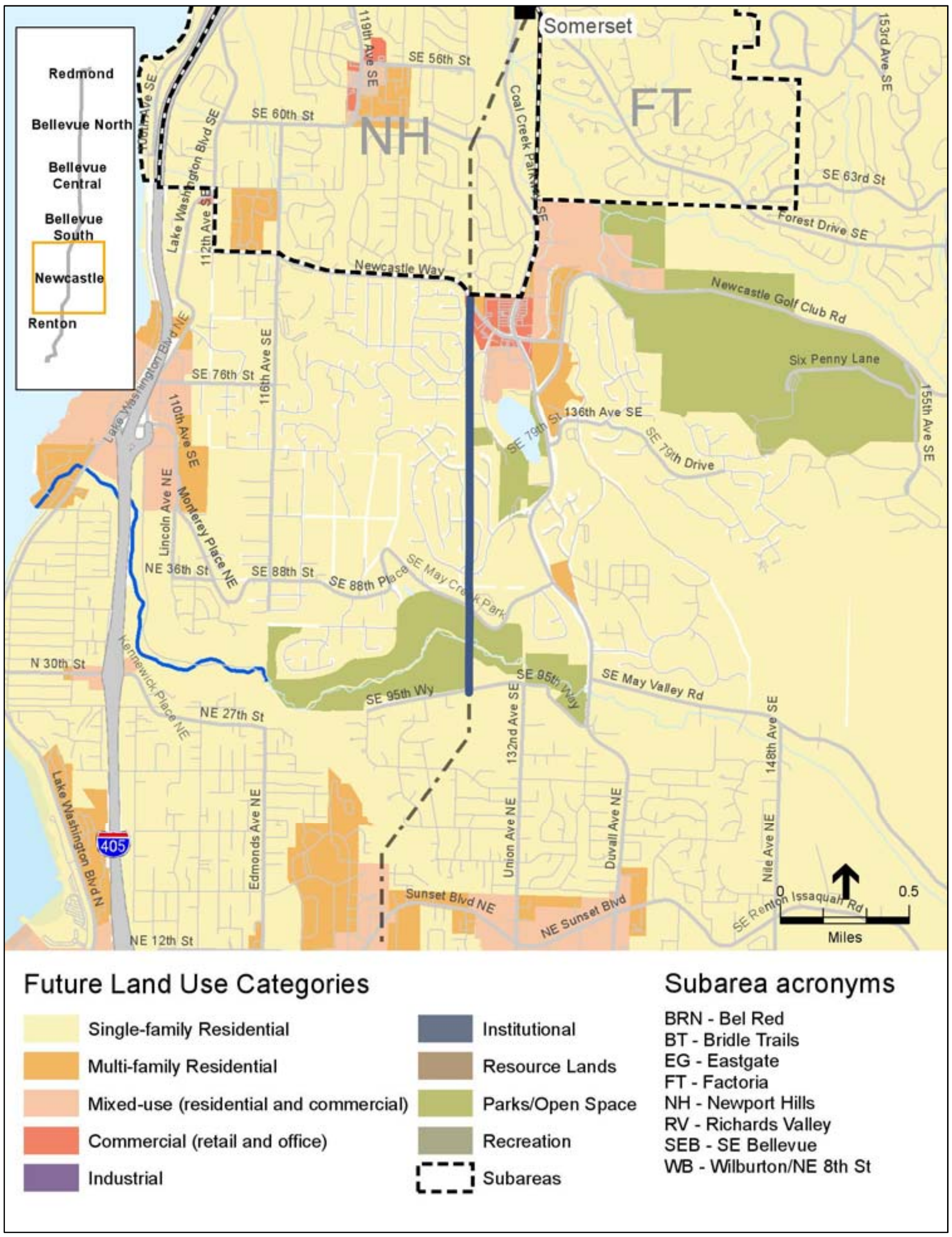


- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Bellevue Comprehensive Plan and the Richards Valley, Factoria, Eastgate, and Newport Hills Subarea policies. The Factoria Subarea Plan includes a policy of minimizing disruptive effects of utility construction on non-property owners, motorists, and pedestrians. Zoning districts in the study area allow electrical utility facilities as a conditional use.
- **Existing Land Use Pattern and Neighborhood Character:** The project would not impact the existing land use pattern of single-family residential. The segment would use the existing corridor and not require any new easements from adjoining properties.
- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be single-family residential, industrial, and commercial. The project would use the existing corridor and would not interfere with planned development.
- **Shorelines:** There are no designated shorelines in this segment.

4.1.5.7 Newcastle Segment – Option 1 (No Code Variance)

For the Newcastle Segment, two options are being considered in this Final EIS, including one that would not require a variance from the 5-foot setback requirement under NMC 18.12.130, and one that would require a variance.

For Newcastle Segment Option 1 (No Code Variance), the pole height and configuration are the same as described in the Phase 2 Draft EIS for the Newcastle Segment. Therefore, impacts for this option are the same as the impacts described for the Newcastle Segment in Phase 2 of the Draft EIS. Potential types of new uses and development along the Newcastle Segment are regulated by the City of Newcastle's Municipal Code (NMC, Title 18). The NMC allows development of a "Utility Facility – Regional" under a Conditional Use Permit.



The criteria for approval of that permit include consideration of impacts on surrounding uses, among other criteria. The analysis in this section focuses on land use and housing impacts. Other impacts are described in other portions of the Final EIS.

The potential impacts to land use and housing for the Newcastle Segment (Option 1) would be less-than-significant because it is consistent with City plans, and would not adversely affect existing and future land use patterns. The impacts are summarized below.

- **Consistency with Plans, Policies, and Regulations:** Under Option 1, the project would be consistent with the Newcastle Comprehensive Plan for land use and housing impacts (City of Newcastle, 2016). Zoning districts in the study area allow electrical utility facilities as a conditional use. The placement of the poles is consistent with the required setback of 5 feet from the Olympic Pipeline easement. Policy UT-P10 of the City's Comprehensive Plan states that the City "should require utility providers to design and construct overhead transmission lines in a manner that is environmentally sensitive, safe, and aesthetically compatible with surrounding land uses." The project is consistent with this policy, except regarding aesthetics. Regarding impacts to the *visual character* of the Newcastle Segment, see Section 4.2.5.7 of the Final EIS.
- **Existing Land Use Pattern and Neighborhood Character:** Under Option 1, the project would not impact the existing land use pattern. The project would use the existing corridor and not require new easements from adjoining properties; single-family residential and other areas on the corridor would not be converted to other uses. Regarding impacts to the visual character of the Newcastle segment, see Section 4.2.5.7 of the Final EIS.
- **Future Land Use Pattern:** Under Option 1, the project would not impact future land uses, which are anticipated to be primarily single-family residential and parks/open space, with a small section of mixed-use and multi-family residential at the north end of the segment. Future land use designations were developed based on the assumption that the transmission line facility would remain and be upgraded. The project would use the existing corridor and would not interfere with planned development.
- **Shorelines:** There are no designated shorelines in this option.

4.1.5.8 Newcastle Segment – Option 2 (Code Variance)

Based on comments received on the Phase 2 Draft EIS and coordination with the City of Newcastle, PSE developed a second option for the Newcastle Segment for analysis in the Final EIS. The Newcastle Segment Option 2 (Code Variance) would use the same corridor as Option 1 but would use poles that are placed closer to the center of the right-of-way than Option 1, which allows use of shorter poles. Option 2 was proposed to reduce adverse effects to the aesthetic environment associated with the Newcastle Segment as analyzed in the Phase 2 Draft EIS (as well as Option 1 as analyzed in the Final EIS). However, placing the poles closer to the center of the right-of-way also places them closer to the Olympic Pipeline system easement than allowed in Newcastle's land use code, and Option 2 would require variance approval from the City of Newcastle.

Title 18 of the Newcastle Municipal Code (NMC) allows development of a "Utility Facility – Regional" under a Conditional Use Permit. It also regulates transmission line utility poles as "structures", and requires them to be separated from regional utility corridors:

> "*All buildings and structures shall maintain a minimum distance of five feet from property or easement lines delineating the boundary of regional utility corridors, except for utility structures necessary to the operation of the utility corridor*" (NMC 18.12.130).

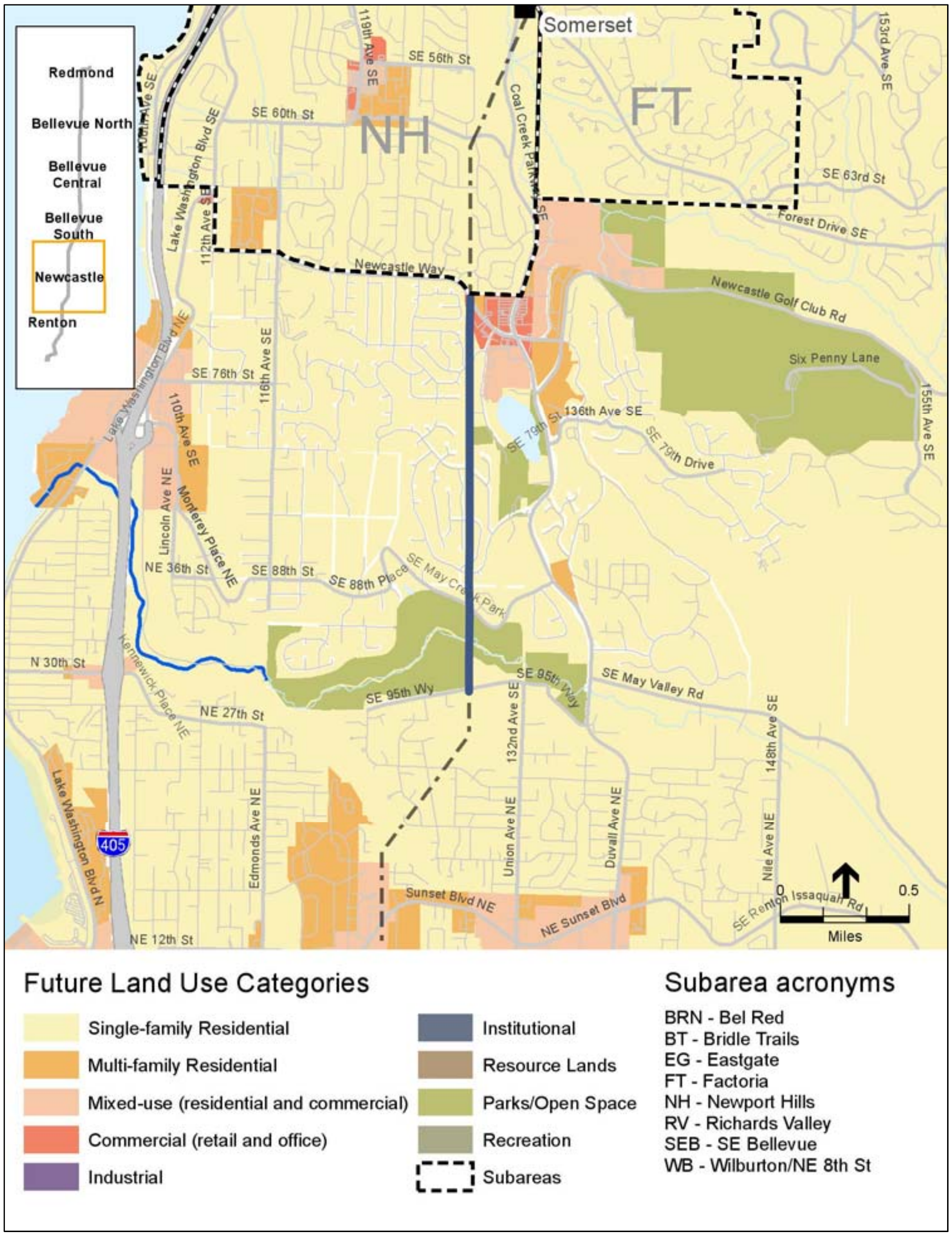
The right-of-way easement for the Olympic Pipeline system varies in width and runs through the middle of the transmission line corridor in the Newcastle Segment, which means that NMC 18.12.130 requires that the poles be placed close to edges of the transmission corridor right-of-way and therefore near adjacent residences and other structures abutting the corridor, and away from the buried pipeline.

Under Option 2, PSE would request from the City of Newcastle a Conditional Use Permit and variance approval to allow the new poles to be placed a minimum of 13 feet from the pipelines. Because of the varying width of the pipeline right-of-way and the varying location of the pipeline within the corridor, the proposed poles would not all be outside of the existing pipeline right-of-way easement. By allowing the poles to be closer to the center of the transmission corridor, a shorter pole design is possible, with conductors on both sides of the pole instead of just on one side as in Option 1 (see the Newcastle Segment Option 2 Segment Sheet, in Chapter 2, page 2-31). Under this design, the topmost conductors would also be lower than Option 1, further minimizing potential adverse effects on the aesthetic environment.

This situation is unique to Newcastle in the project area for two reasons. First, the Olympic Pipeline system runs down the center of the existing corridor in Newcastle for most of the segment; in most of the other segments, the pipeline system generally runs along either the west or east side. Second, Newcastle is the only one of the Partner Cities with existing code language with the 5-foot setback requirement.

The analysis in the EIS is not intended to determine whether Option 2 meets the variance criteria. Review of the variance criteria is a separate part of the permitting process. This analysis examines the impacts that would occur if a variance is approved.

Assuming the variance is granted, the potential impacts on land use and housing for the Newcastle Segment (Option 2) would be less-than-significant. If the project is found to be consistent with variance criteria, it is assumed that the project would be consistent with City policies that allow for flexibility through the approval of variances when there is an unusual property-related condition that was not anticipated by the Code. The impacts on existing and future land use patterns are described and summarized below.



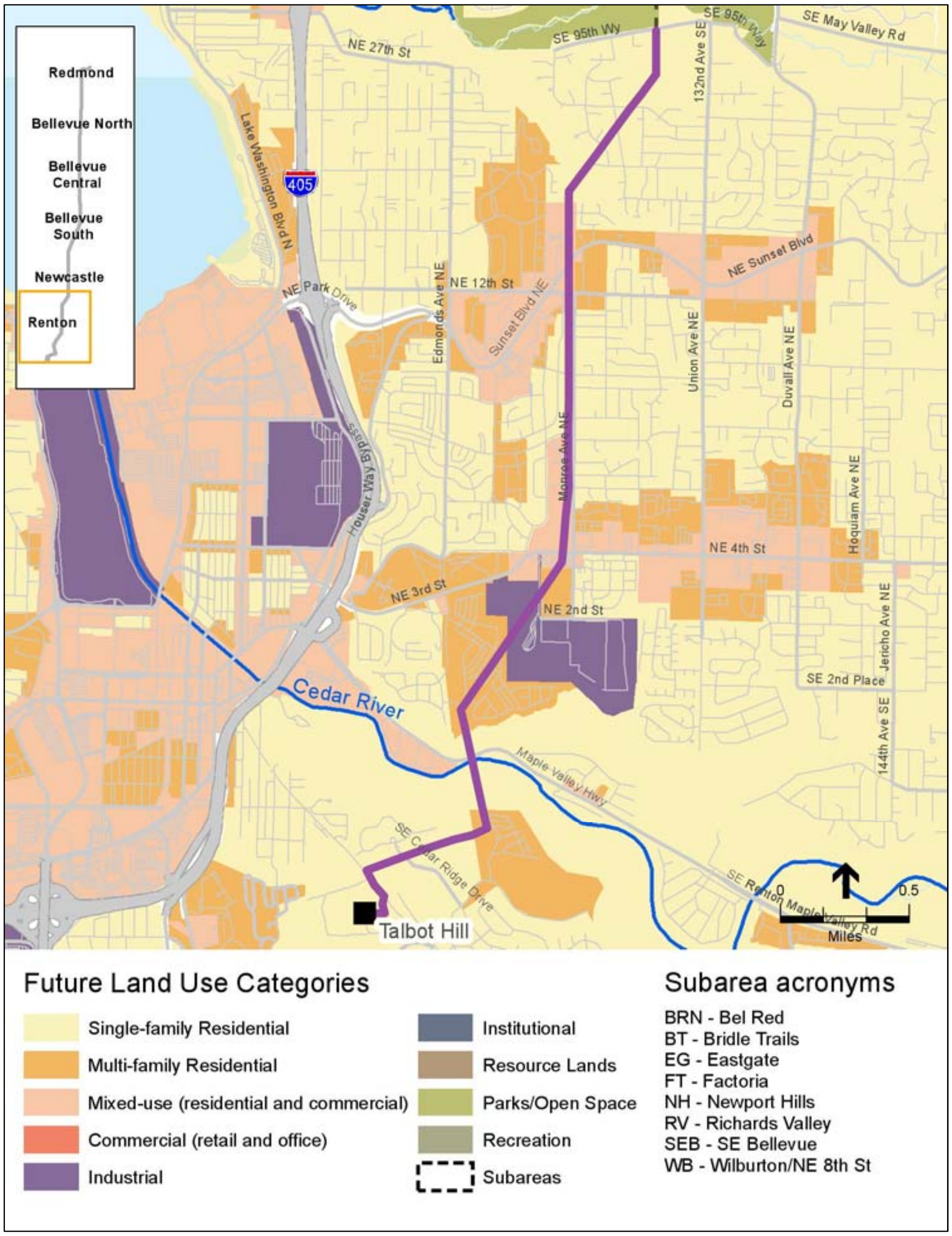
- **Consistency with Plans, Policies, and Regulations:** Under Option 2, the project would be consistent with the Newcastle Comprehensive Plan because it would help accomplish several of the policies in the plan, including the policy to promote co-location of major utility facilities (Policy UT-P3). Because *high-voltage* transmission lines need to be higher than 115 kV lines, and approval criteria require that visual impacts on surrounding uses be minimized (Policies UT-P10 and UT-P14), PSE has proposed pole configurations that are as low as possible to meet industry and safety standards. The variance would allow PSE to use lower pole heights in their design, which would decrease visual impacts to adjacent land uses. However, this option would still adversely affect the visual character of a portion of the segment, although to a lesser degree than Newcastle Option 1 (see Section 4.2.5.8 for a detailed discussion of impacts to scenic views and the aesthetic environment for Option 2).

The project would follow the variance procedures required by the City of Newcastle. Consistency with variance criteria is a means of demonstrating consistency with City policies and code when there are unusual circumstances that create a hardship for an otherwise allowable use to meet development standards. A final decision on the variance will be made by the City after completion of the Final EIS.

- **Existing Land Use Pattern and Neighborhood Character:** Under Option 2, the project would not change the existing land use pattern of single-family residential. The project would use the existing corridor and not require new easements from adjoining properties. As noted, this option would still adversely affect the visual character of a portion of the segment, although to a lesser degree than Newcastle Option 1 (see Section 4.2.5.8 for a detailed discussion of impacts to scenic views and the aesthetic environment for Option 2).
- **Future Land Use Pattern:** Under Option 2, the project would not impact future land uses, which are anticipated to be primarily single-family residential and parks/open space, with a small section of mixed-use and multi-family residential at the north end of the segment. Future land use designations in the City of Newcastle Comprehensive Plan reflect the assumption that the transmission facility would remain. The project would use the existing corridor and would not interfere with planned development.
- **Shorelines:** There are no designated shorelines in this option.

4.1.5.9 Renton Segment

Potential types of new uses and development along the Renton Segment are regulated by the City of Renton's development regulations (Renton Municipal Code [RMC] Title IV) and the Renton Shoreline Master Program (SMP). The potential impacts to land use and housing for the Renton Segment would be less-than-significant because it is consistent with City plans, and would not adversely affect existing or future land use patterns. The impacts are summarized below.



- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Renton Comprehensive Plan (City of Renton, 2015). Zoning districts in the study area allow electrical utility facilities as a conditional use.
- **Existing Land Use Pattern and Neighborhood Character:** The project would not impact the existing land use pattern of vacant land and single-family residential. The project would use the existing corridor and not require new easements from adjoining properties.
- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be mostly single- and multi-family residential, mixed-use, and industrial. The project would use the existing corridor and would not interfere with planned development.
- **Shorelines:** The Renton Segment would go through the Shoreline High Intensity and Urban Conservancy Shoreline Environment Designations. The SMP defines Major Service Utilities as public or private utilities that provide services beyond Renton boundaries, such as electrical transmission lines 55 kV or greater. PSE's Proposed Alignment would include replacing existing transmission lines within the existing corridor but would not change the height of the wires within the shoreline area. The current wooden H-frame structures (which are not within the shoreline area) would be replaced by taller steel monopoles with a smaller footprint, which would be placed in substantially the same locations as the exiting poles, outside of the shoreline zone. The project would be considered repair and maintenance and would not require a Shoreline Conditional Use Permit or a Shoreline Substantial Development Permit (pers. comm., Henning, 2017). The project would require a Shoreline Exemption, which is required for all construction projects within 200 feet of a designated shoreline that are exempted from the requirement for a "substantial development permit" under the Shoreline Management Act. A Shoreline Exemption requires a determination that the project is consistent with the requirements of Renton's SMP. No adverse effects to the shoreline or shoreline uses are anticipated; therefore, impacts to shorelines would be less-than-significant.

4.1.6 Mitigation Measures

Mitigation measures are implemented to reduce or eliminate the adverse impacts associated with a proposed action. Mitigation can be achieved through avoidance, minimization, rectification, elimination, compensation, or monitoring of environmental impacts (WAC 197-11-768, *Mitigation*). See Section 1.11, *Key Findings of the EIS*, for a discussion of how mitigation is applied under SEPA.

For land use, regulations and comprehensive plan and subarea plan policies were reviewed to identify mitigation measures. Mitigation measures specified by code would be required, whereas mitigation measures based on plan policies would be at the discretion of the applicant to adopt or the local jurisdictions to impose as a condition of project approval. This section addresses only the mitigation measures for land use and housing impacts. For an expanded discussion on mitigation measures related to impacts to scenic views and the aesthetic environment, see Section 4.2.6. For an expanded discussion of mitigation measures related to critical areas compliance, see Section 4.3.6. Please refer to Section 4.6.6 for information on mitigation measures related to recreation.

4.1.6.1 Regulatory Requirements

All of the segments and options would need to meet the regulations of the zoning districts that they traverse. In areas where the use is not allowed outright within a zoning district, a Conditional Use Permit would be required. Adherence to the zoning regulations of each jurisdiction is generally not discretionary, and would provide some mitigation for project-related impacts to land use. Mitigation requiring changes to specific design features would be specified during the permitting process, and designed prior to construction. The applicable regulations are presented in Appendix B-3. The setback requirement from the Olympic Pipeline system easement in Newcastle is described in Section 3.1.1 of the Phase 2 Draft EIS, *Relevant Plans, Policies, and Regulations*, and above in Section 4.1.5.8 of this Final EIS.

The review process for Conditional Use Permits varies by jurisdiction, but often includes requirements of public notice and a level of quasi-judicial review. The Conditional Use Permit process can be used to reduce land use impacts because the decision criteria used by each jurisdiction in this review include elements such as compatibility with the comprehensive plan and consideration of the impact on neighboring land uses and property. Measures required through the Conditional Use Permit process are generally discretionary within the regulation of the specific jurisdiction. Such measures could include those listed under potential mitigation measures below.

In Newcastle, PSE intends to apply for a variance from the setback requirement, which could enable the use of shorter poles in that segment, as discussed in Section 4.2, *Scenic Views and the Aesthetic Environment*. Similar to the Conditional Use Permit review process, variance approval requires a determination that granting the variance would not harm adjacent land uses. The City has the right to impose conditions on the facility in regards to location, development, design, use, or operation to mitigate impacts, as summarized in the section below.

Prior to Construction

- Design and operate regional utility facilities to minimize impacts on the surrounding uses, the environment, and the city (NMC 18.44.052.C.1).
- Work with the City of Newcastle to adopt any conditions imposed relating to the location, development, design, use, or operation of a utility facility to mitigate environmental, public safety, or other identifiable impacts. Mitigation measures may include, but are not limited to, natural features that may serve as buffers, or other site design elements such as fencing and site landscaping (NMC 18.44.052.D).

4.1.6.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on review of the comprehensive plan and subarea plan policies. The following mitigation measures could be used to reduce potential impacts from the project.

Prior to Construction

- Consolidate utility facilities and co-locate multiple utilities (City of Newcastle Plan Policy UT-P3).
- Implement new and expanded transmission and substation facilities in such a manner that they are compatible and consistent with the local context and the land use pattern established in the Comprehensive Plan (City of Bellevue Plan Policy UT-95).
- Design, construct, and maintain facilities to minimize their impact on surrounding neighborhoods (City of Bellevue Plan Policy UT-8).
- Conduct a siting analysis for new facilities and expanded facilities at sensitive sites (areas in close proximity to residentially-zoned districts) (City of Bellevue Plan Policy UT-96).
- Underground sections of the transmission lines where inconsistencies with the comprehensive plan policies regarding aerial facilities would otherwise occur.

Undergrounding of transmission lines is not required by any of the subarea plans in the study area. If a City does request that a portion of the transmission line be placed underground, PSE would work with the City to determine the cost of undergrounding and how a tariff may apply. Additional discussion of use of undergrounding as mitigation is included in Section 4.2.6.

During Operation

- Limit the number of cellular telecommunication facilities that could be installed on the proposed 230 kV poles to the number currently installed in the corridor and proposed to be reinstalled as part of the EIS (seven locations).
- Require the reinstalled telecommunications facilities to be in the same approximate locations as they were previously and to comply with the requirements of Chapter 80.54 RCW, Chapter 480-54 WAC, and local jurisdiction regulations.

4.2 SCENIC VIEWS AND THE AESTHETIC ENVIRONMENT

Key Changes from the Phase 2 Draft EIS

The scenic views and aesthetic environment analysis has been updated to reflect PSE's Proposed Alignment. This includes

- Revised and detailed pole height and configuration information.
- Updated the visual simulations.
- Analyzed the new Newcastle Option 2.
- Reassessed visual compatibility and scenic view obstruction.
- Added mitigation reflecting current Newcastle Municipal Code.
- Added mitigation discussion of how pole finish could work in various locations.

SEPA (WAC 197-11) requires all major actions sponsored, funded, permitted, or approved by state and/or local agencies to undergo planning to ensure that environmental considerations, such as impacts related to scenic views and the aesthetic environment, are given due weight in decision-making. The Phase 1 Draft EIS provides a programmatic assessment of impacts to visual character; changes to views, *viewpoints*, and visual resources; and light, glare, and exhaust impacts (see Chapter 11 of the Phase 1 Draft EIS). The Phase 2 Draft EIS provides a project-level assessment of impacts to scenic views and the aesthetic environment for a range of viable segments and options (see Section 3.2.5 of the Phase 2 Draft EIS). This Final EIS provides a project-level analysis of impacts to scenic views and the aesthetic environment resulting from PSE's Proposed Alignment.

The methodology used for this assessment is the same as what is described in Section 3.2.3 of the Phase 2 Draft EIS; that information is incorporated into this Final EIS by reference, as well as included in Appendix C-1 (which was revised for the Final EIS). The study area is defined as the area within 0.25 mile from the centerline of the existing corridor (Figure 4.2-1). This study area is specific to the scenic views and the aesthetic environment assessment and is independent of other elements of the environment. Therefore, when other elements are described in this section (e.g., water bodies, parks and trails, land uses, etc.), the discussion of these resources may be different than what is described elsewhere in the Final EIS. For instance, the study area used for this assessment is larger than the one used for the recreation analysis (Section 4.6). As a result, more recreational resources are described in the analysis of scenic views and aesthetic environment than are evaluated in Section 4.6, *Recreation*.

4.2.1 Relevant Plans, Policies, and Regulations

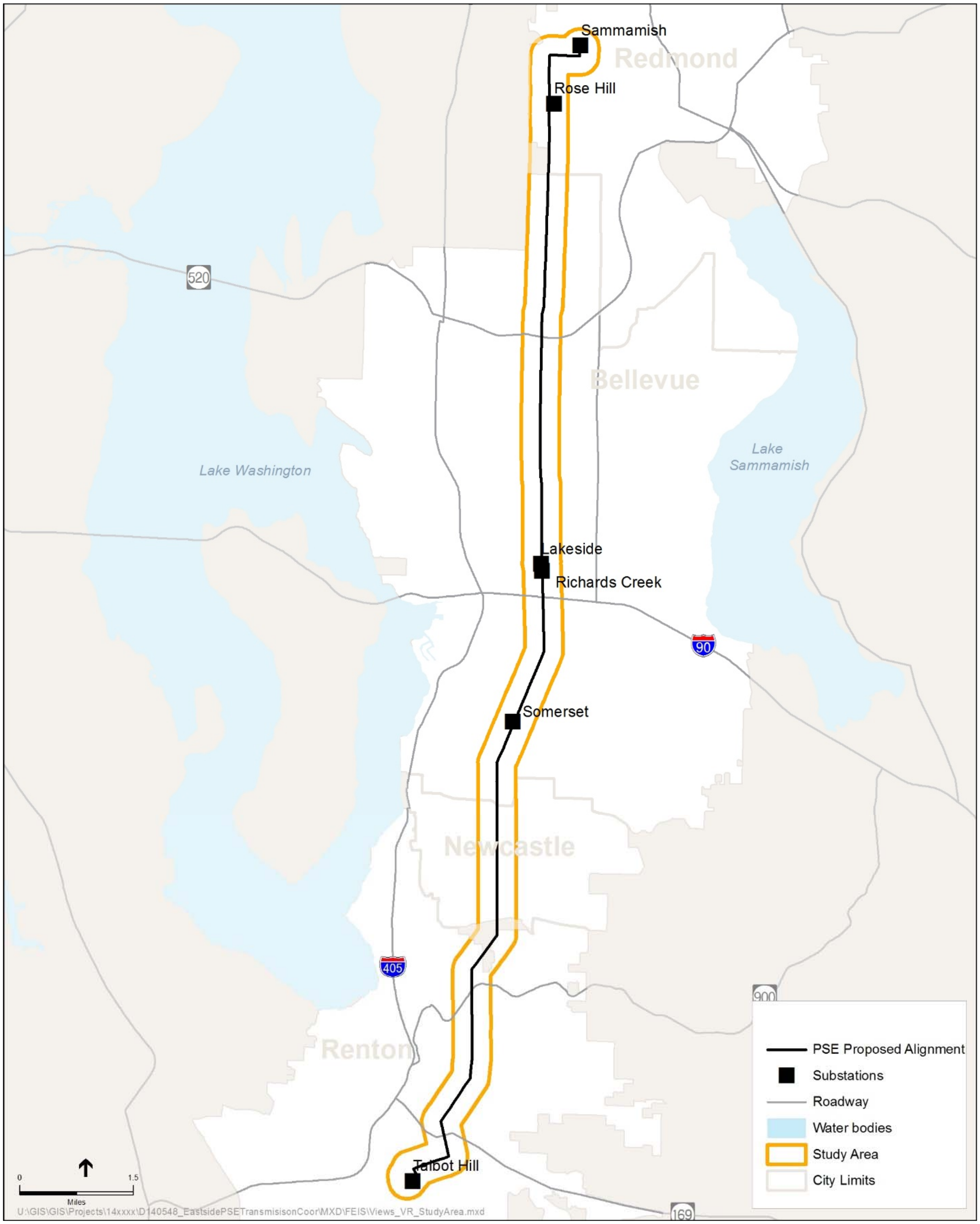
The Phase 1 Draft EIS provides an overview of the planning policies and regulations pertinent to the protection of views and visual resources (see Section 11.2 in the Phase 1 Draft EIS). For the Phase 2 Draft EIS, the policies and regulations considered were updated to incorporate changes to the Newcastle 2035 Comprehensive Plan (City of Newcastle, 2016) and include applicable subarea plan policies (see Appendix C-1). Private covenants were not reviewed unless determined by the Partner Cities to uphold broader City policies. In general, the Partner Cities do not have SEPA policies that provide authority to enforce private covenants. However, covenants can affect the physical environment, and where they do, they are relevant in consideration of the impacts that the project could have. See Section 4.2.2.1 for more information regarding how covenants in the Somerset area were considered for this analysis. The Final EIS draws from the planning policies and regulations described in the Phase 2 Draft EIS and has been updated to include regulatory requirements from Newcastle that PSE would need to comply with (NMC 18.44.052.C.1 and 18.44.052.D).

4.2.2 Scenic Views and the Aesthetic Environment in the Study Area

Scenic views and the aesthetic environment in the study area are described in the Phase 2 Draft EIS. The study area used for the Phase 2 Draft EIS included route options in central and south Bellevue outside of PSE's existing corridor. These are not included in the Final EIS because the Final EIS focuses on PSE's Proposed Alignment, which is entirely within the existing corridor. Information on the affected environment (including relevant plans, policies, and regulations) and the description of scenic views and the aesthetic environment presented in the Phase 2 Draft EIS is incorporated into this Final EIS by reference, and is not repeated here. A revised study area map for PSE's Proposed Alignment is provided below (see Figure 4.2-1). Any corrections to the Phase 2 Draft EIS noted in the Errata section of this Final EIS are also reflected in this section.

4.2.2.1 Bellevue South Segment - Somerset Area Covenants

Although discussed in the impact analysis in the Phase 2 Draft EIS, the effect of view covenants on the Somerset area was not discussed in the affected environment section of the Phase 2 Draft EIS. Therefore, the following section provides background on the existing conditions in the Somerset neighborhood along the Bellevue South Segment. The Somerset neighborhood has neighborhood covenants that protect views (i.e., the View Guideline for Somerset [Somerset, 2016]). These neighborhood covenants represent a "custom" in that they are a form of social contract between residents of the community to follow certain guidelines to protect community interests, in this case residential views. Based on the methodology for the EIS analysis, the viewer sensitivity assessment should consider customs along with other locally adopted guidance for aesthetic and viewer preferences. Although the transmission line is not subject to the covenants, incompatibility between the height of the project and the neighborhood covenants would likely increase *viewer awareness* of the impact (see Section 3.2.3.3 of the Phase 2 Draft EIS). The City of Bellevue Comprehensive Plan states that distinctive neighborhood character within Bellevue's diverse neighborhoods should be protected (see policies in Table 3.2-4 of the Phase 2 Draft EIS). The distinctive character of the Somerset neighborhood is described and protected through the neighborhood's View Guideline, which limits building and vegetation height to preserve existing views. The View Guideline is not an adopted SEPA policy. However, higher viewer awareness does affect the potential significance of an impact. In addition to the higher awareness of the impact, the covenants also have shaped the physical character of the Somerset community, resulting in shorter buildings than would otherwise be allowed and, most notably, far fewer tall trees than are found in most neighborhoods on the Eastside. These physical characteristics are expected to continue because the covenants are permanent and binding on properties within the Somerset neighborhood.



Source: King County, 2015; Ecology, 2014.

Figure 4.2-1. Study Area for the Analysis of Scenic Views and Aesthetic Environment

4.2.3 Long-term (Operation) Impacts Considered

The EIS analysis examines two types of visual impacts: (1) impacts to the aesthetic environment, and (2) impacts to scenic views. It also addresses viewer sensitivity, which applies to both the aesthetic environment and scenic views. The analysis lists potential mitigation measures that could be used to minimize or eliminate project impacts to scenic views and the aesthetic environment. The analysis in the Final EIS focuses on PSE's Proposed Alignment.

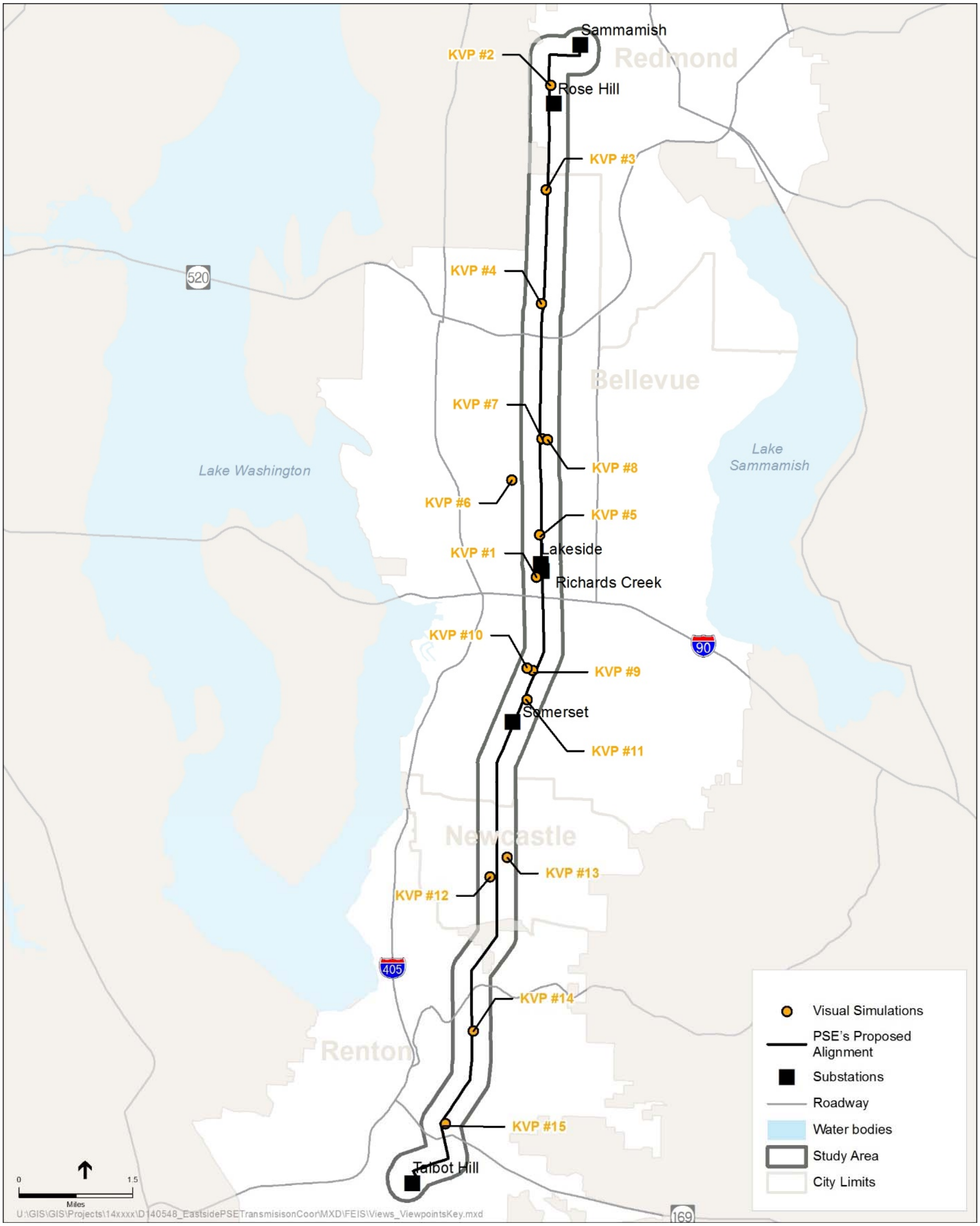
4.2.3.1 Impacts to Visual Quality of the Aesthetic Environment

To help assess changes to the aesthetic environment, over 30 viewpoints were selected at various locations along PSE's Proposed Alignment to show different ways the Energize Eastside project could impact the natural and built environments. Areas identified as sensitive during public scoping and the Phase 2 Draft EIS comment period were also considered during the selection of key viewpoints. Visual simulations of the project for each of the viewpoints were prepared by Power Engineers (Power Engineers, 2017). Methods for preparing the visual simulations are detailed in Appendix C-1. For this EIS, simulations for 15 key viewpoints (KVPs) are used to illustrate impact conclusions (see Section 4.2.5, *Long-term Impacts*). They are listed in Table 4.2-1, and their locations are shown on (Figure 4.2-2**)**. Appendix C-3 incudes simulations for all KVPs and a map showing their locations.

Table 4.2-1. Key Viewpoints Selected for the Visual Quality Analysis in the Final EIS

KVP	Location	Segment/ Option	Reason for Selecting Viewpoint
1	Richards Creek Substation	Richards Creek Substation site	• Shows the new substation, taking into account grading and clearing.
2	Redmond Way	Redmond	• Representative of the natural environment along the segment (topography and vegetation). • Representative of the built environment.
3	13540 NE 54th Pl	Bellevue North	• Representative of the natural environment along the segment (topography and vegetation). • Representative of the built environment (single-family residential development; project configuration and height for most of the segment).
4	13508 NE 29th Pl	Bellevue North	• Commenters requested another simulation of the Bellevue North Segment. • Shows a different pole configuration than what would be typical. • Shows an area where there is a bend in the corridor, change in topography, and where a higher degree of vegetation removal would be required than other areas of the segment.

KVP	Location	Segment/ Option	Reason for Selecting Viewpoint
5	2160 135th Pl SE	Bellevue Central	• Shows pole variation near substation.
6	703 130th Pl SE	Bellevue Central	• From Kelsey Creek Park. • Developed in response to comments on the Phase 2 Draft EIS.
7	13606 Main St	Bellevue Central	• Shows project from rise in topography looking along the transmission line corridor. • Is identified in the Wilburton Subarea Plan as a key view.
8	13636 Main St	Bellevue Central	• Shows a profile view of the project on a rise in topography. • Is identified in the Wilburton Subarea Plan as a key view.
9	4411 Somerset Drive SE	Bellevue South	• Shows project surrounded by single-family residential development and placed on a ridge. • Identified via public comment.
10	13300 SE 44th Pl	Bellevue South	• Shows project looking east toward Somerset from downhill.
11	4730 Somerset Drive SE	Bellevue South	• Identified via public comment; shows typical view from downhill residential street.
12	8446 128th Ave SE	Newcastle – Options 1 & 2	• Representative of the built environment (single-family residential development; project configuration and height for entire segment). • Shows the project from the ridge near the corridor.
13	Lake Boren Park	Newcastle – Options 1 & 2	• View from recreational use. • Shows the project from a lower elevation looking up at the project.
14	1026 Monroe Ave NE	Renton	• Shows project surrounded by institutional and single-family development.
15	318 Glennwood Court SE	Renton	• Shows project on a ridge surrounded by single-family residential development.



Source: King County, 2015; Ecology, 2014.

Figure 4.2-2. Locations of Key Viewpoints used in the Aesthetic Environment Analysis

4.2.3.2 Obstruction of Scenic Views

Impacts to scenic views include the potential for the project to obstruct views of the visual resources identified in the Phase 2 Draft EIS. To identify areas where project-related view impacts would be most likely, an updated geographic information system (GIS) analysis was performed for the Final EIS using only the pole heights for PSE's Proposed Alignment (see Appendix C-1).

4.2.3.3 Viewer Sensitivity

Viewer sensitivity was assessed as high, moderate, or low, using the methodology described in the Phase 2 Draft EIS. Section 3.2.3.3 of the Phase 2 Draft EIS (and Appendix C-1) provides more information about how viewer sensitivity was determined. For the Phase 2 Draft EIS, a high-level understanding of what pole types would occur in various locations was provided. As a result, the assessment of visual coherence of the utility lines themselves focused primarily on where the general pole types would change in each segment (i.e., where there would not be consistent height and form). For this Final EIS, due to design refinements, there is a greater understanding of what pole types would be used within each segment than was known during the Draft EIS. Because of the greater diversity of pole types used within each segment, there is a higher likelihood of inconsistent height and form (non-coherence). For the Final EIS, additional analysis was conducted to determine whether or not lack of utility coherence would result in a significant adverse impact to the aesthetic environment. For more information on the methodology used, see Appendix C-1.

4.2.3.4 Magnitude of Impact

For this analysis, the potential magnitude of project-related impacts is classified as being significant or less-than-significant using the significance criteria listed below (the same criteria used in the Phase 2 Draft EIS):

Less-than-Significant:

- **Aesthetic environment -** The degree of *contrast* between the project and the existing aesthetic environment would be minimal, or viewer sensitivity is low.
- **Scenic views -** The area with impacted scenic views would not include a substantial number of sensitive viewers, defined as residential viewers, viewers from parks and trails, or viewers from outdoor recreation facilities; or the degree of additional obstruction of views compared to existing conditions would be minimal.

Significant:

- **Aesthetic environment -** The degree of contrast between the project and the existing aesthetic environment would be substantial, and viewer sensitivity is high.
- **Scenic views -** The area with impacted scenic views includes a substantial number of sensitive viewers, defined as residential viewers, viewers from parks and trails, or viewers from outdoor recreation facilities; and the degree of additional obstruction of views compared to existing conditions would be substantial.

4.2.4 Long-term Impacts: No Action Alternative

The assessment of impacts to scenic views and the aesthetic environment under the No Action Alternative is the same as was presented in the Phase 2 Draft EIS. Under the No Action Alternative, no substantial new infrastructure would be introduced into the aesthetic environment, and no substantial changes to the visual character or visual quality of the study area would occur. No impacts to scenic views are anticipated.

4.2.5 Long-term Impacts: PSE's Proposed Alignment

4.2.5.1 Impacts Common to All Project Components

Visual Quality of the Aesthetic Environment

Impacts to visual quality of the aesthetic environment were assessed for each segment and option based on the contrast (with either the natural environment or the built environment) that the project would produce, as described in Section 3.2.5.1 of the Phase 2 Draft EIS. Contrast can result from vegetation removal, changes in topography (i.e., grading), the project not blending with the natural setting, incompatible height and form with the surrounding built environment, inconsistent project height and form, and visual clutter.

Several commenters throughout the EIS process have described impacts of the project on the visual quality of the aesthetic environment as resulting in "blight." While SEPA dos not provide a definition of blight, as defined in RCW 35.81.015, a "blighted area" means:

> *An area which, by reason of the substantial physical dilapidation, deterioration, defective construction, material, and arrangement and/or age or obsolescence of buildings or improvements, whether residential or nonresidential;…inappropriate uses of land or buildings; existence of overcrowding of buildings or structures; …deterioration of site;… or any combination of such factors…[that] substantially impairs or arrests the sound growth of the municipality or its environs...*

In general, this is interpreted to mean areas that have been abandoned and fallen into disrepair; the project is not expected to result in blight or other significant impacts on land use (see Section 4.1.5).

Typical pole heights were used when describing the change in height from existing to proposed. Typical pole heights vary throughout the corridor depending on the pole configuration used, differences in topography, and other factors. For this Final EIS, consistent form means that the pole configuration would continuously be either single-circuit or double-circuit. In general, single-circuit poles are used in pairs and have typical heights between 50 and 96 feet. Double-circuit monopoles are singular (not in pairs) and have typical heights between 95 and 99 feet (see Tables 2.1-1 and 2.1-2). However, these typical pole heights vary depending on the segment. Segment-specific typical pole heights are presented in the analysis below and can be taller than the typical heights presented for the whole project. Consistent form generally correlates with consistent height in a given segment. Areas with higher contrast can occur where there is a variety of single-circuit and double-circuit poles in close proximity.

Although it was assumed in the Phase 2 Draft EIS that all of the pole configurations would be made of steel with patina applied to provide a rust-colored look, the Final EIS considers various finishes as being equally likely, including galvanized (light gray), self-weathering (reddish brown), or painted (powder coat). Finishes could be specified by location to better blend with the background or sky.

Section 4.2.6 of the Final EIS describes considerations for selecting pole finishing that can be used by PSE and the Partner Cities to determine which finishing type would contrast less with the surrounding environment.

Cellular Equipment

Comments on the Phase 2 Draft EIS requested more detailed analysis of the appearance of cellular equipment on the 230 kV poles. As stated in Section 2.1.2, cellular equipment exists in eight locations spaced through the project corridor. PSE has proposed replacing existing cellular equipment, if requested by the cellular provider. One of the locations has been identified for decommissioning, so cellular equipment is proposed to be placed in seven locations. Table 4.2-2 lists cell carriers that are expected to move or replace their existing equipment on the new transmission line poles (as of November 2017). Figure 4.2-3 shows existing cellular equipment on a stand-alone pole (under existing conditions) and what it would look like if the cell equipment were placed in the middle wire zone. Appendix C-2 includes a diagram that shows what it would look like if cellular equipment were placed above the wire zone (approximately 10 feet higher than if it were placed in the middle wire zone). The potential for adverse aesthetic impacts is greater if the cellular equipment is located in the above wire zone because taller poles are necessary. This is only proposed on the pole near Newcastle Way at the north end of the Newcastle Segment.

Table 4.2-2. Potential Placement of Cellular Equipment on Project Facilities

Location	Segment	Cell Companies	Location on the Pole
Overlake 13460 NE 40th St	Bellevue North	AT&T	Below wire zone
Kelsey Creek 13601 SE 10th St	Bellevue Central	AT&T/Sprint	Below wire zone
Tyee Middle School 3858 136th Ave SE	Bellevue South	Sprint	Middle wire zone (see Figure 4.2-3)
Somerset Rec Center 4445 136th Pl SE	Bellevue South	T-Mobile	Below wire zone
Somerset substation 5200 Coal Creek Parkway SE	Bellevue South	Sprint and T-Mobile	To be determined
Newcastle Way 12833 Newcastle Way	Newcastle	T-Mobile	Above wire zone
4th St (old Cemetery Rd) 3205 NE 4th St	Renton	Sprint	Below wire zone

Source: PSE, 2017.

Existing Transmission Pole Height: ~60 feet

Figure 4.2-3a. Existing Conditions for Cellular Equipment at 13630 SE Allen Road, Bellevue, Looking Northeast

Proposed Transmission Pole Height: ~95 feet
NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-3b. Proposed Conditions for Cellular Equipment at 13630 SE Allen Road, Bellevue, Looking Northeast

Obstruction of Scenic Views

Where scenic views would be obstructed, the obstruction could be caused by the placement of a pole in a new location; increased diameter of the pole, blocking more of a scenic view than under existing conditions; increased pole height resulting in poles protruding into scenic views; or lines being raised into a spot on the horizon where they would impact previously unobstructed scenic views.

Viewer Sensitivity

As described in Section 3.2.3 of the Phase 2 Draft EIS, viewer sensitivity applies to both the aesthetic environment and scenic views. Relevant plans, policies, and regulations were reviewed as part of the Phase 2 analysis to identify potential impacts that would affect more sensitive viewers (Table 3.2-4 of the Phase 2 Draft EIS, which is incorporated into the Final EIS by reference).

Impact Analysis by Segment in the Final EIS

The following pages summarize the potential impacts on scenic views and the aesthetic environment for PSE's Proposed Alignment, presented for the Richards Creek substation and by segment. For the Redmond, Bellevue North, Bellevue Central, and Renton Segments, the analysis included a review of refined project design details for PSE's Proposed Alignment and updated simulations, with results revised relative to the Phase 2 Draft EIS to reflect the new information. For these segments, the new information and analysis have not altered the conclusions presented in the Phase 2 Draft EIS regarding significant impacts to scenic views and the aesthetic environment.

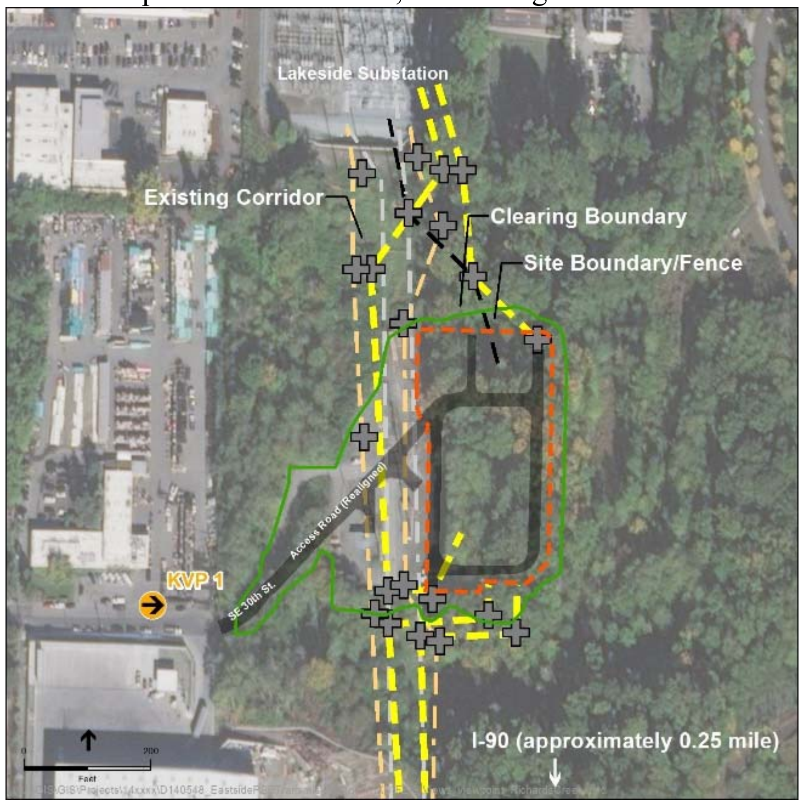
For the Richards Creek substation site and the Bellevue South and Newcastle Segments, the analysis included a review of the project design as presented in the permit applications submitted to Bellevue and Newcastle (PSE, 2017b and 2017c, respectively), as well as updated simulations (Power Engineers, 2017). The results below have been revised relative to the Phase 2 Draft EIS, incorporating the more detailed information in the permit applications on pole locations and vegetation clearing. The new information and analysis have not altered the conclusions presented in the Phase 2 Draft EIS regarding significant impacts to scenic views and the aesthetic environment.

4.2.5.2 New Richards Creek Substation

This analysis has been revised since the release of the Phase 2 Draft EIS to incorporate changes in the pole height, placement, and form associated with PSE's Proposed Alignment. However, impacts to the aesthetic environment would be less-than-significant at the Richards Creek substation site as described in the Phase 2 Draft EIS because the site is within PSE's existing corridor, and the degree of contrast with the existing environment would be minimal. Viewer sensitivity is low because there would be few sensitive viewers, and the utility infrastructure is consistent with existing plans and policies.

There would be no impacts to scenic views because no scenic views were identified at the site.

- **Visual Quality of the Aesthetic Environment:** A new substation would be introduced into the visual environment in an area that currently includes both cleared open space (utility yard) and wooded hillside. Clearing and grading associated with site development would result in new contrast in the aesthetic environment (see Figure 4.2-4, showing KVP 1). Visual quality of the natural environment would change from current conditions as parts of the undeveloped wooded area to the east would be cleared and developed into a substation, and cutting into the hillside and redistribution of fill material would result in a long-term change to the topography of the site. Visual quality of the built environment would not be adversely impacted because the new substation would not contrast with the surrounding built environment. The substation would be constructed immediately to the south of the existing Lakeside substation, and 115 kV transmission lines currently cross the site heading north and south. Because the project would be built adjacent to similar development, it would add to the existing visual clutter. In addition, the variation in pole type would be high at the Richards Creek substation, with multiple lines entering and exiting the substation. However, this would not result in significant impacts to the aesthetic environment, largely because the site would remain screened by vegetation from areas with differing visual character. Therefore, impacts to the visual quality of the aesthetic environment would be less-than-significant.



- **Scenic Views:** There are no scenic views in the vicinity of the proposed substation; impacts to scenic views would be less-than-significant.
- **Viewer Sensitivity:** There are few sensitive viewers in the vicinity of the substation site. The closest residential use is multi-family housing approximately 450 feet to the northeast of the substation site, but residents would not be able to see the new substation due to topography and vegetation. The playground and field associated with Chestnut Hill Academy is roughly 200 feet to the north of the substation site. Although the existing dense tree stands would keep the site from being visible, tree removal at the Lakeside and Richards Creek substations would potentially make both substations more visible from the school property. The proposed substation would not be inconsistent with any study area plans or policies (see Appendix C-1). Therefore, viewer sensitivity is low.

Existing Pole Height: ~65-70 feet

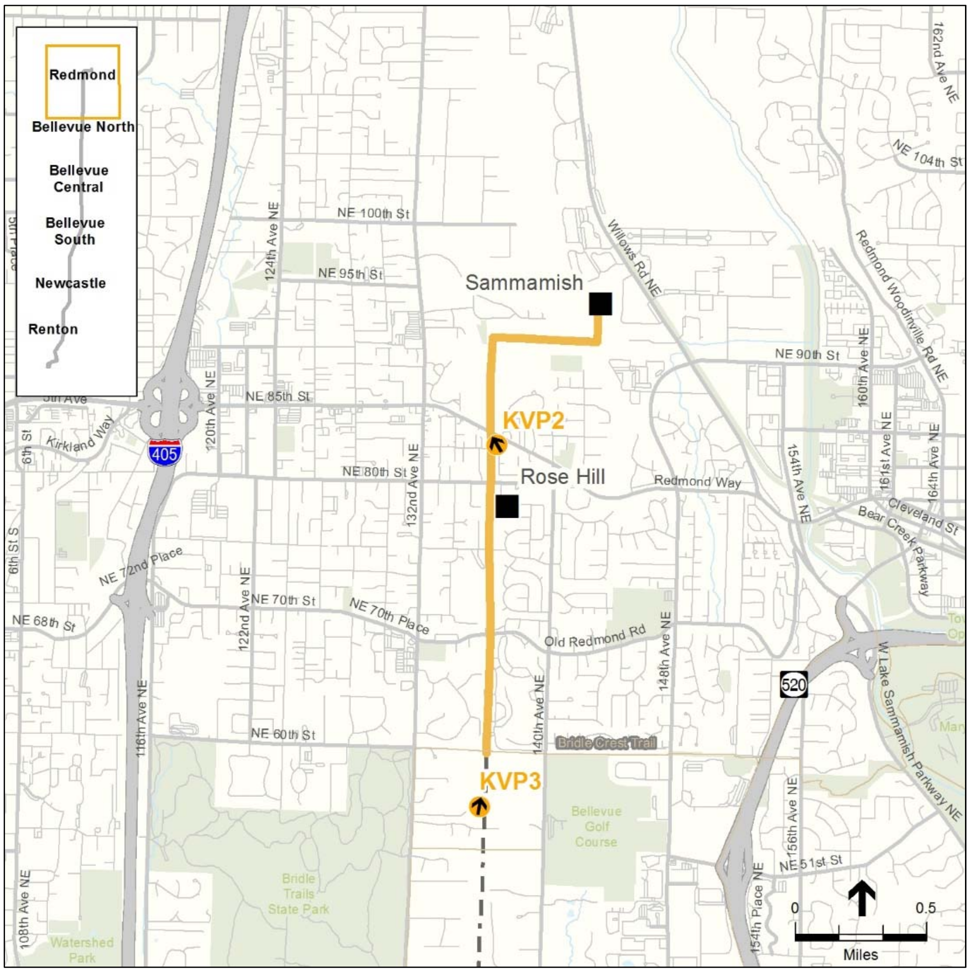
Proposed Pole Height: ~70-100 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-4. KVP 1, Existing and Proposed Conditions of Richards Creek Substation from SE 30th Street Looking East

4.2.5.3 Redmond Segment

Analysis of this segment was revised for the Final EIS to incorporate changes in the pole height and form associated with PSE's Proposed Alignment. However, impacts to the scenic views and the aesthetic environment in the Redmond Segment would still be characterized as less-than-significant, as described in the Phase 2 Draft EIS. The segment is located within PSE's existing corridor, and the degree of contrast with the existing environment would be minimal. Impacts to scenic views are unlikely due to the presence of dense vegetation and tall tree stands. The project would be consistent with existing plans and policies.



- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would increase because the poles would be approximately 30 to 40 feet taller than the existing poles, with a typical pole height of 91 to 102 in the Redmond Segment depending on the pole configuration. The new poles would be taller than much of the surrounding vegetation, and additional clearing would be required, particularly in areas where a large number of trees are within the transmission line corridor. Tree removal would be most noticeable south of Redmond Way and from Old Redmond Road to the southern terminus of the segment. Because the tree removal would occur within the existing corridor, the degree of contrast created by the clearing would be minor. The pole height and configuration would increase the contrast with surrounding residential development. Despite the height increase and additional clearing, the built environment would be unchanged because transmission lines already exist in the corridor.

The new transmission lines would have consistent height and form, except where the transmission lines change direction from heading east-west within the existing 500-foot easement to heading north-south in the 100-foot easement (approximately 0.5 mile southwest of the Sammamish substation), at which point the lines transition from being on two single-circuit monopoles to one double-circuit monopole. This change would occur in an area that is buffered by vegetation and has few viewers. Single-circuit monopoles would also be placed south of NE 80th Street (west of the Rose Hill substation). The degree of contrast would be low because the substation would be in the background and there would be a 500- to 700-foot distance between poles where the lines would transition back to double-circuit monopoles. In addition, viewer sensitivity would be low because the single-circuit monopoles would be visible from only a few residences. The project would reduce visual clutter in the corridor by reducing the number of poles from existing conditions (see Figure 4.2-5, showing KVP 2). Installing a new transformer and other ancillary equipment at the Rose Hill substation is not expected to increase contrast because the site already hosts a 115 kV to 12.5 kV substation.

Impacts to the visual quality of the aesthetic environment would be less-than-significant.

- **Scenic Views***:* The City of Redmond has policies to protect scenic views from public places. Specific public view corridors are codified in RZC 21.42.060. The project would not impact any scenic views from parks, trails, or outdoor recreation facilities. None of the public view corridors identified in RZC 21.42.060 are within the study area. There is the potential for some residential view impacts, but such impacts would be minor due to the presence of dense vegetation and tall tree stands. Impacts to scenic views would be less-than-significant.
- **Viewer Sensitivity:** Primary viewers are residential viewers, who would be sensitive to changes to woodland views. Other sensitive viewers include users of the Bridle Crest Trail. Policies in the Redmond Comprehensive Plan call for protecting woodland views in residential neighborhoods. Trees would be removed, which could potentially change the wooded character of the area. Tree removal would occur within an existing transmission corridor that is already mostly cleared. Therefore, the overall appearance of tree stands and woodland views is not expected to be adversely impacted.

  Some residential viewers may view the increased height of the poles positively because the lines would be higher than at present and therefore out of their line of sight, while others would not view the change as beneficial because the lines would be more visible than under existing conditions.

  Although the project would directly cross the Bridle Crest Trail, it would occur at a location where the existing 115 kV line traverses the trail. The Redmond Zoning Code protects the appearance of public ways. The project would not impact the appearance of public ways because it would be replacing one transmission line infrastructure with another in an existing utility corridor. Viewer sensitivity is moderate.

Existing Pole Height: ~50 feet

Proposed Pole Height: ~100 feet

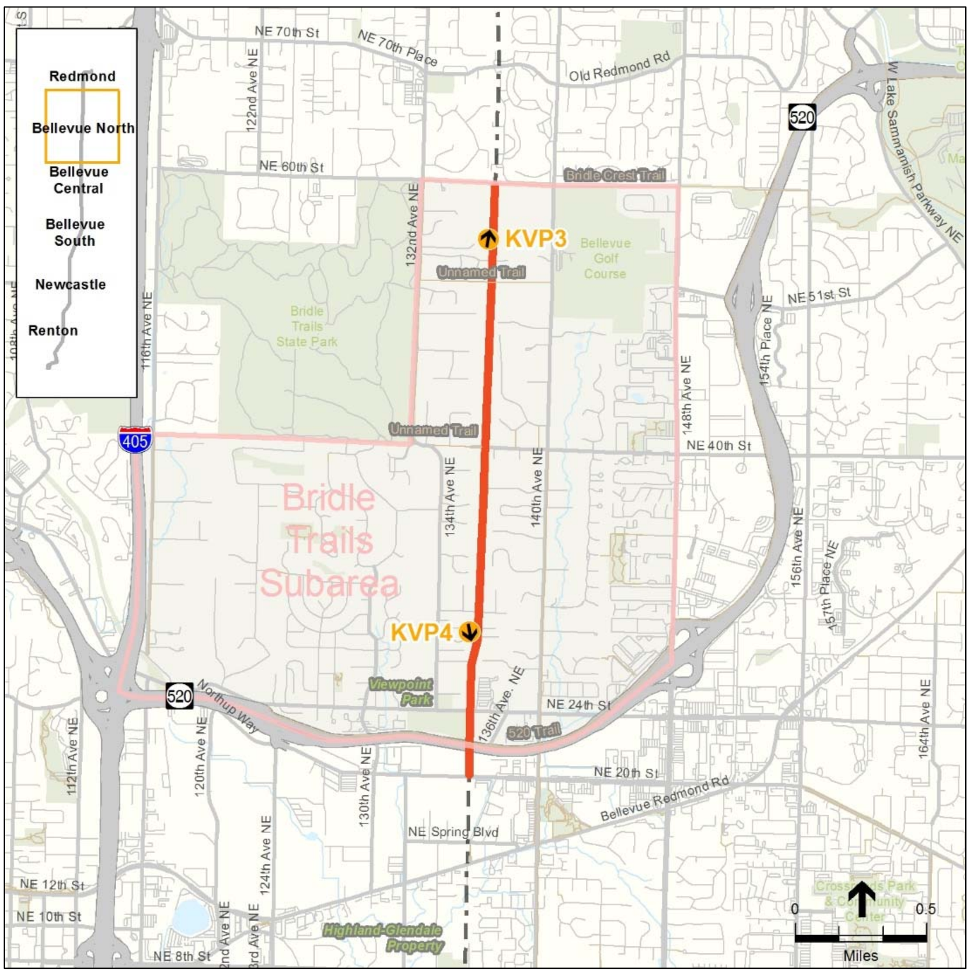
NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-5. KVP 2, Existing and Proposed Conditions from Redmond Way Looking Northwest

4.2.5.4 Bellevue North Segment

Analysis of this segment was revised for the Final EIS to incorporate changes in the pole height and form associated with PSE's Proposed Alignment. Impacts to the scenic views and the aesthetic environment in the Bellevue North Segment would be less-than-significant, as described in the Phase 2 Draft EIS. The transmission lines would be in the existing corridor, and there would be minimal contrast with existing conditions. Viewer sensitivity is low because there are few sensitive viewers. The project would be consistent with existing plans and policies because the tree removal (0.5 percent of trees within the Bridle Trails Subarea) is not expected to substantially change the existing wooded, natural, rural, and equestrian character of the Bridle Trails Subarea (see Appendix C-1). In addition, no trees would be removed from the lower slopes of the bluff adjacent to SR 520 at approximately 136th Avenue NE, so the existing visual separator between residential areas and the freeway would not be removed (see Appendix C-1).

There would be no impacts to scenic views because the degree of additional obstruction of views from the transmission line would be minimal.



- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would be minimal because the approximately 93-foot poles in the Bellevue North Segment would in most cases be shorter than the surrounding vegetation or would appear shorter than surrounding vegetation due to vegetation density (see Figure 4.2-6, showing KVP 3). In general, the topography does not affect the visibility of the transmission lines along this segment because dense, tall vegetation obscures the view of the transmission lines (see Figure 4.2-7, showing KVP 4). Within the built environment the poles would be approximately 40 feet taller than existing conditions, and the pole diameter would be larger than existing conditions, contrasting more with the surrounding houses and existing utility infrastructure. The new transmission lines would have consistent form and height throughout most of the segment, and would reduce visual clutter by reducing the number of poles. The one exception would be where pairs of single-circuit monopoles would be used south of NE 24th Street to cross SR 520. This would not create significant adverse impacts because it would be in a highly vegetated area to the north of SR 520 and in a commercial area abutting SR 520 to the south. Overall, impacts would be less-than-significant.

- **Scenic Views:** No scenic views from parks, trails, or outdoor recreation facilities would be significantly impacted. There are occasional views of the Cascades along the transmission corridor, views of the Olympics from Northup Way, and views of Mount Rainier along SR 520. Changes in the transmission infrastructure from 115 kV transmission lines to 230 kV transmission lines are not expected to negatively impact views from those locations because the change would occur within an existing transmission corridor, and the increase in height would move the wires farther above drivers' line of sight of visual resources. Impacts would be less-than-significant.
- **Viewer Sensitivity:** Sensitive viewers along the Bellevue North Segment are primarily residential viewers and users of the two unnamed trails, the 520 bike trail, and Viewpoint Park. In general, because of the high density of tall vegetation, only residential viewers close to the transmission lines would be able to view the lines. The closer that viewers are to the transmission lines, the less likely they are to view the lines because increasing the existing pole height by 40 feet would raise the lines out of their line of sight. The presence of dense vegetation also reduces the likelihood that the transmission lines would be visible from any of the recreational resources, except where the lines directly cross them. In addition, none of these resources are identified as having scenic qualities, and a transmission line already crosses these resources. The Bridle Trails Subarea Plan protects the wooded, natural, rural, and equestrian character of the subarea, and it encourages retention of vegetation on the lower slopes of the bluff adjacent to SR 520 at approximately 136th Avenue NE to provide a visual separator between residential areas and the freeway (City of Bellevue, 2015). Approximately 0.5 percent of the trees in the Bridle Trails Subarea as a whole would be removed for the project. No trees would need to be removed directly north of SR 520. Overall, viewer sensitivity is low.

Existing Pole Height: ~55 feet

Proposed Pole Height: ~90 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-6. KVP 3, Existing and Proposed Conditions from 13540 NE 54th Place Looking Northeast

Existing Pole Height: ~55 feet

Proposed Pole Height: ~100 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-7. KVP 4, Existing and Proposed Conditions from 13508 NE 29th Place Looking South

4.2.5.5 Bellevue Central Segment (Revised Existing Corridor Option)

Analysis of this segment was revised in the Final EIS to incorporate changes in the pole height and form associated with PSE's Proposed Alignment. Impacts to the scenic views and the aesthetic environment along the Bellevue Central Segment would be less-than-significant (as described in the Phase 2 Draft EIS) because the transmission lines would be within the existing corridor, and contrast with the existing environment would be minimal. Viewer sensitivity is low because the project would not be inconsistent with study area plans or policies.

Scenic view impacts along this segment would be less-than-significant.

- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would be most noticeable where tall vegetation is not present or is limited (e.g., at the Glendale Country Club). Most of the vegetation removal would occur south of the Lake Hills Connector. In general, the visibility of the lines from the west would be limited because views would be partially to fully blocked by vegetation in the foreground. Near the Lakeside substation, contrast would also be more noticeable because approximately 43 trees would be removed. Contrast with the built environment would be slightly greater than existing conditions because the poles would typically be approximately 40 feet taller and the pole diameter would be larger than the existing poles. A transmission line already exists in the corridor, and the new transmission lines would have consistent form and height throughout the segment, except for where the lines would cross

Bel-Red Road and would cross the Lakeside substation and tie into the Richards Creek substation. The change in pole configuration at the Bel-Red Road crossing would not result significant adverse effects because it would be in a commercial parking lot, with the primary viewers being drivers on Bel-Red Road. In residential areas north of the Lakeside substation, increased clutter would be created through the addition of more poles at the substation and the introduction of new pole configurations (see Figure 4.2-8, showing KVP 5). This would be visible to only a few residential viewers, and the degree of additional clutter would not dominate the aesthetic environment to the degree that significant adverse impacts would occur. In general, the project would reduce visual clutter by reducing the number of poles. Therefore, impacts would be less-than-significant.

- **Scenic Views:** Scenic view impacts along this segment would be minimal because topography and vegetation obscure scenic views from most of the study area.
- **Viewer Sensitivity***:* Sensitive viewers along the segment are residential viewers and recreational users. Kelsey Creek Park is the only recreational resource identified by the City as being used for its natural setting. Kelsey Creek Park hosts a high number of recreational visitors and is used year-round. The presence of dense vegetation reduces the visibility from Kelsey Creek Park; however, it would be visible from some locations (see Figure 4.2-9, showing KVP 6). Where visible, it is likely that only the upper portion of the transmission lines could be seen. Due to the distance between the transmission lines and the park (approximately 0.34 mile), the project would not substantially alter the natural setting of Kelsey Creek Park. The project would directly cross and/ or follow the SE 3rd Trail, the SE 10th Trail, unnamed trail(s), the Highland–Glendale Property, and Skyridge Park. Because none of these resources are identified by the City as being used for their views or natural setting, and a transmission line already crosses these resources, viewer sensitivity to the change is expected to be low. The project would not be inconsistent with the Wilburton/NE 8th Street Subarea Plan because it would not substantially change the following key views: From SE 1st Street and Main Street at the transmission line right-of-way at 136th Avenue (see Figure 4.2-10, showing KVP 7, and Figure 4.2-11, showing KVP 8). A transmission line already exists, and the project would change only the height and form of the line. Chestnut Hill Academy is less than 100 feet to the east. Tree removal would make the Lakeside substation more visible; however, because the majority of the tree removal would be located further south, impacts would be minor. Overall, viewer sensitivity is low.

Existing Pole Height: ~55 feet

Proposed Pole Height: ~100 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-8. KVP 5, Existing and Proposed Conditions from 2160 135th Place SE Looking Southeast

Existing Pole Height: ~75 feet

Proposed Pole Height: ~90 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-9. KVP 6, Existing and Proposed Conditions from 703 130th Place SE (Kelsey Creek Park) Looking Northeast

Existing Pole Height: ~50 feet

Proposed Pole Height: ~95 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-10. KVP 7, Existing and Proposed Conditions from 13606 Main Street Looking North

Existing Pole Height: ~55 feet

Proposed Pole Height: ~95 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

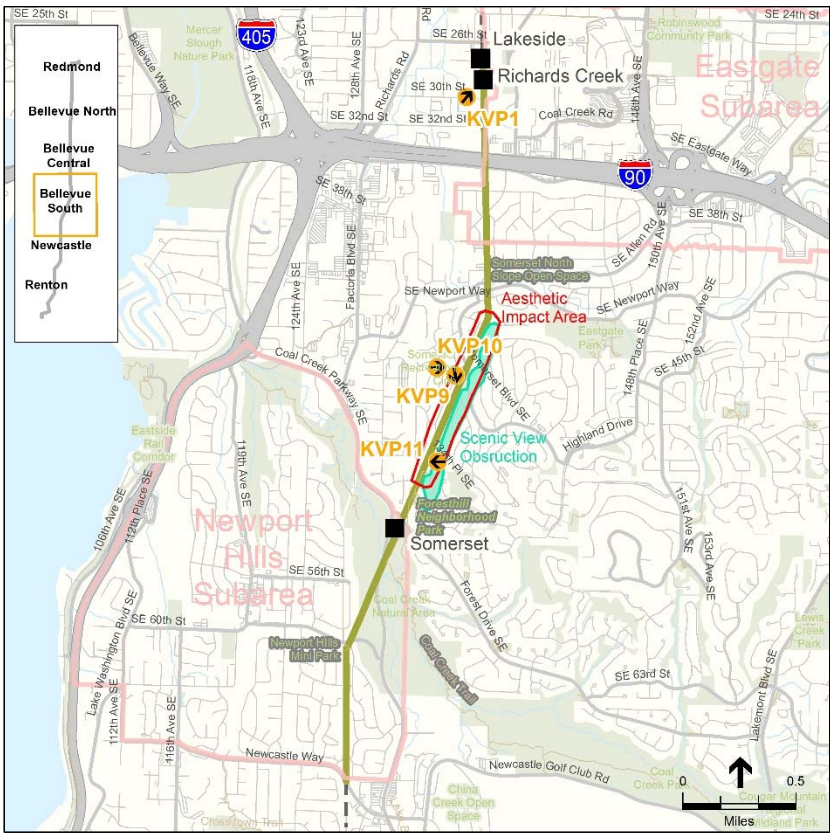
Figure 4.2-11. KVP 8, Existing and Proposed Conditions from 13636 Main Street Looking West

4.2.5.6 Bellevue South Segment (Revised Willow 1 Option)

Analysis of this segment was revised for the Final EIS to incorporate changes in the pole height and form associated with PSE's Proposed Alignment. Impacts to the scenic views would be less-than-significant, as indicated in the Phase 2 Draft EIS, but moderate impacts affecting scenic views in limited areas are discussed in detail below. Impacts to the aesthetic environment would be significant along the Bellevue South Segment, as was described in the Phase 2 Draft EIS.

Contrast with the existing aesthetic environment would generally be low through this segment because the transmission lines would be within the existing corridor. The exception to this is where the transmission lines would traverse the Somerset neighborhood. Building and vegetation heights are lower in the Somerset neighborhood than other areas of the corridor, making the existing aesthetic environment within that neighborhood unique in this segment and when compared to other neighborhoods in Bellevue that are affected by the project. As a result, the degree of contrast created by the taller poles is substantial.

Viewer sensitivity is generally high along this segment, particularly where it traverses the Somerset neighborhood and the Coal Creek Natural Area. However, impacts to the Coal Creek Natural Area would be less-than-significant because vegetation removal would be limited.



In the Somerset neighborhood, the combination of high viewer sensitivity and substantial contrast created by the taller poles would mean that significant impacts to visual quality are expected along that portion of the Bellevue South Segment.

The new, taller poles would result in scenic view impacts east of the transmission lines, relative to existing conditions, primarily in the Somerset portion of the Bellevue South Segment. However, these impacts would be less-than-significant due to the limited degree of obstruction produced by the wires, the relatively small number of residences impacted, and the lack of policy supporting protection of private residential views. The neighborhood immediately south of SE Newport Way would also potentially experience some scenic view impacts, but taller existing vegetation would limit the impacts.

- **Visual Quality of the Aesthetic Environment:** The segment would be entirely within the existing corridor, which has been partially cleared and managed. A substantial number of trees in the existing corridor have been identified for potential removal, including within residential areas north and south of the Coal Creek Natural Area (including Newport Hills Mini-Park). This would change the vegetated appearance for residential viewers immediately adjacent to the corridor. Because those areas are within an existing, managed corridor, the degree of contrast produced by each clearing would be low; therefore, these impacts would be less-than-significant. Contrast with the natural environment may occur where large amounts of vegetation are removed or the poles are taller than the surrounding vegetation.

  The existing 115 kV transmission lines and approximately 60-foot H-frame structures along the existing corridor would be removed and replaced by one or two monopoles at each location (see the Segment Sheet for the Bellevue South Segment in Chapter 2, page 2-27). North of SE Newport Way and south of the Somerset substation, double-circuit 95-foot tall steel monopoles would be used. South of SE Newport Way to the Somerset substation, pairs of single-circuit, 79-foot tall monopoles would be used. Except for the locations where the lines would transition between single-circuit monopoles to double-circuit monopoles, the height and form of the transmission line would be consistent. Contrast with the built environment would be less-than-significant, except for where the transmission lines would cross the Somerset neighborhood.

  Based on additional analysis conducted for the Final EIS, Figure 4.2-12 shows the aesthetic impact area and scenic view obstruction area along the Bellevue South Segment. Although the new transmission lines would be within an existing transmission corridor, and the height and form of the transmission lines would be consistent through the Somerset area, there would be a substantial degree of contrast between the low-scale buildings and vegetation within the Somerset neighborhood (e.g., see Figure 4.2-13, showing KVP 9). The Somerset neighborhood has covenants that impose height restrictions and make the existing aesthetic environment within the neighborhood unique. Because the aesthetic environment of the Somerset neighborhood is comprised of height-restricted features, the difference in height between the new poles and the surrounding built environment would be more pronounced than in other areas along the segment where buildings and vegetation are taller. This is where changes to the aesthetic environment would be the most notable, and significant impacts to the aesthetic environment would occur (immediately uphill and downhill of the line) in the aesthetic impact area shown on Figure 4.2-12. This impact would dissipate with distance (see Figure 4.2-14, showing KVP 10). Within the aesthetic impact area, significant impacts to the aesthetic environment would occur.

- **Scenic Views:** Most of the scenic views in this segment are from the Somerset neighborhood and are of the Olympics, Lake Washington, and the Bellevue and Seattle skylines. This is an area with a relatively high population density (see Appendix C-1). The degree of scenic view obstruction is expected to be higher in the Somerset neighborhood because the poles would protrude approximately 20 feet higher than under existing conditions, and because this area has preserved views through property covenants requiring lower vegetation and building heights than in other areas in Bellevue and the Eastside. The increased pole height would raise the lines above the viewshed of some residential viewers (those nearest the lines), and into the viewshed of others farther uphill. Figure 4.2-12 shows the area of Somerset where these impacts on scenic views would be most pronounced. This area includes approximately 110 residences. For viewers uphill of the area shown, impacts would be far less pronounced because the proposed taller poles would be below the horizon and would be farther away. There also could be scenic view impacts to drivers on streets within the area shown on Figure 4.2-12 that slope down to the west. In the neighborhood immediately south of SE Newport Way, residences could experience impacts, but most residents would not experience adverse impacts due to the presence of tall vegetation, which limits scenic views as well as potential views of the poles. Impacts to scenic views along the Bellevue South Segment would be less-than-significant because of the limited number of residences that would experience view obstruction, and because the transmission lines would alter views but would not completely block them.

- **Viewer Sensitivity:** Sensitive viewers along this segment are residential viewers and recreational users. Coal Creek Natural Area is the only recreational resource identified by the City as being used for its natural setting. It is also a highly used year-round recreational resource. Approximately 20 trees would be removed near the Coal Creek to SE 60th Street segment of the Lower Coal Creek Trail. The tree removal would diminish the natural setting and make Coal Creek Parkway more visible to trail users. Although not identified as being used for their natural settings, the Forest Hill Neighborhood Park, Somerset North Slope Open Space, and Newport Hills Mini Park would be directly crossed by the project. Because these recreation areas are already traversed by the existing transmission line corridor, viewer sensitivity is lower for users along the corridor. Sensitivity is expected to be high at the Somerset North Slope Open Space and Newport Hills Mini Park, where park users would view a higher degree of contrast as the new transmission lines would be a change in height and form.

  The placement of higher poles in the existing corridor has the potential to impact views from adjacent single-family areas in the Eastgate Subarea. The increase in pole height (approximately 35 feet) would reduce the existing obstruction of scenic views for abutting residences because the wires would be higher, and out of the line of sight from those residences. There is the potential for inconsistency with the Newport Hills Subarea Plan, which emphasizes the preservation of existing trees on protected slopes and hilltops as a distinct visual element. Within the Newport Hill Subarea, protected slopes are primarily associated with the Coal Creek ravine. Fewer than 40 trees would likely be removed from priority steep slopes, priority steep slope buffers, and landslide hazard areas (PSE, 2017b). Tree removal would be dispersed and surrounded by retained trees stands. Therefore, the appearance of the vegetation as a distinct visual element is not anticipated to change. Tree removal would occur within the Coal Creek ravine; however, the number of trees removed, when compared to the number of trees within the ravine as a whole, is not expected to impact the aesthetics of the Coal Creek Natural Area to the degree that it would no longer be considered a "distinct visual element" (see Table 3.2-4 of the Phase 2 Draft EIS).

  The segment also traverses the Somerset neighborhood, which has shorter buildings and vegetation than other study area neighborhoods as a result of the covenants described in Section 4.2.2.1. Although the transmission lines are not subject to the covenants, the covenants would likely increase viewer awareness of the impact (see Figure 4.2-15, showing KVP 11). As such, viewer sensitivity to changes in the views from those residences would be high. Overall, viewer sensitivity for the Bellevue South Segment is moderate, but it is high within the Somerset neighborhood.

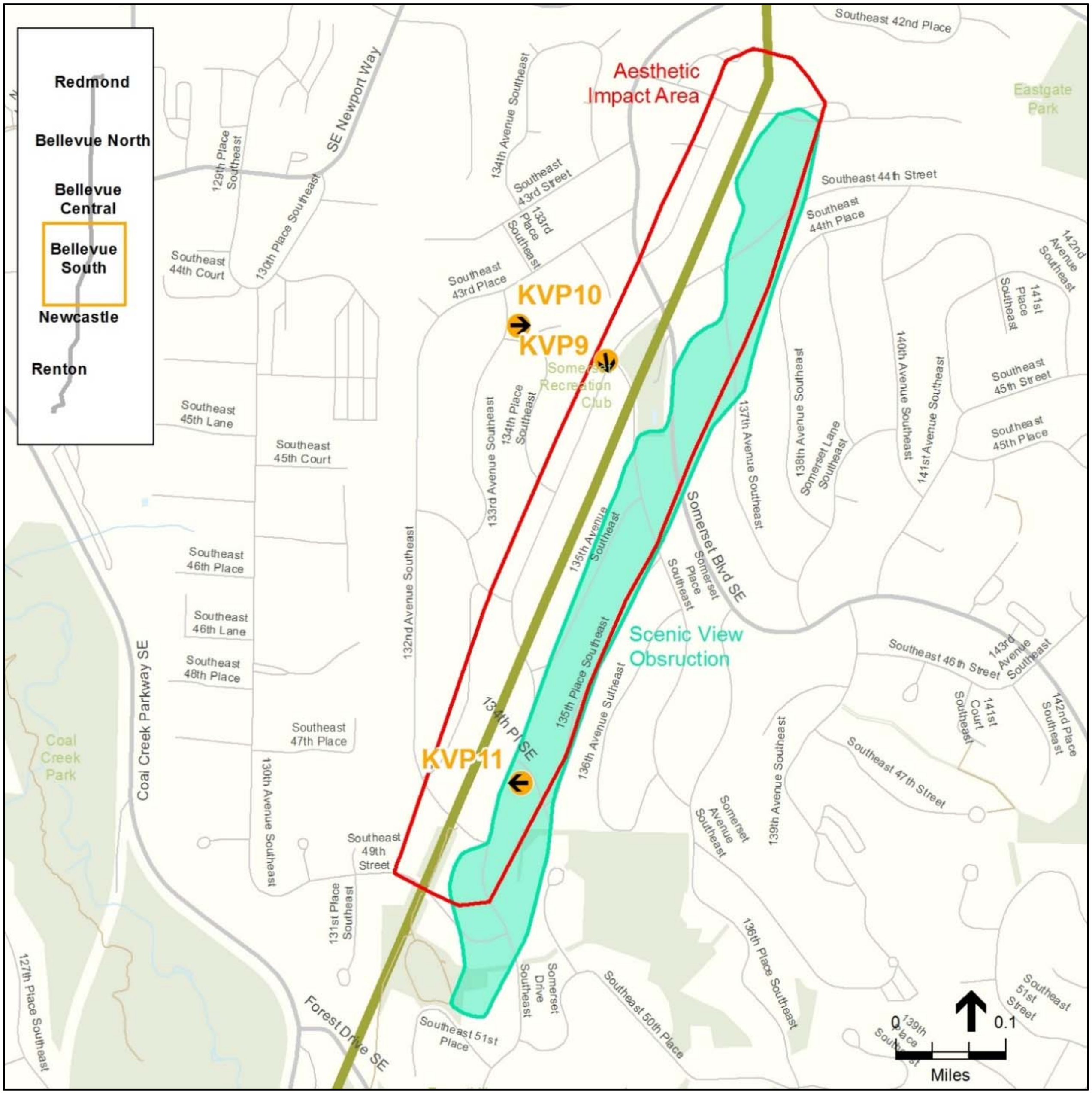


Figure 4.2-12. Bellevue South Segment - Aesthetic Impact Area and Scenic View Obstruction Area in the Somerset Neighborhood

Existing Pole Height: ~55 feet

Proposed Pole Height: ~75 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-13. KVP 9, Existing and Proposed Conditions from 4411 Somerset Drive SE Looking Southeast

Existing Pole Height: ~55 feet

Proposed Pole Height: ~75 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-14. KVP 10, Existing and Proposed Conditions from 13300 SE 44th Place, Looking East

Existing Pole Height: ~44 feet

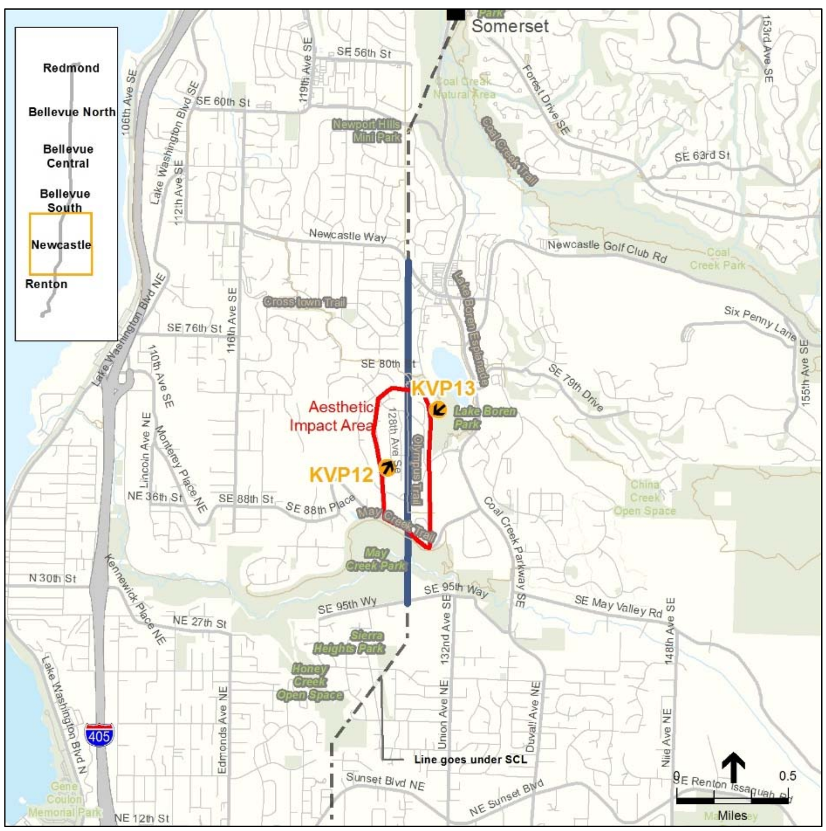
Proposed Pole Height: ~75 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-15. KVP 11, Existing and Proposed Conditions from 4730 Somerset Drive SE Looking West

4.2.5.7 Newcastle Segment – Option 1 (No Code Variance)

Two options are analyzed in the Final EIS for the Newcastle Segment: one that would not require a code variance, and one that would require a code variance. Option 1 (No Code Variance) has a similar pole height and configuration to the Newcastle Segment described in the Phase 2 Draft EIS. Therefore, the assessment below is the same as presented in the Phase 2 Draft EIS. North of the May Creek ravine, project impacts on the aesthetic environment of the Newcastle Segment Option 1 would be significant. Although the proposed project would be placed in the existing transmission line corridor, the poles would be almost double the height (from 55 feet to approximately 95 feet) of the existing poles, making it more visible from neighboring residences and residential streets. When coupled with placement of the project on the ridge, this would make the new transmission lines a defining feature that contrasts strongly with the existing built environment. This portion of the project would adversely affect neighborhood character, in conflict with the Newcastle Comprehensive Plan. The Comprehensive Plan protects the scale and character of existing neighborhoods through policies that call for transmission lines to be sited and designed to minimize visual impacts to adjacent land uses. The portion of the option within the May Creek ravine would result in less-than-significant aesthetic impacts due to the topography of the ravine and the presence of tall, dense vegetation, both of which would reduce the degree of contrast between the project and the surrounding aesthetic environment.



Impacts to scenic views would be less-than-significant because there would be a low degree of additional view obstruction compared to existing conditions. No scenic views from recreational facilities would be impacted. Based on additional analysis conducted for the Final EIS, Figure 4.2-16 shows the aesthetic impact area and scenic view obstruction area along the Newcastle Segment.

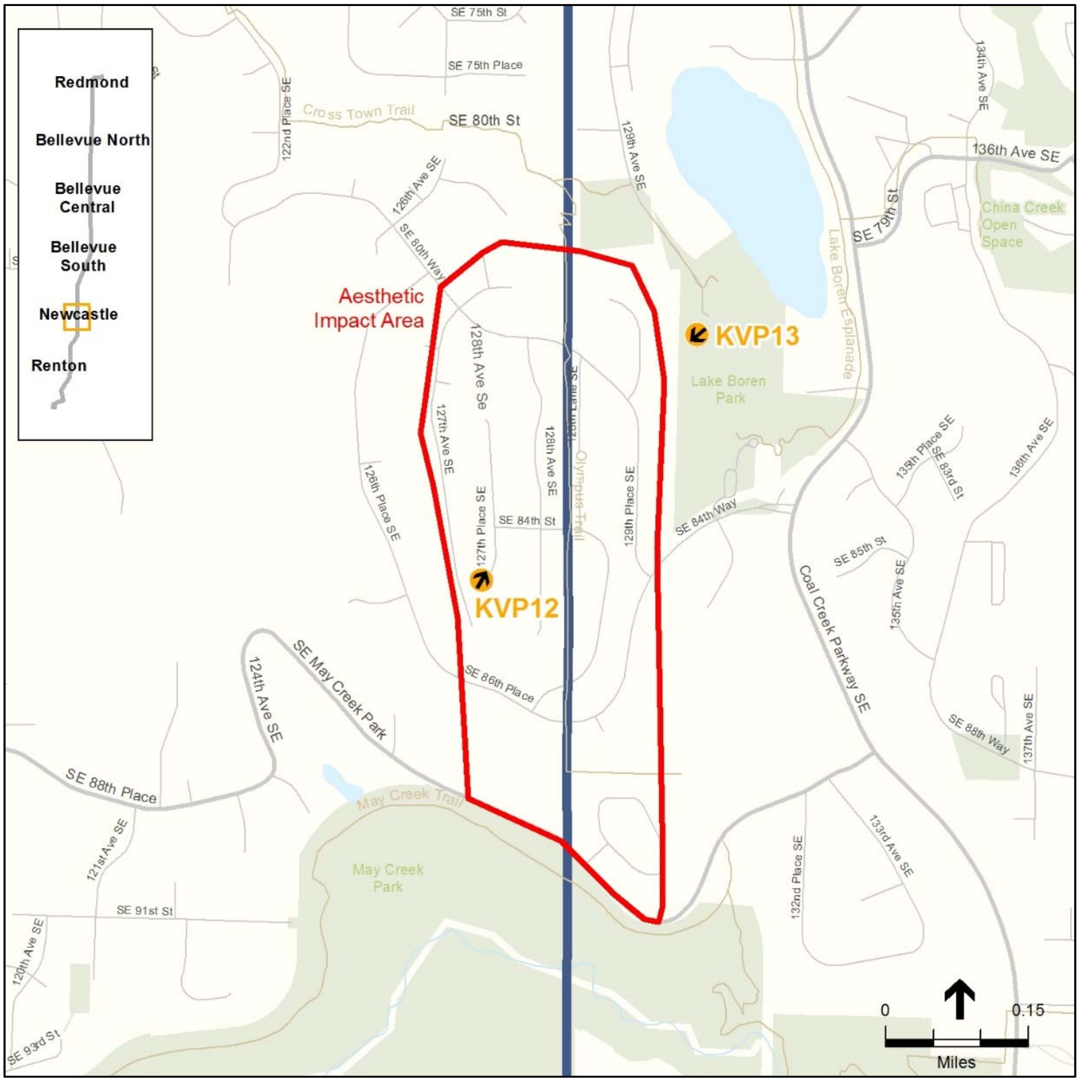


Figure 4.2-16. Aesthetic Impact Area resulting from the Newcastle Segment Option 1 (No Code Variance)

- **Visual Quality of the Aesthetic Environment:** In general, the poles and wires would be more noticeable where the transmission lines are on a ridge with low vegetation (e.g., the portion of the option north of May Creek) than other conditions where the topography and presence of dense, taller tree stands result in the poles and wires being less visible (e.g., in the May Creek ravine). Currently, the existing poles are minimally noticeable north of May Creek because of their height (approximately 55 feet) and placement within the center of the corridor. Under the proposed project, the poles would nearly double in height (to approximately 95 feet), making them more visible from residential streets and less likely to be concealed by vegetation due to their proximity to residences. When coupled with the placement of the line on the top of a ridge, this would result in the poles contrasting more with the surrounding houses and utility infrastructure due to the pronounced prominence of the transmission lines. This would substantially change the residential character of the surrounding neighborhood as the transmission lines would become a defining visual feature of the neighborhood (see Figure 4.2-17, showing KVP 12). Although transmission lines already exist in the corridor, and the new transmission lines would have

DSD 005548

consistent height and form throughout the option, the degree of contrast with the built environment would result in significant adverse impacts to visual quality within the residential portion of Newcastle identified in Figure 4.2-16. Within the May Creek ravine, project-related impacts to the visual quality of the aesthetic environment would be less-than-significant because the topography and presence of dense vegetation would reduce the degree of contrast between the project and the surrounding aesthetic environment. On the pole near Newcastle Way, the pole would be approximately 10 feet taller (above the wire zone) to accommodate proposed cellular equipment. The pole would be below the ridge, but the cell equipment would protrude above it, making it visible from residences on the ridge that currently have little if any view of the transmission line. While no significant impacts would result from this pole due to limited viewer extent (one pole), it would introduce a higher degree of contrast between the project and the existing aesthetic environment than similar poles to the south.

- **Scenic Views:** Most views from the Olympus neighborhood are of the Cascades, the Olympics, and in some places Mount Rainier. Views of the Cascades, Cougar Mountain, and Mount Rainier from this residential area could be impacted, including places with high population density (see Appendix C-1). The degree of scenic view obstruction is expected to be low due to the presence of other obstructions, such as trees and buildings, and the limited number of pole locations. No scenic views from parks, trails, or outdoor recreation facilities would be impacted. Impacts to scenic views would be less-than-significant.
- **Viewer Sensitivity:** Primary viewers are residential viewers and users of Lake Boren Park, Lake Boren Esplanade, May Creek Natural Area (May Creek Park and May Creek Trail), Cross Town Trail, and Olympus Trail. Because the project would be on a ridge, it would be visible by much of the Newcastle population. The highest density of residential viewers in the study area along the Newcastle Segment Option 1 is in the north portion of Newcastle, between Newcastle Way and SE 80th Way (see Appendix C-1). Although viewer sensitivity is lower within the existing corridor than elsewhere in Newcastle, overall viewer sensitivity is high, based on the extent of affected viewers and Newcastle's policies regarding aesthetic impacts from transmission lines. The City of Newcastle Comprehensive Plan protects the scale and character of existing neighborhoods through policies that call for transmission lines to be sited and designed to minimize visual impacts to adjacent land uses (e.g., Policy UT-P10, UT-P14) (City of Newcastle, 2016). From some vantage points, such as from Lake Boren Park, the distance from the lines would diminish the perceptible differences in height and inconsistency with the surrounding built environment (see Figure 4.2-18, showing KVP 13). Within the neighborhoods surrounding the transmission lines, the new transmission lines would become a defining visual feature and significantly impact the visual character of the residential area (see Figure 4.2-17, showing KVP 12). Therefore, the project would be inconsistent with the Newcastle Comprehensive Plan Policy UT-P10 and would result in significant impacts.

Existing Pole Height: ~55 feet

Proposed Pole Height: ~95 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-17. KVP 12, Existing and Proposed Conditions from 8446 128th Avenue SE Looking Northeast (Option 1)

Existing Pole Height: ~50 feet

Proposed Pole Height: ~95 feet

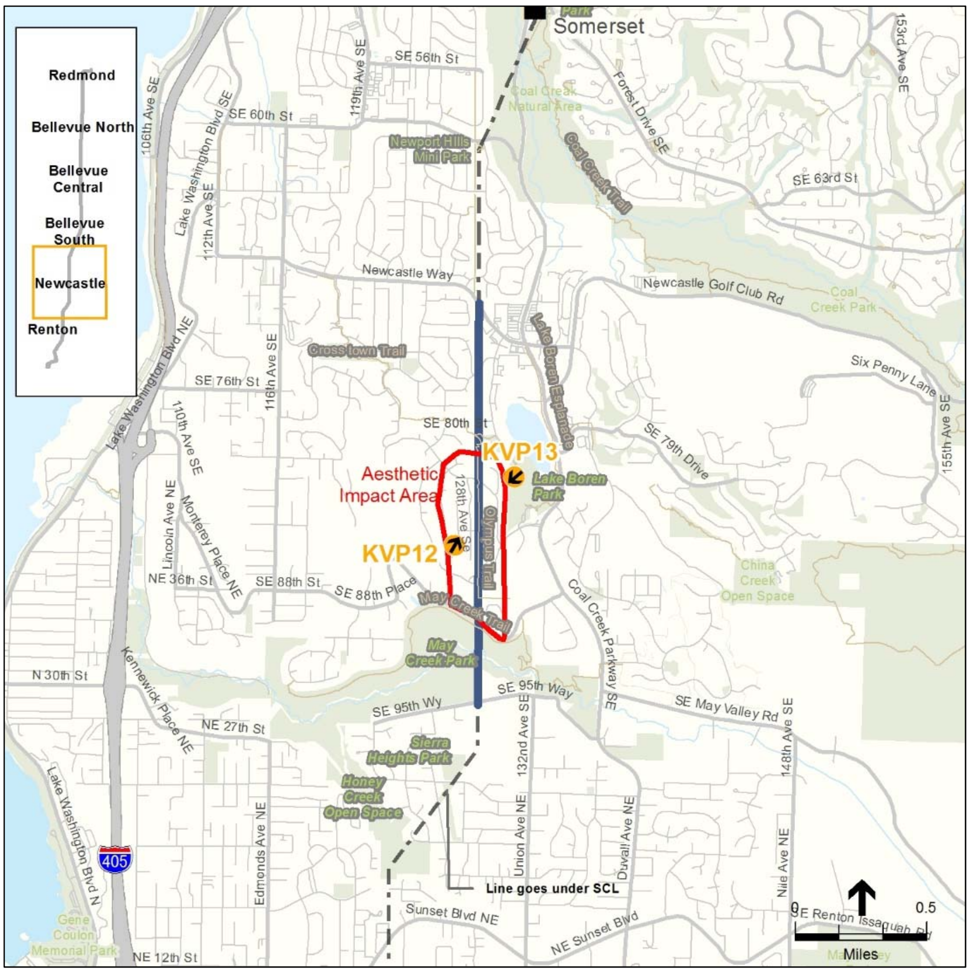
NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-18. KVP 13, Existing and Proposed Conditions from Lake Boren Park Looking Southwest (Option 1)

4.2.5.8 Newcastle Segment – Option 2 (Code Variance)

A code variance would be required for the Newcastle Segment, Option 2. Option 2 would use the same route in the existing corridor as Option 1, but would have a different pole configuration and height, and would be placed more centrally within the corridor. Although this would reduce aesthetic impacts compared to Option 1, Option 2 would result in significant impacts to the aesthetic environment due to the change in neighborhood character.

Impacts to scenic views would be less-than-significant because there would be a low degree of additional view obstruction compared to existing conditions. No scenic views from recreational facilities would be impacted.



- **Visual Quality of the Aesthetic Environment:** The new poles would be approximately 14 feet shorter than those proposed under Option 1 (and approximately 25 feet taller than the existing 55-foot H-frame poles). In addition, approximately half of the new poles would be placed closer to the center of the transmission corridor under Option 2 because the 5-foot setback from the pipeline easement would be waived or reduced by the variance approval. Placement of the poles more centrally within the corridor would reduce the degree of contrast from neighboring residences and roadways because the increased distance between the poles and the houses would make the difference in height between the two structures appear to be less. Although the project would increase the height of the transmission line poles and use larger diameter poles than the existing poles, it would use fewer poles, and would not become a defining feature of the neighborhood in the way Option 1 would (see Figure 4.2-19, showing KVP 12). The project would significantly impact the visual character of the surrounding residential neighborhood because of the increase in pole height and increased prominence of the transmission line within the neighborhood (see Figure 4.2-19, showing KVP 12). The aesthetic impact area would be the same as Option 1 (see Figure 4.2-16), with areas outside of the impact area experiencing less-than-significant impacts (see Figure 4.2-20, showing KVP 13). Within the May Creek ravine, project-related impacts to the visual quality of the aesthetic environment would be less-than-significant because the topography and presence of dense vegetation would reduce the degree of contrast between the project and the surrounding aesthetic environment.

- **Scenic Views:** The potential for impacts to scenic views would be less than under Option 1 because the poles would be shorter. Similar to Option 1, impacts to scenic views would be less-than-significant under Option 2.
- **Viewer Sensitivity:** Viewer sensitivity is the same as under Option 1. Under Option 2, the project would still significantly impact the visual character of the residential area (see Figure 4.2-19, showing KVP 12). Therefore, the project would be inconsistent with the Newcastle Comprehensive Plan policies regarding visual impacts of major utilities.

Existing Pole Height: ~55 feet

Proposed Pole Height: ~85 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-19. KVP 12, Existing and Proposed Conditions from 8446 128th Avenue SE Looking Northeast (Option 2)

Existing Pole Height: ~50 feet

Proposed Pole Height: ~80 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-20. KVP 13, Existing and Proposed Conditions from Lake Boren Park Looking Southwest (Option 2)

4.2.5.9 Renton Segment

Analysis of this segment was revised for the Final EIS to incorporate changes in the pole height and form associated with PSE's Proposed Alignment. Impacts to the scenic views and the aesthetic environment in the Renton Segment would be less-than-significant, as described in the Phase 2 Draft EIS. Overall, impacts to the aesthetic environment from the Renton Segment would be less-than-significant. Although the poles would typically be taller (up to 40 feet taller depending on the pole location and configuration) and larger in diameter than existing poles, the segment would be located entirely within PSE's existing corridor, resulting in low contrast with existing conditions. Although adopted policies address general aesthetic qualities and public views, overall viewer sensitivity is considered low because development in the area has all occurred around the existing transmission lines, and the project would not be inconsistent with policies related to aesthetics and public views. Impacts to the aesthetic environment would be less-than-significant.

Impacts to scenic views would be less-than-significant because the degree of additional obstruction would be minimal compared with existing conditions.

- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would be high as there is little vegetation along the segment, except near Honey Creek and the Cedar

DSD 005556

River. Near the creek and river, the poles would blend with the natural environment because they would have similar or shorter height than the abutting tree stands. Although the corridor width would not change, tree removal would be required, particularly within the Honey Creek ravine. None of the trees in the Cedar River valley would need to be removed because the transmission lines would be well above the tops of trees (as is the case with the existing line), and would not need to be removed under PSE's Vegetation Management Program (The Watershed Company, 2016).

In general, poles are more visible when a transmission line is on a ridge with low vegetation (such as the Liberty Ridge neighborhood), or in areas where it is generally flat and adjacent to a roadway (e.g., Renton Technical College) than other topographic and vegetation conditions (see Figures 4.2-21 and 4.2-22, showing KVPs 14 and 15, respectively). Poles and wires are marginally visible from within ravines (such as the Honey Creek ravine) under existing conditions. This would continue to be the case under the project. Contrast with the built environment would be slightly more than existing conditions because the typical pole heights would range from 5 feet shorter than existing conditions to 40 feet taller, with the tallest poles associated with the double-circuit monopoles south of Honey Creek. Pole diameter would also be larger than existing poles, but the number of poles would be reduced.

Visual clutter would be increased in the area north of Honey Creek and near the Talbot Hill substation. In the 0.29-mile section of the segment that goes past Sierra Heights Elementary School to the end of Sierra Heights Park, there would be four different pole types, resulting in a high degree of contrast due to increased visual clutter (see the Segment Sheet for the Renton Segment in Chapter 2, page 2-33). The portion of the segment that directly crosses Sierra Heights Park would host three different pole types varying in typical height from 50 to 84 feet. Sierra Heights Park already hosts a variety of transmission lines of different heights and forms. Therefore, viewers would be less sensitive to the change in visual clutter produced by the project. The existing SCL transmission line would not need to change to accommodate the project.

In general, visual clutter along the segment would be lessened south of the SCL crossing due to the reduced number of poles.

Near the Talbot Hill substation, there would be a variety of pole types within many views, including double-circuit monopoles and two types of single-circuit pairs. Visual clutter near substations is typical and likely to be expected, and viewer sensitivity is low. Changes to the built environment would be less-than-significant because transmission lines already exist in the corridor; however, they would be replaced with new transmission lines with a different height and form.

Elsewhere along the segment, the height and form would be consistent. The poles in all locations would be taller than the existing poles. The form would also change from an H-frame configuration to a monopole configuration, changing the look of the transmission lines. Some viewers may positively perceive the increased height of the poles because the lines would be moved up and out of their line of sight, while others would not view the change as beneficial.

Overall, impacts to the visual quality of the aesthetic environment would be less-than-significant.

- **Scenic Views:** Areas with the highest density of scenic views are on Talbot Hill, which has low population density. The only public recreation site from which scenic views have the potential to be impacted is along the Cedar River Trail. Changes to the existing corridor are not expected to result in significant impacts. The height and location of the proposed poles and transmission lines would not obscure views of the Cedar River from the trail. Impacts to scenic views would be less-than-significant.

- **Viewer Sensitivity***:* Primary viewers are residential viewers and recreational users of the Cedar River Natural Zone (Cedar River Park and Cedar River Trail), Honey Creek Open Space (including Honey Creek Trail), Philip Arnold Park, Riverview Park, and Sierra Heights Park. These recreational resources are already traversed by a transmission line corridor, so changes to the aesthetics for these viewers would be associated with any vegetation clearing or changes in the height and appearance of the transmission lines. The new poles would be approximately 40 feet taller than existing poles, but the change would not be noticeable from the Cedar River Park, Cedar River Trail, Honey Creek Open Space, Honey Creek Trail, Philip Arnold Park, or Riverview Park due to the distance from common viewpoints, topography, and presence of dense vegetation. The corridor directly crosses Sierra Heights Park. Within the park, the three different new pole types would vary in height from 50 to 84 feet.

  No vegetation clearing would be required where the project crosses the Cedar River Park, Cedar River Trail, or Riverview Park because the topography of the Cedar River valley provides sufficient clearance between the lines and the vegetation below. Figure 4.2-23 (not a KVP) shows the appearance of the existing lines from the Cedar River Trail, as well as the existing pole structure from the trail. The distance between the trail and the pole (approximately 1,000 feet) would make the change in form (from two adjacent wooden H-frame structures to one taller steel monopole) less noticeable. The height of the lines is expected to stay the same. Although the diameter of the wires would be slightly larger, it is not expected that the difference would be perceivable from the trail (Figure 4.2-23) (also see Appendix C-2, which includes a figure that compares the diameters of the existing wire and the new wires in the proposed project). The City of Renton Comprehensive Plan protects natural forms, vegetation, distinctive stands of trees, natural slopes, and scenic areas that "contribute to the City's identity, preserve property values, and visually define the community neighborhoods" (City of Renton, 2015). Changes to the appearance of those features would be minor because an existing corridor would be used. The City of Renton also has comprehensive plan policies stating that change should be accommodated "in a way that maintains Renton's livability and natural beauty" (City of Renton, 2015). Because the project would utilize an existing transmission line corridor, the project would be consistent with the plan. In general, viewer sensitivity along this segment is moderate along the Cedar River Trail and low elsewhere.

Existing Pole Height: ~55 feet

Proposed Pole Height: ~90 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-21. KVP 14, Existing and Proposed Conditions from 1026 Monroe Avenue NE Looking North

Existing Pole Height: ~50-70 feet

Proposed Pole Height: ~75 feet

NOTE: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography and other factors. Pole finishes could vary throughout the project corridor and have not been selected at this point.
Source: Power Engineers, 2017

Figure 4.2-22. KVP 15, Existing and Proposed Conditions from Glennwood Court SE Looking North

View of the existing transmission lines from the Cedar River Trail

View of the existing pole structure from the Cedar River Trail

Figure 4.2-23. Existing Views from the Cedar River Trail

4.2.6 Mitigation Measures

For scenic views and the aesthetic environment, regulations and comprehensive plan policies were reviewed to identify mitigation measures. Mitigation measures specified by code would be required, whereas mitigation measures based on comprehensive plan policies would be at the discretion of the applicant to adopt or the local jurisdictions to impose as a condition of project approval. Each jurisdiction's discretionary decision-making will be informed by the analysis and comparison of the options set forth above. All mitigation measures would be determined during the permitting process, but may be applied prior to construction, during construction, or during operation of the project. For instance, some mitigation measures (such as co-locating utilities with existing utility corridors whenever possible) have already been incorporated into the project design. Alternatively, PSE may make commitments to certain measures (such as using landscaping to screen above-ground utility facilities to diminish visual impacts) but may not actually execute them until the project has been constructed.

Section 4.2.6.1 details the regulatory requirements that PSE would need to meet. Section 4.2.6.2 describes potential mitigation measures that could be used to reduce impacts. Section 4.2.6.3 provides information to assist decision-makers with selection of pole finishes based on different background colors. Section 4.2.6.4 describes considerations that would need to be taken into account if placing the transmission lines underground is used as a mitigation measure.

4.2.6.1 Regulatory Requirements

Local regulations would require some mitigation of project-related impacts to the aesthetic environment, and would be implemented during the design stage (prior to construction) and as long-term mitigation strategies (e.g., maintenance of screening vegetation). The applicable regulations are listed below based on the stage when they would be applied. Requirements are summarized below by jurisdiction and would be required to be incorporated into the design prior to construction. (Note: The Cities of Redmond and Renton do not have regulations that directly address mitigation of impacts to scenic views or the aesthetic environment that would be produced by this project.)

Within the City of Bellevue, the project (other than the conductors) would need to be sight-screened through landscaping and fencing (Bellevue City Code 20.20.255). In the City of Newcastle, the project would need to be designed and operated to minimize impacts to surrounding uses, the environment, and the city (Newcastle Municipal Code [NMC] 18.44.052.C.1). PSE would also need to work with the City of Newcastle to adopt any conditions imposed relating to the location, development, design, use, or operation of a utility facility to mitigate environmental, public safety, or other identifiable impacts. Mitigation measures may include, but are not limited to, natural features that may serve as buffers, or other site design elements such as fencing and site landscaping (NMC 18.44.052.D).

4.2.6.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on City of Bellevue, City of Newcastle, and City of Renton's comprehensive plans. (Note: plans and policies of the City of Redmond do not directly address mitigation of impacts to scenic views or the aesthetic environment that would be produced by this project. However, general policies for all communities support application of the measures listed below.) The applicable policies are presented based on the stage at which they would be applied. Additional mitigation measures are also proposed by the EIS Consultant Team based on their ability to reduce contrast.

Prior to Construction

- Ensure siting and location of transmission facilities is accomplished in a manner that minimizes adverse impacts on the environment and adjacent land uses (City of Renton Plan Policy U-72).
- Consolidate utility facilities and co-locate multiple utilities (City of Newcastle Plan Policy UT-P3).
- Implement new and expanded transmission and substation facilities in such a manner that they are compatible and consistent with the local context and the land use pattern established in the Comprehensive Plan (City of Bellevue Plan Policy UT-95).
- Design, construct, and maintain facilities to minimize their impact on surrounding neighborhoods (City of Bellevue Plan Policy UT-8).
- Conduct a siting analysis for new facilities and expanded facilities at sensitive sites (areas in close proximity to residentially-zoned districts) (City of Bellevue Plan Policy UT-96).
- New development should install a dense visual vegetative screen along Richards Road (City of Bellevue Plan Policy S-RV-31).
- Consider neighborhood character in planting appropriate varieties and trimming tree limbs around overhead lines (City of Newcastle Plan Policy UT-P9).
- Design overhead transmission lines in a manner that is aesthetically compatible with surrounding land uses (City of Newcastle Plan Policy UT-P10). This could include design measures such as changes to pole height, spacing, location, or color.
- Minimize visual and other impacts of transmission towers and overhead transmission lines on adjacent land uses through careful siting and design (City of Newcastle Plan Policy UT-P14).
- Design transmission structures to minimize aesthetic impacts appropriate to the immediate surrounding area whenever practical (City of Newcastle Plan Policy UT-P16).
- Underground sections of the transmission lines where unavoidable significant impacts to scenic views or the aesthetic environment would otherwise occur.
- Position poles and adjust pole height to minimize impacts to the greatest extent possible. In Newcastle, a variance from the setback requirements would allow the poles to be positioned farther away from the houses. This would also allow for shorter poles.
- Specify poles with an aesthetic treatment (such as paint or a self-weathering finish) to reduce contrast with the surrounding environment (see Section 4.2.6.3 below).

During Construction

- Retain or replace trees to the greatest extent possible.

During Operation

- Limit disturbance to vegetation within major utility transmission corridors to what is necessary for the safety and maintenance of transmission facilities (City of Newcastle Plan Policy UT-P8). In areas where vegetation disturbance is unavoidable, replant with vegetation that would be compatible with vegetation clearance requirements, preventing future vegetation removal or maintenance in the future.

- Use landscape plantings to screen or improve the appearance of areas surrounding above-ground utility facilities and to diminish visual impacts vegetation clearing in the corridor (City of Newcastle Plan Policy UT-P20).
- Require the reinstalled telecommunications facilities to be in the same approximate locations as they were previously and to comply with the requirements of Chapter 80.54 RCW, Chapter 480-54 WAC, and local jurisdiction regulations.

4.2.6.3 Considerations for Selecting Pole Finishes

PSE's Proposed Alignment would include poles that could have various finishes, including galvanized (light gray), self-weathering (dark reddish brown), or painted (powder coat of any color). Finishes could be specified by location to better blend with the surrounding environment. Table 4.2-3 provides information to assist decision-makers with selection of pole finishes based on different background colors.

Background color is not uniform, so it may be helpful to employ a professional with experience in evaluating visual character, such as a landscape architect or urban designer, to determine the dominant background color. Background color and the color of the surrounding features will also vary depending to the viewpoint considered. When determining appropriate pole finishes, decision-makers should consider a variety of viewpoints along the segment and locations of sensitive viewers for which they wish to reduce contrast.

PSE has indicated that its preferred finish is the self-weathering finish because it requires the least maintenance. This finish has the least contrast of the three finishes in areas with trees, which are common along much of the corridor.

In some areas, where there are few trees as tall as the transmission line poles (and therefore the poles would be mostly viewed against the sky), or where the background is otherwise light in color, galvanized poles could have lower contrast than poles with self-weathering finish.

In some instances, such as commercial districts with distinctive character, a painted pole as an accent color may be desired, to work with an overall urban design theme or similar objective. Depending on the paint color selected, it could either reduce or increase contrast. Use of a painted pole could reduce contrast if a site-specific, natural color were selected. However, it is more likely that a painted pole would increase contrast. In areas where viewer sensitivity is low, a painted pole in a contrasting color could be used to accentuate the existing built character (e.g., if sited in a district with set design standards and painted an appropriate color). An example of this is shown in Figure 4.2-24, where a transmission pole was painted the same color as one of the neighboring high school's school colors, along a busy road within a commercial district.

Table 4.2-3. Considerations for Selecting Pole Finishing

Consideration	Galvanized Steel Pole Finish	Self-weathering Pole Finish	Painted Poles
Background Color			
Darker due to presence of vegetation or development	Produces more contrast.	Produces less contrast.	Can produce more or less contrast depending on the color selected.
Lighter due to absence of vegetation or development	Produces less contrast.	Produces more contrast.	Can produce more or less contrast depending on the color selected.
Color of Surrounding Features			
Surrounded by taller, darker features	Produces more contrast.	Produces less contrast.	Can produce more or less contrast depending on the color selected.
Surrounded by no features; light features; or shorter, darker features	Produces less contrast.	Produces more contrast.	Can produce more or less contrast depending on the color selected.
Surrounding Land Use			
Surrounded by a natural landscape	Can produce more or less contrast depending on background color and color of surrounding features.	Can produce more or less contrast depending on background color and color of surrounding features.	Can produce more or less contrast depending on the color selected.
Surrounded by a residential neighborhood	Can produce more or less contrast depending on background color and color of surrounding features.	Can produce more or less contrast depending on background color and color of surrounding features.	Can produce more or less contrast depending on the color selected.
Part of district with set design standards	Can produce more or less contrast depending on background color and color of surrounding features.	Can produce more or less contrast depending on background color and color of surrounding features.	Can be a defining feature that accentuates existing district character depending on color selected.

Figure 4.2-24. Example of a Painted 115 kV Transmission Line Pole in Bellevue (near the intersection of NE 24th Street and Bel-Red Road)

4.2.6.4 Considerations for Choosing to Underground the Transmission Lines

Although proposed as a potential mitigation measure, installing the transmission lines underground involves several technical challenges, as well as the potential for other impacts to the environment.

An underground line would require a new corridor to avoid co-location with the Olympic Pipeline system (Power Engineers, 2014). This new corridor would need to be in a street or on other public or private property that PSE would have to obtain rights to use. An agency requiring an underground segment would need to coordinate with PSE on design, including finding places where a transition point can be made to the overhead lines at each end. PSE has indicated that their tariff (as described in Section 2.2 of the Phase 2 Draft EIS) requires that a requesting party pay the additional costs for design, construction, and operation of the underground line. For portions in public right-of-way, utility conflicts must be evaluated and can contribute to substantial costs, construction duration, and technical challenges, including effects of stray current and corrosion.

There are aesthetic and other considerations for design of underground transmission lines. Trees cannot be planted on top of underground lines because heat from the lines can damage tree roots, and roots can inhibit access to the lines if needed for repair. Construction could require removal of trees whose roots would be damaged. Transition stations, where the lines change from overhead to underground, are described in Section 11.6.3.8.1 of the Phase 1 Draft EIS. Technical requirements make these structures more massive and encumbered with equipment than typical overhead poles. In addition, underground access *vaults* about 25 feet in length would be needed every quarter of a mile, and cannot have plantings or structures near or over them that would obstruct access to them.

The Energize Eastside project has an objective of being developed in time to address an anticipated capacity deficiency in the near future. Several factors related to undergrounding a portion of the line could cause substantial delay in completing the project. Developing a design could take several months. Gaining permission to cross private property, if necessary, could require legal action that would delay construction. Materials for underground lines are different from those for overhead lines and can have lead times of many months for delivery. Construction of an underground segment also takes longer than an overhead segment. Given all these factors, construction of an underground segment could lag behind the rest of the project by many months to years. One potential way to address the timing issues would be to allow the overhead lines to be built on the condition that they be replaced at a later date with underground lines. This would add to construction cost and construction impacts.

Construction costs (not including right-of-way costs) for underground installation of a 230 kV transmission line for the Energize Eastside project were estimated to be approximately $23 million to $28 million per mile, as compared to $3 million to $4 million per mile for an overhead line (Power Engineers, 2014). This would be based on PSE's tariff, which PSE has indicated places the burden of any cost above that of the most economical design on the requesting party.

4.3 WATER RESOURCES

This section provides a project-level analysis of potential impacts on water resources in the study area including streams, rivers, wetlands, and groundwater. The study area for water resources includes areas within about 300 feet of the project. This encompasses the area where water quality and critical areas permits would be required. It also allows for consideration of impacts such as sedimentation or contamination of off-site water resources. The major water resources in the study area are shown in Figure 4.3-1. More detailed maps of the streams, rivers, and wetlands in the study area are included in Section 4.3.5. Impacts on fish and aquatic resources are discussed in Section 4.4, *Plants and Animals*.

Key Changes from the Phase 2 Draft EIS

- Updated the analysis to reflect PSE's Proposed Alignment.
- Added analysis of the new Newcastle Option 2 route.
- Revised information for the Richards Creek substation site based on new site data.
- Revised and clarified some of the mitigation measures, based on comments received.
- Revised the analysis of potential impacts on water resources based on refined design details, such as pole placement.
- Made minor clarifications throughout based on comments received (such as information on wetland and stream categories).

Water resources within the study area were assessed primarily using the critical areas delineation reports for the Redmond, Bellevue North, Bellevue Central, and Renton Segments prepared by The Watershed Company for PSE for the Energize Eastside project (The Watershed Company, 2016, 2017). Water resources information for the Richards Creek substation site and the Bellevue South and Newcastle Segments are based on permit applications submitted to the cities of Bellevue and Newcastle (PSE, 2017b and 2017c).

Additional sources of information on water resources in the study area consulted to describe the affected environment include the following:

- Washington State Department of Ecology (Ecology) Water Quality Assessment and *303(d) List*.
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data.
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil maps.
- Washington Department of Fish and Wildlife (WDFW) interactive mapping programs (Priority Habitats and Species [PHS] on the Web and SalmonScape) (WDFW, 2016, 2017).
- Washington Department of Natural Resources (WDNR) Forest Practices Application Review System.
- King County's GIS mapping website (iMAP).
- City of Bellevue, Storm and Surface Water System Plan (City of Bellevue, 2016a).
- Critical areas GIS datasets and mapping websites and aerial imagery for the study area.

The resource protection policies and requirements of the municipalities within the study area, identified in the Phase 1 Draft EIS (Chapter 5, Water Resources), were reviewed for completeness and current relevance. Information sources are primarily from the appropriate community comprehensive plans, and regulations and codes for critical areas and shoreline management.

Source: King County, 2015; Ecology, 2014; FEMA, 2016; Kirkland, 2015; Redmond, 2015; Sammamish, 2015; Issaquah, 2015; Newcastle, 2015; Renton, 2015; Bellevue, 2015.

Figure 4.3-1. Water Resources in the Study Area

4.3.1 Relevant Plans, Policies, and Regulations

Water resources in the study area are managed by the City of Bellevue, City of Newcastle, City of Redmond, and City of Renton. Although the study area includes unincorporated land within the jurisdiction of King County, no water resources are in such areas. Federal and state regulations also apply. The applicable plans, policies, and regulations are described generally in the Phase 1 Draft EIS (see Section 5.2). No new state or federal regulations have been adopted since publication of the Phase 1 Draft EIS. The City of Newcastle adopted an update to its critical areas regulations in May 2016 (Newcastle Municipal Code Chapter 18.24).

Methods for Studying the Affected Environment

The EIS Consultant Team collected maps and other information available from the Partner Cities, King County, and Washington State to describe existing water resources. Technical reports for critical areas were reviewed to characterize resources in the study area.

Any impacts on streams or wetlands must comply with critical areas ordinances of the Partner Cities and King County. Critical areas ordinances typically restrict activities in streams and wetlands, require buffers around streams and wetlands to protect their functions and values, and prescribe mitigation for impacts. Appendix D summarizes the critical area requirements for the Partner Cities and King County.

The City of Redmond and the City of Renton have designated *wellhead protection areas* to protect aquifers that provide their drinking water. The wellhead protection requirements are similar for both cities and generally restrict the type of activity or land use that can occur in a wellhead protection area and place limits on the type and amount of *hazardous materials* that can be stored in those areas (RZC 21.64.050 and RMC 4-3-050). The City of Bellevue and the City of Newcastle do not have critical aquifer recharge or wellhead protection areas.

4.3.2 Existing Water Resources in the Study Area

Existing water resources in the study area include streams and rivers, wetlands, and groundwater, as described below by project component for PSE's Proposed Alignment. Some of the streams and the Cedar River have Federal Emergency Management Agency designated floodplains. However, any poles placed in the floodplain would not obstruct flood flows or alter drainage, so impacts on floodplains are not described further.

4.3.2.1 Streams and Rivers

The study area includes several streams and the Cedar River. Most major streams, including Kelsey Creek, Coal Creek, and May Creek, flow generally from east to west and drain to Lake Washington. Streams in the Redmond and Bellevue North area, including Willows Creek, drain to Lake Sammamish or the Sammamish River. Streams in the study area fall under the jurisdiction of the City of Bellevue, City of Newcastle, City of Redmond, or City of Renton. Kelsey Creek in the City of Bellevue and Cedar River in the City of Renton are Shorelines of the State and regulated under each jurisdiction's Shoreline Master Program (see Section 4.1 and Appendix B-3 for additional discussion of the Shoreline Master Programs).

Table 4.3-1 summarizes the streams within the existing corridor for PSE's Proposed Alignment, including information on the stream classification and required stream buffer according to the Partner Cities' critical areas requirements (see Appendix D). Information about stream crossings is based on data collected by The Watershed Company (2016 and 2017), as well as the permit applications for

Bellevue and Newcastle (PSE, 2017b, 2017c). The table uses the same naming convention as The Watershed Company reports for unnamed tributaries. Additional streams may be identified as part of the permitting process. For all streams, PSE would comply with mitigation requirements in accordance with applicable critical area regulations.

Table 4.3-1. Streams in the Study Area

Stream	Stream Type[1]	Required Buffer (feet)
Richards Creek Substation Site – Two streams are on or adjacent to the Richards Creek substation site. Stream A is a seasonal stream that flows through Wetland C and into Wetland A. Stream C flows along the west edge of the site and is crossed by the existing access road.		
Stream A	Type N	50
Stream C	Type F	100
Redmond Segment – The transmission line crosses Willows Creek and several of its tributaries at the north end of the Redmond Segment. Willows Creek flows east to the Sammamish River. (Note: PSE has proposed a project to improve flow and habitat conditions in Willows Creek, south of the Sammamish substation.)		
Willows Creek (three crossings)	II	150
Three Willows Creek tributaries	II (fish access blocked by culverts)	150
Other Willows Creek tributaries	III	100
Bellevue North Segment – The transmission line crosses one unnamed tributary of Valley Creek.		
Unnamed tributary of Valley Creek	Type N	50
Bellevue Central Segment, Revised Existing Corridor Option - The Bellevue Central Segment is located mostly in the Kelsey Creek drainage, with a small portion in the Richards Creek drainage. Richards Creek flows into Kelsey Creek just south of the Lake Hills Connector. Kelsey Creek is a Shoreline of the State, but this segment is not located in the shoreline jurisdiction.		
Kelsey Creek	Type F	100
Kelsey Creek tributaries EB02 to EB05, EB10, EB11	Type F	25
Kelsey Creek tributaries EB9, EB12 to EB14	Type N	50
East Creek	Type F	100
Other Richards Creek tributaries	Type F	100

Stream	Stream Type[1]	Required Buffer (feet)
Bellevue South Segment, Revised Willow 1 Option – The Bellevue South Segment crosses the East Creek, Sunset Creek, and Coal Creek drainages.		
Unnamed streams MB01, MB03	Type N	50
Unnamed stream MB01	Type N	25
Unnamed streams JB02, JB04, JB05 (Coal Creek), MB02	Type F	100
Newcastle Segment – The Newcastle Segment crosses May Creek and a small seasonal drainage that flows to Lake Boren.		
Unnamed streams MN01, MB01	Type Ns	25
May Creek	Type F	100
Renton Segment – The Renton Segment crosses four stream reaches, including the Cedar River, Honey Creek, Ginger Creek, and an unnamed tributary to the Cedar River. The Cedar River is a Shoreline of the State.		
Cedar River	Type S, Shoreline	100
Honey Creek	Type F	115
Ginger Creek	Type Np	75
Unnamed tributary of Cedar River	Type Ns	50

[1] Stream types are based on fish use and are classified by the Partner Cities in their critical areas ordinances. Redmond classifies streams as Class I, II, II, and IV. The other cities use the Washington Department of Natural Resources system of Type S, F, N, and O. See Appendix D for additional information on stream types and buffer requirements.

Source: The Watershed Company, 2016 and 2017.

4.3.2.2 Wetlands

Wetlands in the study area were delineated as part of the critical areas assessments conducted by The Watershed Company in 2016 and 2017, as well as the permit applications for Bellevue and Newcastle (PSE, 2017b, 2017c). The Watershed Company delineated wetlands generally 25 feet on either side of the existing corridor. In some areas, a wider study area was used based on conditions at the site.

Table 4.3-2 summarizes the wetlands within PSE’s Proposed Alignment, including information on the wetland classification and required wetland buffer according to the Partner Cities’ critical areas requirements (Appendix D). Information in the table is based on data collected by The Watershed Company (2016 and 2017), as well as the permit applications for Bellevue and Newcastle (PSE, 2017b, 2017c). The table uses the same naming convention for wetlands as The Watershed Company reports. Note that the 2017 report changed the names of the wetlands at Richards Creek; the table shows the 2017 name and notes the former name in parenthesis. Additional wetlands may be identified as part of the permitting process. For all wetlands, PSE would comply with mitigation requirements in accordance with applicable critical area regulations.

Table 4.3-2. Wetlands in the Study Area

Wetland	Wetland Category[1]	Required Buffer (feet)
Richards Creek Substation – Five wetlands are on or adjacent to the Richards Creek substation site[3].		
Wetland A (formerly Wetland BC)	Category III	110
Wetland B (formerly Wetland E)	Category III	60
Wetland C (formerly Wetland A)	Category III	110
Wetland D (formerly Wetland FG)	Category II	110
Wetland H (formerly Wetland JB01)	Category II	110
Redmond Segment – Wetlands in the Redmond Segment are all north of Redmond Way. The wetlands are adjacent to Willows Creek and several of its tributary streams, although wetland hydrology is provided primarily by groundwater seeps.		
Wetland ARDE8 (Sammamish Substation)	Category II	300
Wetlands CR01, CR02, CR03, CR04	Category III	150
Bellevue North Segment – Two wetlands were identified in the Bellevue North Segment. One is adjacent to Valley Creek, between Bellevue Golf Course and Bridle Trails State Park. The other wetland is near the south end of the segment, adjacent to SR 520, and is primarily supported by groundwater seeps.		
Wetland A (Overlake Farms)	Category III	60
CB01	Category III	60
Bellevue Central Segment, Revised Existing Corridor Option – Twenty-three wetlands were identified along the Existing Corridor Option, including a large wetland complex along both sides of the Lake Hills Connector roadway. The ten wetlands north of the Lake Hills Connector are small, disturbed wetlands, frequently associated with small streams and typically supported by groundwater seeps. Most of the wetlands south of the Lake Hills Connector are small, disturbed wetlands in depressions, swales, or breaks in slopes; some are associated with small stream channels in the area.		
Wetlands EB17, BC, FG	Category III	110
Wetlands EB01, EB02, EB03, EB04, EB06, EB08, EB09, EB10, EB13, EB15, EB16, EB19, EB20, EE	Category III	60
Wetlands EB05, EB11, EB12	Category IV	40
Wetlands EB07, EB14, EB18	Category IV	--[2]

Wetland	Wetland Category[1]	Required Buffer (feet)
Bellevue South Segment, Revised Willow 1 Option – Thirteen wetlands were identified along the Bellevue South Segment. These wetlands are associated with small streams crossing the existing corridor, as well as several larger wetland complexes associated with East and Coal creeks.		
Wetland JB08	Category III	110
Wetland MB01	Category III	60
Wetlands MB04, JB04, A (Somerset), D (Somerset), E (Somerset)	Category IV	40
Wetlands JB02, JB03, JB05, MB02, MB03, C (Somerset)	Category IV	--[2]
Newcastle Segment – Two small wetlands were identified in the Newcastle Segment. One is a depressional wetland west of 129th Avenue SE and is supported by groundwater. The other is north of SE 95th Way and is supported by groundwater and surface water.		
Wetland MN01	Category III	60
Wetland MN02	Category III	60
Renton Segment – One wetland was delineated in the Renton Segment, near its south end. It is primarily supported by groundwater, supplemented by surface water and precipitation.		
Wetland NR01	Category III	100

[1] Wetlands were rated using either Ecology's 2014 Wetland Rating System (Hruby, 2014) or the 2004 rating system (Hruby, 2004). The categories are defined by the Partner Cities in their critical areas ordinances. See Appendix D for additional information on wetland categories.

[2] Category IV wetlands less than 2,500 square feet are not regulated by the City of Bellevue.

[3] For this Final EIS, the wetland descriptions have been updated based on the delineation report prepared by The Watershed Company in June 2017. The delineation report used different names for the wetlands than were used for the 2016 reconnaissance-level report.

Source: The Watershed Company, 2016 and 2017.

DSD 005574

4.3.2.3 Groundwater

Geotechnical studies found groundwater along the existing corridor at depths ranging from less than 10 feet to approximately 60 feet (GeoEngineers, 2016). Groundwater was found at or near the surface on the Redmond Segment in the wetland area south of the Sammamish substation and in the vicinity of the Richards Creek substation.

Within the study area, Redmond and Renton utilize groundwater for a portion of their water supply. The north end of the corridor is within Redmond's Wellhead Protection Zone 4 (RZC 21.64.050). Development within Wellhead Protection Zone 4 must comply with BMPs for water quality and quantity approved by Redmond's Technical Committee (RZC 21.64.050D.4.b). The south end of the corridor is in Zone 2 of the City of Renton's Wellhead Protection Area (RMC 4-3-050). The City of Renton regulates the storage, handling, treatment, use, or production of hazardous materials in this zone. Construction within Zone 2 must comply with additional construction requirements in the City of Renton Municipal Code 4-4-030.C8. The proposed transmission line is not in a King County Groundwater Management Area (King County, 2016). Bellevue maintains four wells used for emergency supply. These wells are all located east of 148th Avenue NE and would not be affected by the transmission line (City of Bellevue, 2016b). Bellevue also has several other wells that are held in reserve for emergency use. These wells are also well outside the transmission line corridor.

4.3.3 Long-term (Operation) Impacts Considered

Potential long-term impacts on water resources include increased stormwater runoff from new impervious surfaces or permanently cleared areas, soil compaction that could reduce groundwater infiltration, contamination of surface water or groundwater from hazardous materials, and loss of stream function or wetland or buffer acreage and function. The scale and proximity of water resources determined the intensity of potential impacts. The analysis considers potential mitigation measures to minimize or eliminate project impacts on water resources. For this analysis, the magnitude of project-related impacts is classified as being either less-than-significant or significant, as described below.

- **Less-than-Significant** - Impacts on water resources are considered less-than-significant if project activities would:
  - Cause minor permanent alterations to or disturbances of water resources;
  - Allow minimization or full mitigation of impacts;
  - Be in compliance with permit requirements; or
  - Be largely avoided by the implementation of BMPs.

  This would also include moderate and temporary changes in water quality conditions in adjacent water bodies or groundwater.

Methods for Analyzing Long-term Impacts

The analysis of potential long-term or operational impacts on water resources in the study area is based primarily on long-term or ongoing activities, such as vegetation management, facility maintenance, and other potential ground- or water-disturbing events that would occur during operation of the project. The analysis also includes the potential effects of permanent changes in the study area on adjacent water resources. The analysis considers stormwater runoff from impervious and/or disturbed surfaces, leaks or spills from heavy equipment needed for corridor maintenance activities, and the potential use of chemicals for invasive plant species management.

- **Significant** – Impacts on water resources are considered significant where project activities cannot be reduced through mitigation and would cause any of the following:
    - Permanent or long-term alteration of aquatic habitat;
    - Adverse changes to the quality or quantity of surface water or groundwater resources; or
    - Long-term impairment of the ecological functions of supporting fish, wildlife, or wetland plant species in the study area.

4.3.4 Long-term Impacts: No Action Alternative

Under the No Action Alternative, PSE's existing maintenance activities and programs would continue as described in Chapter 2, with a potential for only periodic and small-scale impacts on water resources. Environmental requirements regarding the protection of these resources would apply to PSE's activities. Activities under the No Action Alternative would be limited in scale and frequency, typically consisting of maintenance of the transmission facilities, such as pole replacement and periodic vegetation maintenance activities along the existing transmission line corridor. Any pole replacement would occur in place and with similar poles. Vegetation maintenance activities would include vegetation removal, but would not typically require ground clearing that would expose soils and increase erosion. Therefore, nearby water resource features (rivers, streams, and wetlands) would not be affected. None of these activities would have a significant impact on stormwater runoff, surface water quality or quantity, or groundwater.

4.3.5 Long-term Impacts: PSE's Proposed Alignment

4.3.5.1 Impacts Common to all Components

Similar to the analysis presented in the Phase 2 Draft EIS, in general, long-term impacts on water resources would be less-than-significant under PSE's Proposed Alignment. All impacts would be minor and could be fully mitigated through compliance with applicable regulations and implementation of BMPs. The types of impacts associated with the transmission line and poles would be similar for all segments.

The installation of poles, permanent access roads, or other transmission facilities in wetlands, streams, or their buffers could lead to a loss of acreage or function. PSE has the flexibility to move the poles by up to 25 feet in either direction along the corridor and would not place new poles directly in streams. Similarly, PSE would avoid locating poles in wetlands to the extent feasible. However, in some places it may not be possible to avoid putting new poles in wetlands or wetland buffers. PSE would not locate permanent access roads in wetlands. Any poles in wetlands or buffers would require compliance with the Partner Cities' critical areas ordinance, which require avoidance and mitigation. Placement of overhead lines crossing the Cedar River would require compliance with the shoreline management ordinance. The size of disturbance and the permanent reduction in wetland or buffer acreage would be small (generally less than 25 square feet per pole). In some locations, replacement poles may require larger footings than the existing poles, resulting in a small net increase in disturbance within wetland buffers. The impacts would be minor and could be fully mitigated through compliance with applicable regulations. Therefore, impacts would be less-than-significant. Impacts from vegetation clearing in floodplains, wetlands, and in buffers for wetlands and streams are described in more detail in Section 4.4, *Plants and Animals*.

The new 230 kV transmission lines would require tree removal along the existing corridor as described in Section 4.4.1.1, *Plants and Animals.* PSE's vegetation management plan (described in detail in Section 4.4.1.1) would prevent tall trees and noxious weeds from growing in the new and existing corridors. Low vegetation would be allowed to grow in the corridor, and there would be no areas of exposed soil following construction. Therefore, erosion and sedimentation would not increase, and no long-term impacts on water quality are expected; impacts would be less-than-significant.

Permanent access roads for the maintenance of poles and transmission lines (and the access road to the new substation, as described below) would create increased pollution-generating impervious surfaces. Runoff from these surfaces could affect water quality; however, PSE will rely on existing roads to access the corridor to the extent possible, and any new permanent roads would be short segments connecting to existing roads. New roads would include stormwater treatment systems that meet state and local requirements. Therefore, impacts of these roads on stormwater runoff and water quality would be less-than-significant.

Maintenance of poles would be limited to regular upkeep and replacement. Poles would be replaced in the same location with a similar type of pole. Access roads to poles and transmission lines would also be maintained. These maintenance activities would likely include grading and pavement repair, which would comply with applicable regulations. Therefore, they would have a less-than-significant impact on water resources.

The presence of maintenance vehicles and equipment in the vicinity of streams and wetlands could result in accidental spills of fuel, oil, hydraulic fluid, and other chemicals. These fluids could reach wetlands, streams, or groundwater if spills are not controlled. Maintenance contractors would be required to develop *spill prevention and control plans* prior to issuance of the clearing and grading permit, that would be implemented to minimize impacts, so these impacts would be less-than-significant.

Once installed, poles would not affect stormwater runoff, groundwater infiltration, or shallow groundwater flow. The new poles would be steel and would not generate substances that could contaminate surface or groundwater. Where old poles treated with a wood preservative are removed and replaced with steel poles, a potential source of groundwater and water contamination would be removed.

The completed transmission line would not generate any pollutants that would affect existing Ecology 303(d) listings for streams and rivers along the new and existing corridors. The project would not generate sediment that would increase *turbidity*. Tree removal in riparian areas could increase stream temperatures and affect 303(d) listings. Avoiding tree removal by pruning or topping trees in compliance with critical areas regulations would help maintain shading and reduce temperature increases.

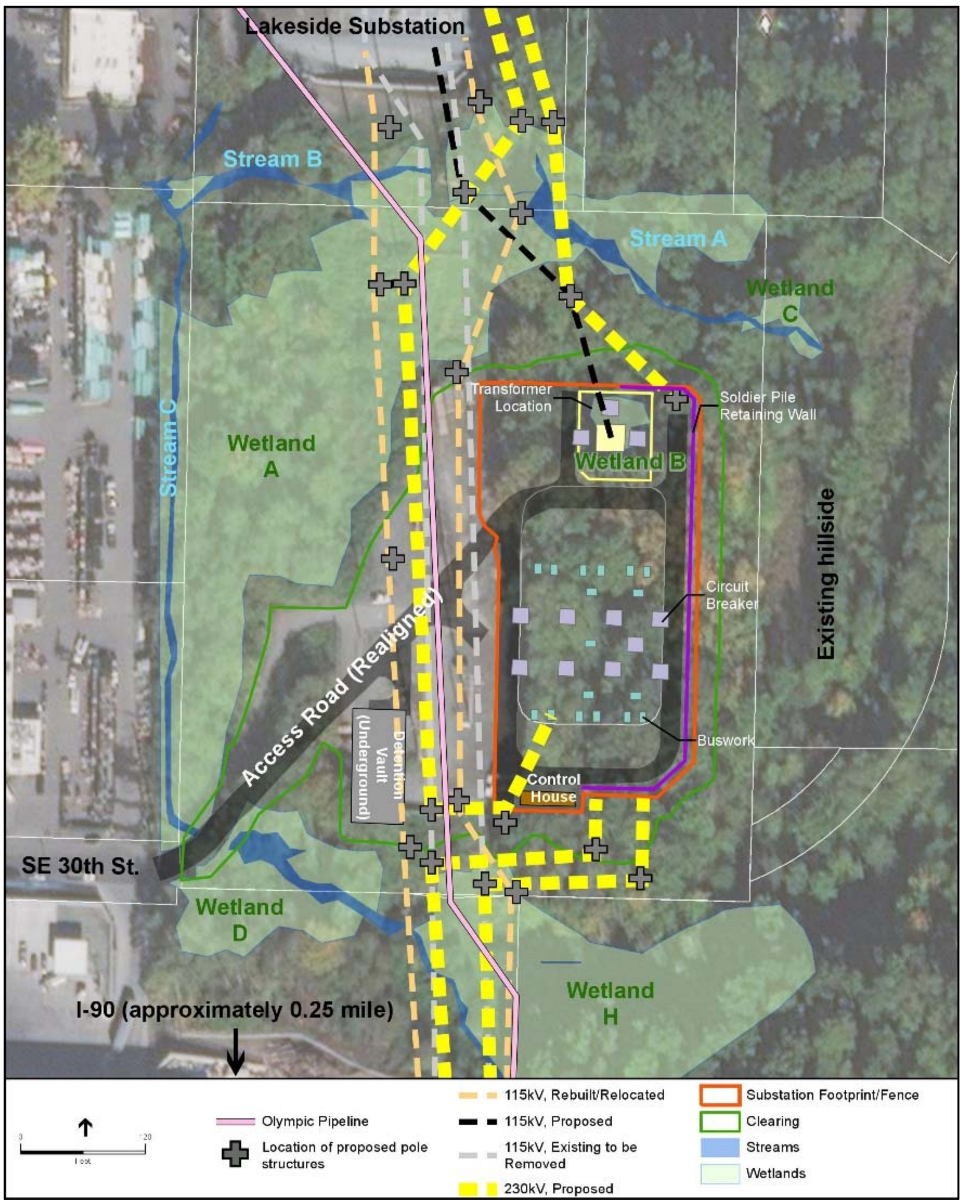
The following pages summarize the potential impacts on water resources for PSE's Proposed Alignment, presented for the Richards Creek substation and by segment. For the Redmond, Bellevue North, Bellevue Central, and Renton Segments, the analysis included a review of refined project design details for PSE's Proposed Alignment, with results revised relative to the Phase 2 Draft EIS to reflect the new information. For these segments, the new information and analysis have not altered the conclusions presented in the Phase 2 Draft EIS regarding significant impacts on water resources.

For the Richards Creek substation site and the Bellevue South and Newcastle Segments, the analysis included a review of the project design as presented in the permit applications submitted to Bellevue and Newcastle (PSE, 2017b and 2017c, respectively). The results below have been revised relative to the Phase 2 Draft EIS, incorporating the more detailed information in the permit applications on pole locations and critical areas (including wetlands, streams, and their buffers). The conclusions regarding significant impacts on water resources, however, are the same as presented in the Phase 2 Draft EIS.

4.3.5.2 New Richards Creek Substation

New facilities at the Richards Creek substation would be sited to avoid the wetlands and streams on-site to the extent possible. A large wetland (Wetland A) is on the north and west sides of the site, and Wetland B is on the site. Three smaller wetlands (Wetlands C, D, and H) are outside the property boundary. Stream C is west and south of the site and Stream A is north of the site.

The fenced portion of the main substation facility would not be in Wetland A or D, but the realigned access road and the north portion of the substation (including a large cleared area) would be within their 110-foot buffers (see Figure 2-1). Wetland B would be filled to accommodate the substation facilities. Ten poles would be located in Wetland A or its buffer, and approximately six poles would be in Wetland H or its buffer. No impacts would occur to Wetland C or its buffer. Impacts on the wetlands and buffers would be mitigated in compliance with City of Bellevue requirements, which include on-site buffer enhancement.



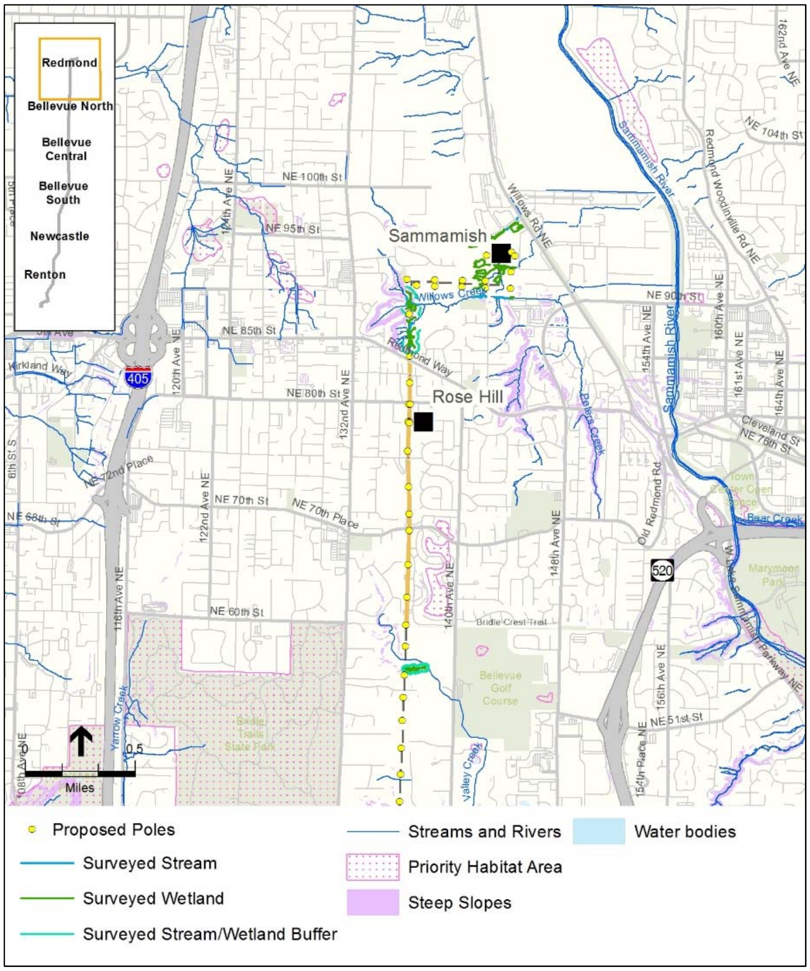
The realigned access road would cross Stream C. As part of the mitigation proposed at the Richards Creek substation site, PSE would realign upstream and downstream sections of the stream and replace the existing culverts at the road crossing. The stream realignment, larger culverts, and stream enhancement (channel improvements, installation of woody debris, and vegetation planting) would increase streamflow conveyance capacity, improve sediment transport, reduce flooding on adjacent properties, improve fish passage, and improve habitat conditions. Additional mitigation for impacts on Stream C would need to comply with City of Bellevue Critical Areas Ordinance standards for stream crossings and restoration (see Appendix D). A stormwater detention vault would be constructed within the buffers for Wetland A and Stream C.

Some of the site is currently covered with gravel, which is typically considered an impervious surface by regulatory agencies. The majority of the 2-acre site would be covered with gravel to prevent water from ponding near the transformers and other facilities. The gravel areas would not be pollution-generating surfaces. The realigned access road (approximately 24 feet wide and 500 feet long) would be paved with asphalt and would be a new pollution-generating surface. Runoff from the site would be controlled with a new stormwater treatment system, including the detention vault, that would meet the City of Bellevue stormwater and clearing and grading codes (LUC 24.06 and LUC 23.76). Impacts of the new substation on water resources would be minor because PSE would comply with applicable federal, state, and local regulations to protect water resources and would implement appropriate BMPs to protect nearby water bodies.

- **Stormwater Runoff.** Increased impervious surface could increase runoff from the site, but all runoff would be treated and detained in compliance with City of Bellevue requirements, so impacts on water resources would be less-than-significant.
- **Groundwater Infiltration.** The amount of increased impervious surface would not affect groundwater infiltration because the area of impervious surface is relatively small and is not likely to reduce infiltration. Impacts would be less-than-significant.
- **Streams and Buffers**. The access road would cross Stream C, and some facilities would be located within its buffer. Impacts would be less-than-significant because required mitigation would protect the stream from instream work associated with the culvert replacement. The new culvert at Stream C and stream enhancement would increase streamflow capacity.
- **Wetlands and Buffers**. The new substation and associated facilities would impact the buffers of Wetlands A, D, and H, and Wetland B would be filled. Poles would be installed in Wetlands A and H. Required mitigation would protect the wetland functions and values. Impacts would be less-than-significant.

4.3.5.3 Redmond Segment

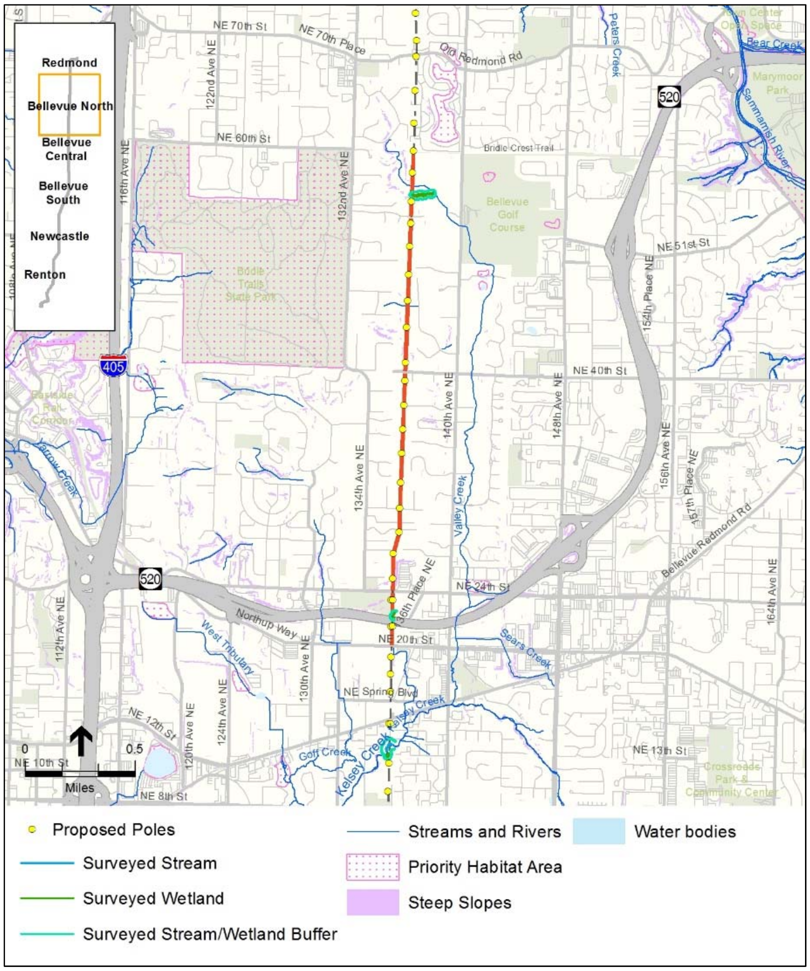
In general, impacts on water resources would be less-than-significant along this segment because it follows the existing corridor and would cause only minor alterations to or disturbances of water resources.



- **Streams and Buffers.** The transmission line would continue to cross Willows Creek and its tributaries, but the crossings would not cause long-term impacts on the streams or buffers. No poles would be located in streams or buffers. The Energize Eastside project would not interfere with PSE's proposed Willows Creek habitat improvement project, south of the Sammamish substation.
- **Wetlands and Buffers.** There is one Category II and three Category III wetlands along this segment with relatively large buffers. There are currently four poles in the wetland complex along Willows Creek, and that number would remain the same. Therefore, there would be no additional long-term impact on wetlands. The number of poles in buffers would be reduced from eight to seven and the buffer would be enhanced, resulting in a beneficial impact.

4.3.5.4 Bellevue North Segment

In general, impacts on water resources would be less-than-significant along this segment because it follows the existing corridor and would cause only minor alterations to or disturbances of water resources.

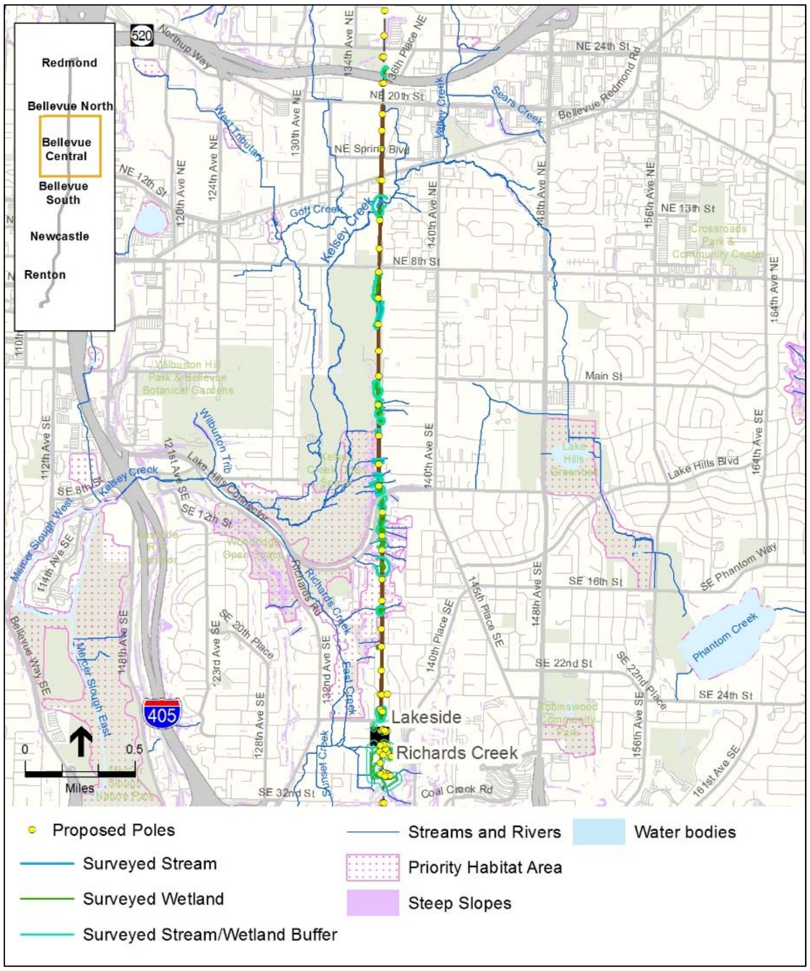


- **Streams and Buffers.** None of the poles would be in streams or stream buffers, so no impacts would occur.
- **Wetlands and Buffers**. None of the poles would be in wetlands or buffers; therefore, no impacts would occur.

DSD 005582

4.3.5.5 Bellevue Central Segment (Revised Existing Corridor Option)

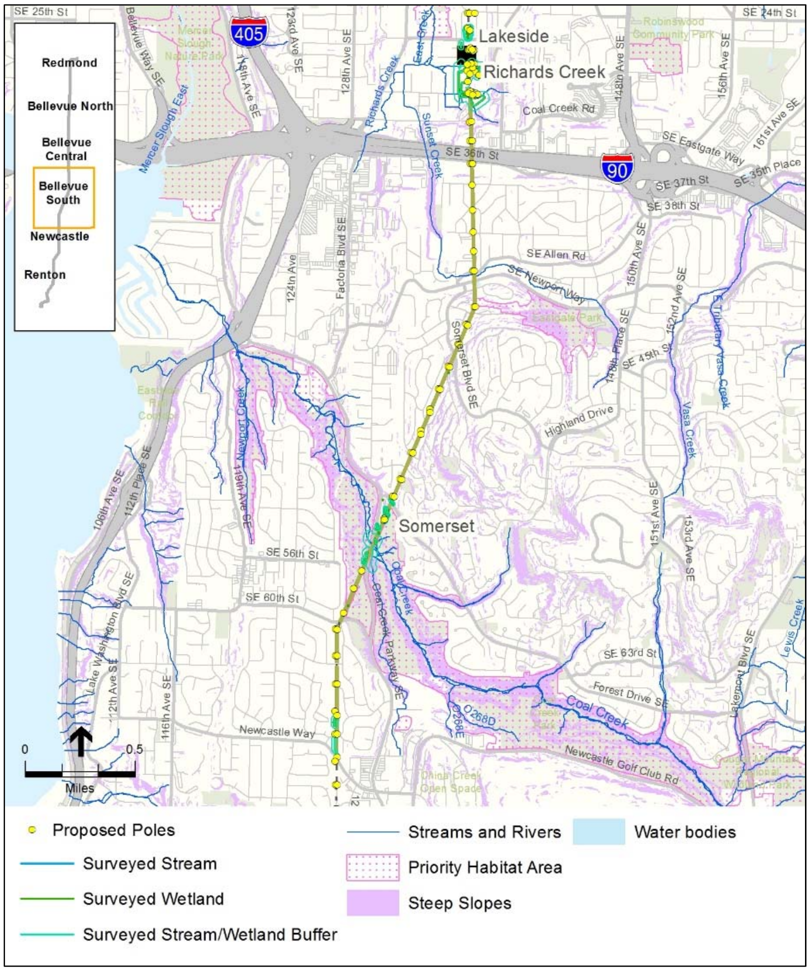
PSE's Proposed Alignment for the Bellevue Central Segment follows the route of the Existing Corridor Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. Impacts on water resources would be less-than-significant along this segment because it follows the existing corridor and would cause only minor alterations to or disturbances of water resources.



- **Streams and Buffers.** None of the poles would be in streams or stream buffers, so no impacts would occur.
- **Wetlands and Buffers**. All of the wetlands along this segment are Category III or IV with relatively small buffers. Some of the Category IV wetlands are too small to be regulated by the City of Bellevue. The existing three poles in wetlands would be reduced to zero with this segment. Removing the poles would cause a minor reduction in wetland acreage that would be mitigated in accordance with critical area requirements. Therefore, there would be no long-term impact on wetlands. The number of poles in buffers would be reduced from 14 to nine, resulting in beneficial impacts.
- **Shorelines.** The Bellevue Central Segment is outside the Kelsey Creek shoreline jurisdiction, so no impacts would occur.

4.3.5.6 Bellevue South Segment (Revised Willow 1 Option)

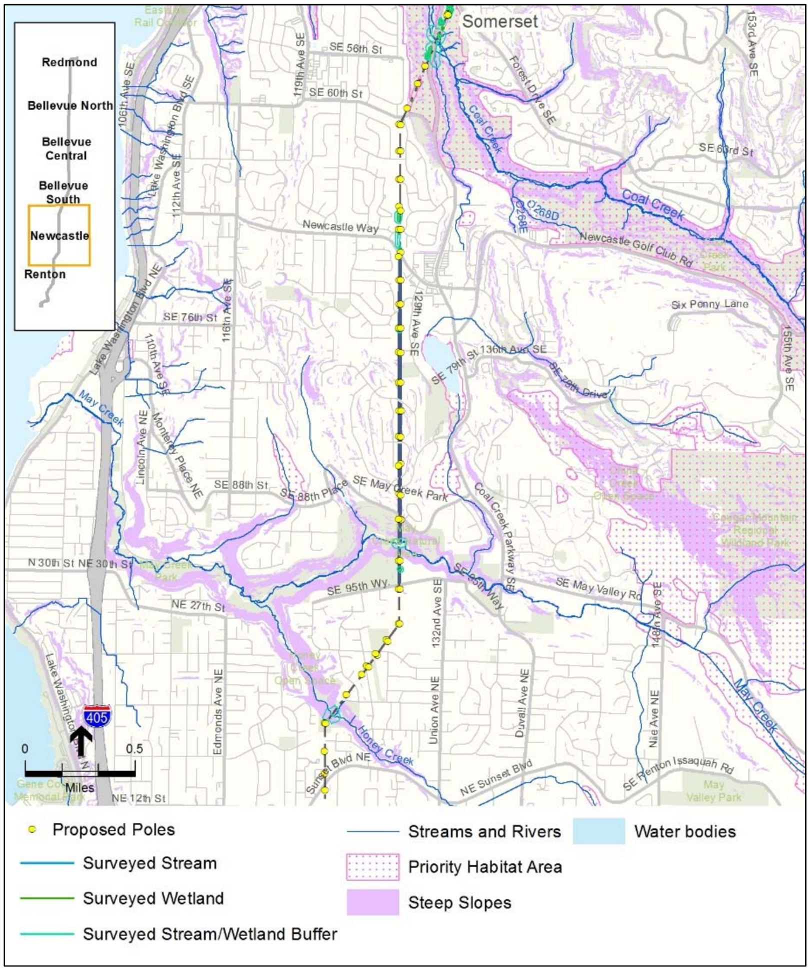
PSE's Proposed Alignment for the Bellevue South Segment follows the route of the Willow 1 Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. The Bellevue South Segment is within the existing corridor. Impacts on water resources would be less-than-significant along this segment because it would cause only minor alterations to or disturbances of water resources that could be mitigated.



- **Streams and Buffers.** The transmission line crosses unnamed tributaries of East, Sunset, and Coal creeks. The crossings would not cause long-term impacts on streams and no poles would be located in streams or buffers. Impacts on buffers would be minor and mitigated in accordance with applicable critical area requirements. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers**. All of the wetlands along this segment are Category III or IV with relatively small buffers. The number of poles in wetlands would remain the same, but the number located in buffers would decrease from seven to one, resulting in beneficial impacts.

4.3.5.7 Newcastle Segment – Option 1 (No Code Variance)

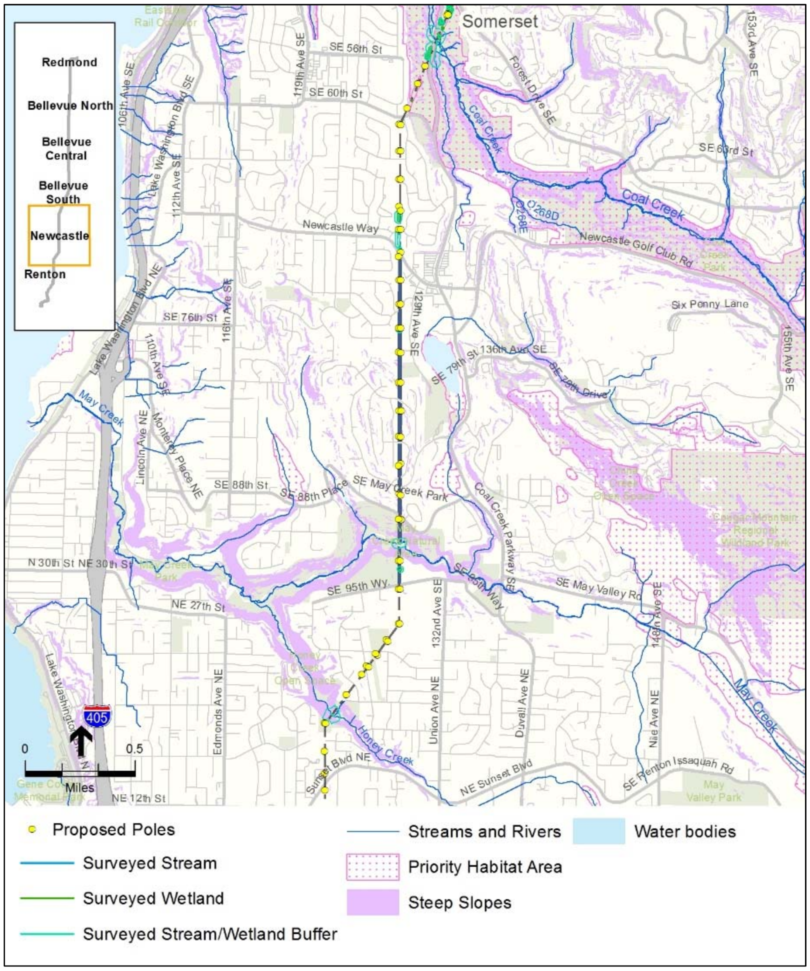
Impacts on water resources would be slightly greater than for Option 2 because the larger pole size requirement requires larger footings. Impacts on water resources would be less-than-significant along this segment because it would cause only minor alterations to or disturbances of water resources that could be mitigated.



- **Streams and Buffers**. The Newcastle Segment, Option 1 crosses May Creek and two unnamed streams along the existing corridor. No poles would be placed in streams or stream buffers. The crossings would not cause long-term impacts on streams. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers**. The number of poles in wetland buffers would be reduced as compared to existing conditions, resulting in beneficial impacts. The larger footings for the poles required for Option 1 would result in a small net increase in fill in the wetland buffer.

4.3.5.8 Newcastle Segment – Option 2 (Code Variance)

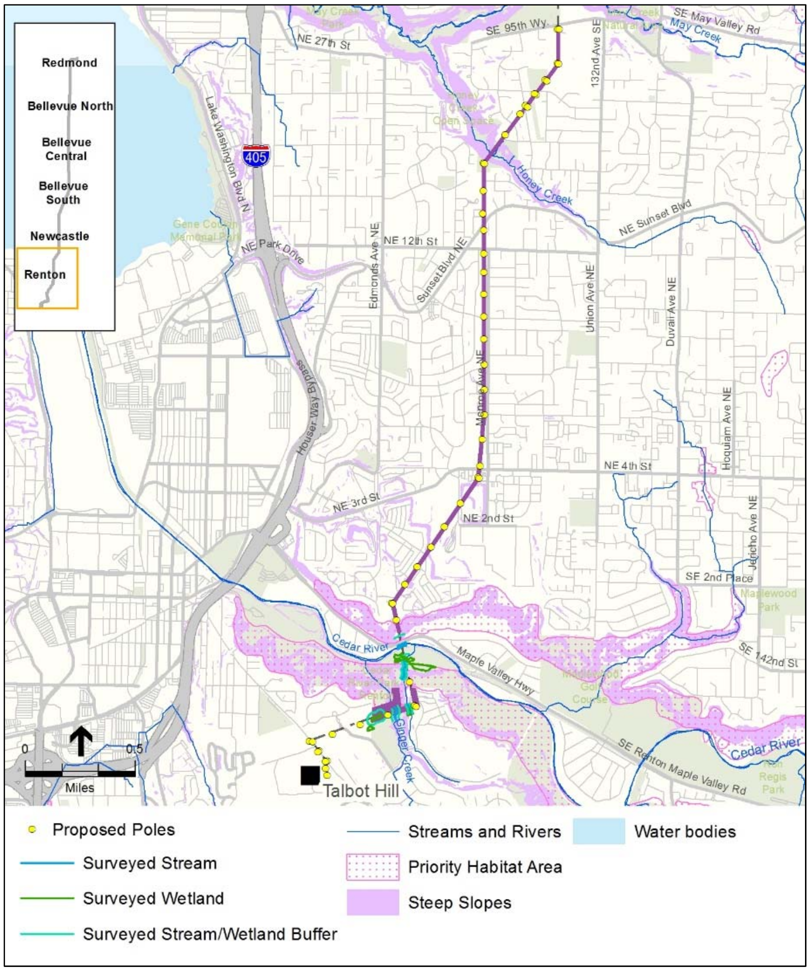
Impacts on water resources would be slightly less for Option 2 of the Newcastle Segment because of the smaller footings for the poles. Impacts on water resources would be less-than-significant along this segment because it would cause only minor alterations to or disturbances of water resources that could be mitigated.



- **Streams and Buffers**. Same as Option 1.
- **Wetlands and Buffers**. The number of poles in wetland buffers would be reduced relative to existing conditions, resulting in beneficial impacts. The smaller footings for poles for Option 2 would result in a net reduction in fill in the wetland buffer.

4.3.5.9 Renton Segment

The Renton Segment would be within the existing corridor. Impacts on water resources would be less-than-significant along this segment because it would cause only minor alterations to or disturbances of water resources that could be mitigated.



- **Streams and Buffers**. The transmission line would cross three creeks—May, Honey, and an unnamed tributary—and the Cedar River in the existing corridor, the same as existing conditions. No poles would be placed in streams or stream buffers. The crossings would not cause long-term impacts on streams, and no impacts on buffers would occur. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers.** The one wetland in this segment identified in the critical areas delineation reports for the Renton Segment is Category III with a 100-foot buffer (The Watershed Company, 2016, 2017). No poles would be placed in the wetland or buffer. Any impacts to wetlands or buffers would be minor and mitigated in accordance with applicable critical area requirements, so impacts would be less-than-significant.
- **Shorelines**. Although the wires would pass over the Cedar River (as they do at present), no poles would be within the City of Renton's shoreline jurisdiction for the Cedar River, so no impacts would occur.

4.3.6 Mitigation Measures

For water resources, regulations established in stormwater regulations, shoreline management programs, and critical area ordinances were reviewed to identify mitigation measures. Because all of the mitigation measures are specified by code, they would all be required for project development. The required mitigation measures would fully mitigate adverse impacts; therefore, no mitigation measures are proposed in addition to code requirements

4.3.6.1 Regulatory Requirements

The project would need to comply with applicable federal, state, and local regulations, some of which would mitigate the potential for long-term adverse impacts on water resources. Mitigation measures required for compliance with such regulations are not appealable. The applicable regulations are presented below based on the stage at which they would be applied.

Prior to Construction

The wetlands within PSE's Proposed Alignment are waters of the state subject to the applicable requirements of state law (see RCW 90.48 and WAC 173.201A). Some are also waters of the U.S. and subject to Section 404 and Section 401 of the Clean Water Act (33 United States Code [USC] §1341) and 40 Code of Federal Regulations (CFR) Section 121.2. Before any direct wetland impacts occur, PSE would obtain the necessary state and federal authorizations. To obtain state and federal authorization, PSE must provide:

- A jurisdictional determination from the U.S. Army Corps of Engineers stating whether the delineated wetlands are under federal jurisdiction.
- An application and report presenting impacts on jurisdictional wetlands.
- A mitigation plan for unavoidable wetland impacts following the standards in *Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance* (Ecology, 2006).

The project would also need to comply with the following regulations of the Partner Cities:

- Stormwater regulations of the Partner Cities, which are based on the standards set by Ecology's *Stormwater Management Manual for Western Washington* (Ecology, 2014).
- Requirements of Shoreline Master Programs for Renton in crossing the Cedar River (see Appendix B-3).
- Requirements of each applicable Partner City's critical areas ordinance (see Appendix D). Typical mitigation measures suggested in the ordinances include:
    - Replacement of wetland acreage based on replacement ratios in critical areas ordinances.
    - Replacement of lost buffer area.
    - Enhancement or restoration of buffers.
- Avoid locating poles in wetlands and wetland buffers to the extent possible. It should be possible to avoid most wetlands by raising the height of poles, allowing for a longer stretch of transmission line over the wetland.

During Operation

- Implement Spill Prevention Control and Countermeasures Plans during maintenance activities (for poles, the transmission corridor, and access roads) to prevent spills or leaks of hazardous materials, paving materials, or chemicals from contaminating surface or groundwater.

4.4 PLANTS AND ANIMALS

This section provides a project-level analysis of potential impacts to wildlife, fish, and plant communities and their available habitat within the study area (Figure 4.4-1). The study area extends about one-half mile on either side of PSE's Proposed Alignment, based on the estimated extent that construction noise from project activities or project operations could potentially influence wildlife behavior.

Key Changes from the Phase 2 Draft EIS

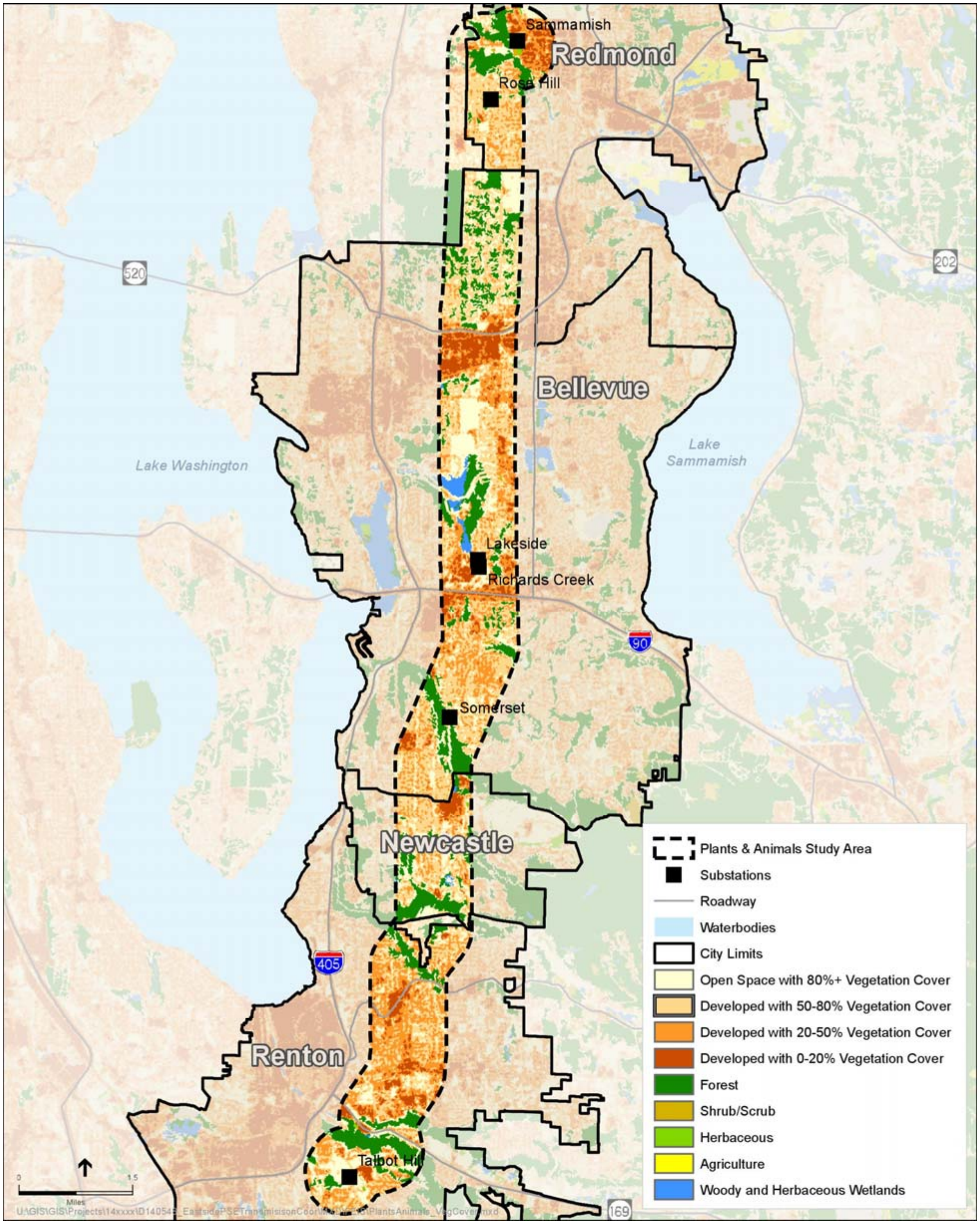
This section has been updated from the Phase 2 Draft EIS to reflect impacts associated with PSE's Proposed Alignment, clarify vegetation management protocols, include additional information on potential wildlife impacts, and refine the discussion of impacts associated with the Richards Creek substation site.

Plant and animal resources in the study area include various vegetation cover types (including herbaceous, scrub-shrub, forest, agricultural, and woody and herbaceous wetland vegetation), as well as associated upland and aquatic wildlife species. These resources were identified and assessed primarily based on the critical areas (wetlands and streams) reports prepared by The Watershed Company for PSE for the Energize Eastside project (The Watershed Company, 2016a, 2016b). Additional sources of information on plants and animals in the study area consulted to describe the affected environment are listed in the Phase 2 Draft EIS (Section 3.4, page 3.4-1).

Two sets of GIS data were used for the Final EIS: tree inventory data collected and analyzed during 2015 and 2016 for the Phase 2 Draft EIS (The Watershed Company, 2016c), and tree inventory data that were collected and analyzed in 2017 for segments of the project PSE carried forward for permit review (The Watershed Company, 2017).

The tree inventories conducted in 2015 and 2016 occurred along the approximately 100-foot-wide existing PSE easement (The Watershed Company, 2016a). The survey identified the number and location of all vegetation with a potential to reach a mature height of 15 feet or more. This method provided a conservative estimate, in that PSE could trim or prune rather than completely remove trees in a manner that ensures compliance with NERC standards. See Appendix E-2 of this Final EIS for a description of the methodology that The Watershed Company used for the survey, and for the steps the EIS Consultant Team took to confirm the surveys met best practice. These data were used for the Redmond Segment, Bellevue North Segment, Bellevue Central Segment (north of the Lakeside substation), and Renton Segment. A more refined methodology was used for the analysis of the 2017 tree inventory that considered the proximity of the actual transmission alignment and variations in topography (see Appendix E-2). It more accurately represents what trees would need to be removed for the project. These 2017 data were used for the following segments/options:

- The portion of the Bellevue Central Segment that includes the Lakeside substation
- Richards Creek substation site
- Bellevue South Segment
- Newcastle Option 1 (No Code Variance)
- Newcastle Option 2 (Code Variance)



Source: King County, 2015; Ecology, 2014.

Figure 4.4-1. Study Area and Land Cover for Plants and Animals

Resource protection policies and requirements identified during the Phase 1 analysis were reviewed for completeness and current relevance. Information sources also included federal, state, and local regulations, policies, ordinances, and programs established to protect natural resources.

The project follows PSE's existing corridor, which consists of a managed vegetated easement and right-of-way area (including established access routes), providing habitat and migration corridors for area wildlife, as well as specific critical habitat areas (wetlands, streams, ponds, and their associated buffers). This analysis assesses the long-term impacts (alterations) to the habitat and the expected changes in species occurrence or use of this altered habitat.

Wetlands and streams are water resources and are described in Section 4.3, *Water Resources*. This section analyzes their value as fish and wildlife habitat.

4.4.1 Relevant Plans, Policies, and Regulations

Since publication of the Phase 2 Draft EIS, no new laws, plans, policies, or regulations have been implemented that would apply to the management of aquatic and terrestrial species, within King County or the Partner Cities. For more details, refer to Section 3.4.1 of the Phase 2 Draft EIS. However, additional clarification has been obtained regarding vegetation management requirements for 230 kV transmission lines, which is provided below.

4.4.1.1 PSE Vegetation Management Program

PSE's Vegetation Management Program includes different standards and management/maintenance practices for 115 kV and 230 kV lines, as described below (PSE, 2014).

Vegetation Management/Maintenance Standards for 115 kV Transmission Lines

As described in Section 3.4.1 of the Phase 2 Draft EIS, the maintenance practice currently followed in PSE's existing corridor involves removal, pruning, and trimming of trees that could interfere with the transmission lines. For 115 kV transmission lines, PSE currently maintains (i.e., trims or removes) trees that would mature to a height of greater than 25 feet, and that are located within the Managed Right-of-Way, which includes the area directly under the wires (referred to as the Wire Zone, which accommodates the area where the conductors and insulators can swing) and 10 feet outside of the outer transmission wires (Figure 4.4-2). The overall size of the Managed Right-of-Way typically varies by site-specific conditions. Trees within the Managed Right-of-Way could be removed, or trimmed or pruned, to maintain adequate separation between the wires and vegetation. As a result, some trees within the corridor with a height of greater than 25 feet may be allowed to remain if they can be pruned in a manner that allows sufficient clearance from the lines (PSE, 2014). Maintenance requirements are typically reviewed on a 3-year cycle.

In addition to typical maintenance procedures, trees within the Legal Right-of-Way but outside of the Managed Right-of-Way that are at risk of falling on or otherwise likely to come in contact with nearby wires are proactively trimmed or removed. This area was previously misidentified as the Danger Tree Zone in the Phase 1 and Phase 2 Draft EISs. As an ongoing maintenance practice that would not change as a result of the Energize Eastside project, if trees outside of the Legal Right-of-Way would pose a threat to the transmission line, PSE coordinates with adjacent land owners to obtain permission to trim or remove them.

PSE selectively uses herbicides, in combination with tree removal and pruning, for vegetation management/maintenance in accordance with BMPs. PSE also implements an ecologically based, integrated weed management program to control the spread of invasive and noxious weeds. These weeds can crowd out native plants, degrade habitats, and increase harmful erosion (PSE, 2016a).

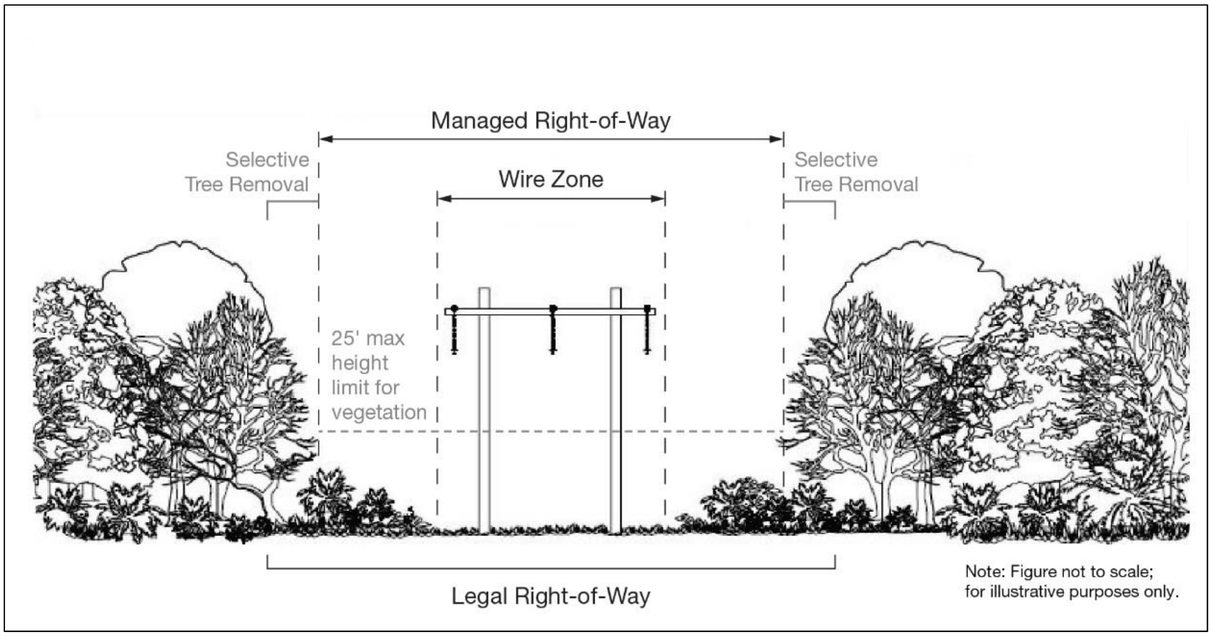


Figure 4.4-2. Vegetation Management Zones for 115 kV Transmission Lines

PSE's policy is to restore vegetation other than trees within transmission corridors to as like or better condition. Outside of the Managed Right-of-Way, tree replacement is agreed upon with the property owner (in some cases the owner may prefer tree removal without replacement). Tree replacement would also comply with local code requirements, as described above in Section 3.4.1 of the Phase 2 Draft EIS.

Vegetation Management/Maintenance Standards for 230 kV Transmission Lines

To provide reliable service to PSE customers and respond to standards of the NERC (the organization in charge of improving the reliability and security of the bulk power system in North America), PSE has adopted vegetation management/maintenance standards for electric transmission lines with voltages of 200 kV or higher (Figure 4.4-3). The overall size of the vegetation management/maintenance area typically varies by transmission pole type (see Appendix E-1). Based on strict application of these standards, PSE would remove any vegetation within the Wire Zone that matures to a height of more than 15 feet (PSE, 2014), unless terrain conditions allow at least 20 feet of clearance between the lowest conductor and the potential mature height of the vegetation. Within the Managed Right-of-Way, PSE would conduct selective vegetation removal and maintenance on a case-by-case basis based on the proximity of vegetation to its built infrastructure, as determined in the field by PSE vegetation maintenance crews. Trees outside of the Managed Right-of-Way but within the Legal Right-of-Way could also be trimmed to maintain at least 16 feet of clearance from the wires, or removed based on a combination of tree height, species, health, and distance from the wires. In general, it is assumed that trees with a height of 70 feet or greater between the Managed Right-of-Way and the Legal Right-of-Way would be removed, along with all dead or dying trees of any height. However, with the primary exception of lowering the maximum potential mature tree height limit, tree maintenance activities along transmission lines at 200 kV or higher (including 230 kV lines) would be largely unchanged compared to existing procedures in the 115 kV transmission line corridor. No trees are proposed for removal outside of the Legal Right-of-Way as part of the Energize Eastside project. PSE's policies for weed management and vegetation restoration are also the same for 230 kV and 115 kV transmission lines.

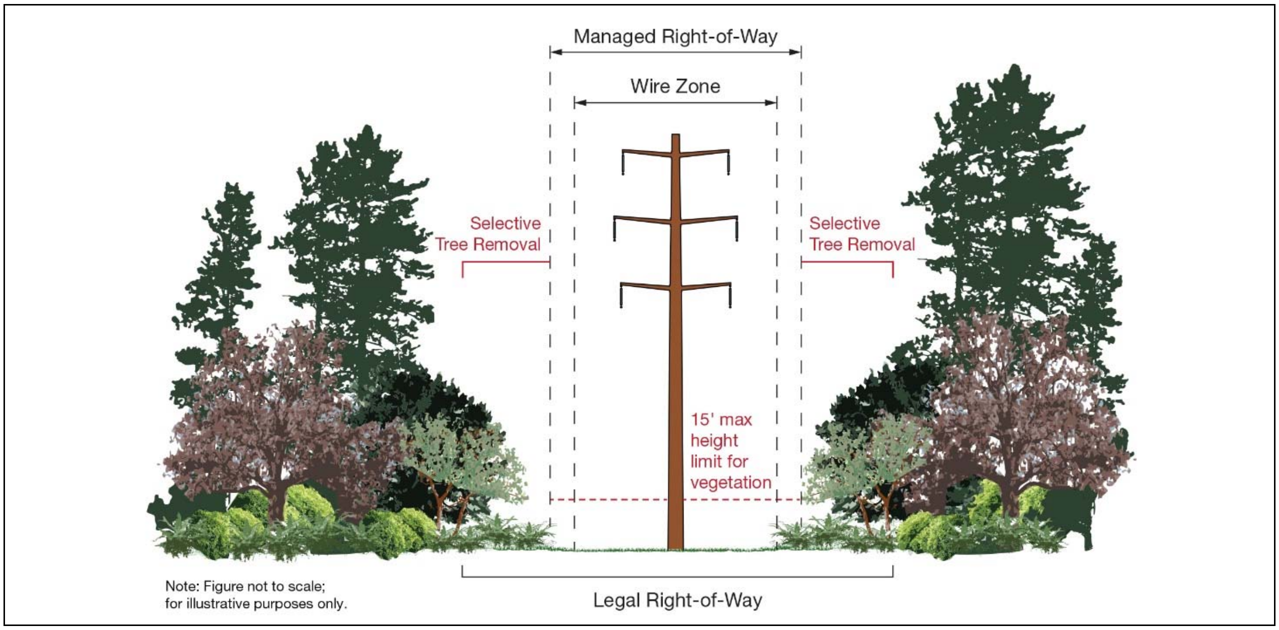


Figure 4.4-3. Vegetation Management Zone for 230 kV Transmission Lines

4.4.1.2 PSE Avian Protection Program

PSE implements measures to minimize the effects of its transmission system on avian species through its Avian Protection Program, with particular emphasis on species of local importance, and those protected under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and the Endangered Species Act. See Section 3.4.1.4 in the Phase 2 Draft EIS for a description of PSE's Avian Protection Program.

4.4.2 Plants and Animals in the Study Area

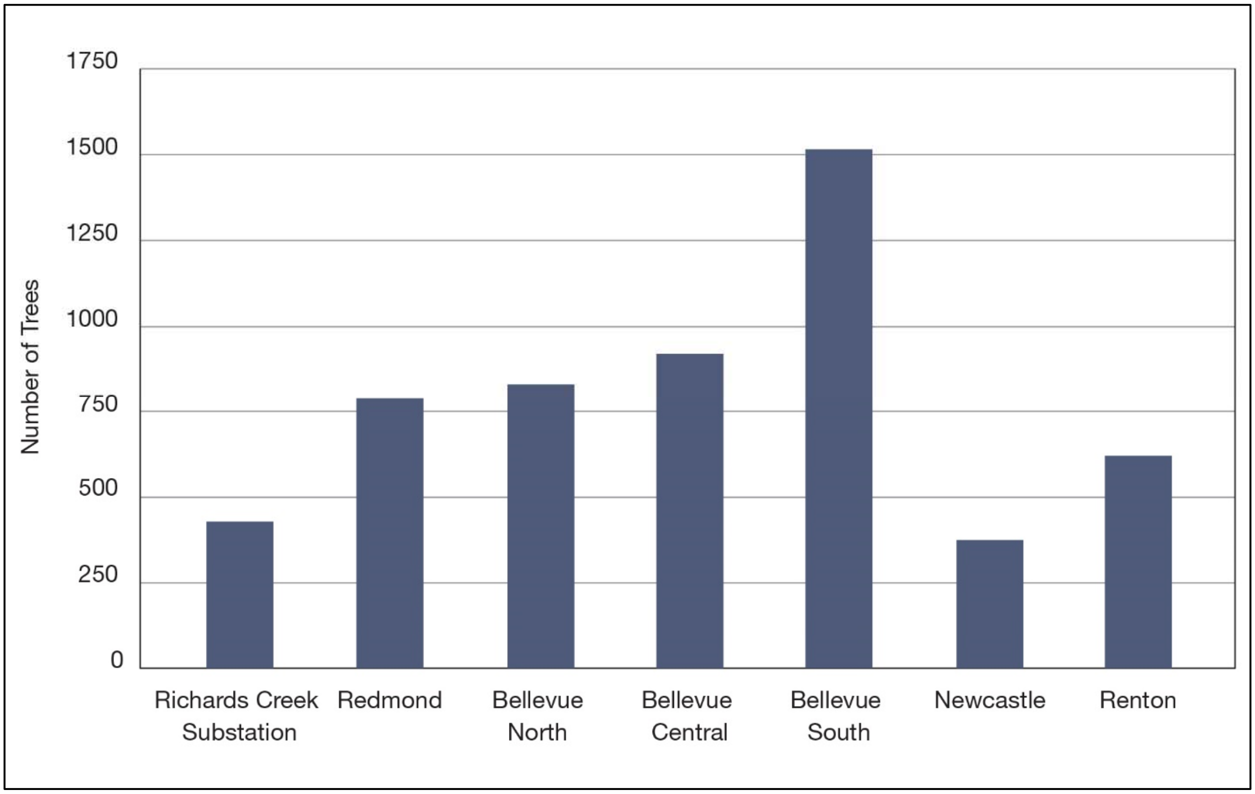
4.4.2.1 Vegetation Cover

Vegetation within the study area is described in Section 3.4.1.1 of the Phase 2 Draft EIS, indicating that a substantial portion of the Phase 2 study area is already developed or maintained to varying degrees.

Plants

As indicated in the Phase 2 Draft EIS (see Section 3.4.2.1), trees provide numerous functions and benefits, including wildlife habitat for breeding, rearing, and foraging. They also provide direct and indirect benefits to aquatic habitats by reducing stormwater flows, controlling stream temperatures (shade), and reducing streambank erosion. Heavily vegetated and forested areas also provide wildlife corridors to enhance wildlife population connectivity to various habitat types that support such activities as breeding, foraging, and rearing.

As described at the beginning of Section 4.4, two sets of GIS data showing proposed tree removal were used for the Final EIS analysis. Appendix E-2 describes the different methods used for the two datasets, and Appendix L describes how the 2017 permit-level data were applied to this analysis. The consolidated information from these surveys includes an inventory of approximately 5,500 trees (Figure 4.4-4).



Source: The Watershed Company, 2016c, 2017.

Figure 4.4-4. Total Trees Surveyed

Rare Plants

As indicated in the Phase 2 Draft EIS, no rare plants are known to occur within PSE's Proposed Alignment (WDNR, 2016).

4.4.2.2 Fish and Wildlife

As described in Section 3.4.2.2 of the Phase 2 Draft EIS, much of the study area consists of substantially modified fish and wildlife habitat, including extensive landscaped or maintained areas. However, some of the areas along PSE's existing corridor include WDFW-designated priority habitats (WDFW, 2016a) and other natural areas. Animal species typically found in landscaped areas have a high tolerance for human disturbance. The dominance of these species is due to decreased available habitat, smaller habitat patch sizes, increased edge habitat, increased non-native vegetation, and decreased vegetative complexity (The Watershed Company, 2009).

Despite the existing habitat modifications and ongoing maintenance activities, the existing corridor provides important urban habitat and migration and connectivity corridors for existing wildlife (The Watershed Company, 2009). Such connectivity corridors are particularly crucial for less mobile species (e.g., ground-oriented mammals) to forage, reproduce, and travel between larger patches of available habitat. While still important for larger mammals and birds, which tend to be more mobile, these connectivity corridors effectively increase the overall available habitat sizes (The Watershed Company, 2009). In addition, the pole structures and wires provide potential nesting and roosting habitat for some avian species.

Several large avian species that tolerate human activity occasionally occur in portions of the study area, including the bald eagle, peregrine falcon, osprey, red-tailed hawk, and great blue heron (The Watershed Company, 2009). However, these species are not known to extensively use the existing transmission line corridor for breeding or foraging, and PSE's Avian Protection Program is intended to discourage such uses.

The wetlands, streams, floodplains, and rivers in the study area (described in Section 4.3, *Water Resources*) provide habitat for a variety of native and non-native fish and other aquatic-oriented species. These include a number of migratory species (sockeye, coho, kokanee, and Chinook salmon, as well as steelhead, cutthroat trout, peamouth, and lamprey) (WDFW, 2016b; City of Bellevue, 2016b; King County, 2016). Other common species found in the area streams include stickleback, bluegill, and sculpin. While most streams in the study area are identified as non-fish bearing waters, the larger rivers and streams (i.e., Cedar River, and Kelsey, Richards, and Coal creeks) provide important fish habitat (City of Bellevue, 2016b; King County, 2016).

Ecology has categorized the lower reaches of May Creek, Coal Creek, and the Cedar River as "Core Summer Salmonid Habitat" for aquatic life use (Ecology, 2011; King County, 2016). As part of the updated water quality standards, these stream reaches have also been assigned an additional "Supplemental Spawning and Incubation Protection," which specifies temperature criteria of 13ºC to be applied from September 15 through May 15.

4.4.2.3 Sensitive or Protected Fish and Wildlife

As described in the Phase 1 Draft EIS (Section 6.4) and Section 3.4.2.3 of the Phase 2 Draft EIS, the study area provides potential habitat for several bird, mammal, reptile, amphibian, and fish species protected by federal, state, or local environmental laws and regulations (e.g., federal or state listed *endangered or threatened species,* species protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act). The critical areas ordinances of King County and the Partner Cities also list species of local concern. A list of these species and their federal/state designation is provided in Appendix C of the Phase 1 Draft EIS, and species of local concern are identified in Section 3.4.2.3 of the Phase 2 Draft EIS.

4.4.3 Long-term (Operation) Impacts Considered

Potential long-term impacts include impacts to plant and animal resources in the study area caused by the operation of the project, as well as permanent impacts caused by construction. Such activities include the loss of habitat due to construction, regular vegetation maintenance activities, facility maintenance protocols, and other activities that could disturb species or their habitats. In particular, the analysis of operation impacts includes the short- and long-term impacts of tree removal, and is based on the project-specific tree inventory reports (The Watershed Company, 2016a). These reports assess the number, size, and type of trees expected to be removed as part of the project, and the conditions (tree density) of adjacent properties. The analysis also considered noise disturbance, habitat loss or alteration, invasive plant species management protocols, vegetation maintenance, and stormwater runoff from impervious and/or disturbed surfaces.

Methods for Analyzing Long-term Impacts

To determine long-term (operational) impacts, the EIS Consultant Team assessed the number of trees and significant trees, and acres of habitat potentially subject to vegetation management/ maintenance, as well as the change in the number of poles to assess changes in habitat availability. The potential presence of protected fish, wildlife, and plant species was also assessed to determine the significance of such changes.

As described in the Phase 2 Draft EIS (Section 3.4.3), the project would typically install new poles as close to the existing poles as practicable, and the existing poles would be removed. However, the proposed pole types would typically reduce the number of poles along the existing corridor, although the size (height) and overall footprint of the new poles would increase to some degree. Therefore, the amount and quality of natural resource habitat in the study area is not expected to substantially decrease. Habitat changes would occur primarily due to the number of trees removed along the existing corridor, as a result of specific vegetation management requirements for 230 kV power lines compared to the existing 115 kV lines.

4.4.3.1 Magnitude of Impact

For this analysis, the magnitude of project-related impacts is classified as being less-than-significant or significant, as follows:

- **Less-than-Significant** – Impacts to plants and animals are considered less-than-significant if project activities would:
  - Cause minor alterations or disturbances to study area habitats, including impacts that could be minimized but not fully mitigated.
  - Occur in developed areas with minimal or poor quality habitat.
  - Disrupt or disturb wildlife uses, but not prevent or eliminate use.
  - Mitigate for impacts through compliance with tree protection or critical areas ordinances.

  This includes moderate interference with the breeding, feeding, or movement of resident or migratory fish, bird, amphibian, or mammal species; as well as activities that could cause harassment, injury, or death to common species, whose populations would not be substantially altered by project activities. This also includes limited or moderate permanent disturbance or effects on sensitive plant species or wetlands.

- **Significant** – Impacts to plants and animals are considered significant where project activities would cause any of the following:
  - Injury, death, or harassment of federal and state-listed endangered or threatened species, or bald eagle and peregrine falcon (state sensitive and federal species of concern).
  - A reduction of habitat quality or quantity that can substantially affect the critical survival activities (breeding, rearing, and foraging) of these protected species.
  - Substantial interference with the breeding, feeding, or movement of native resident or migratory fish, bird, amphibian, or mammal species; or noncompliance with tree protection ordinances or critical areas (wetland and stream) protective ordinances.

4.4.4 Long-term Impacts: No Action Alternative

Long-term impacts of the No Action Alternative are the same as those described in the Phase 2 Draft EIS. Under the No Action Alternative, PSE would continue its current line maintenance activities along the existing corridor as described in Chapter 2. As a result, the Phase 2 Draft EIS concluded that there would be a minor loss of vegetation or disturbance to animals from permanent structures. As discussed, only minor direct and indirect impacts are expected to occur from temporary noise disturbances, limited habitat alteration or loss (temporary or permanent vegetation clearing), temporary degradation of aquatic habitat from runoff from disturbed areas, and the potential spread of invasive plant species into areas disturbed by maintenance activities. Therefore, the No Action Alternative would result in less-than-significant impacts to plants and animals. See the Phase 2 Draft EIS, Section 3.4.4 for a detailed discussion.

4.4.5 Long-term Impacts: PSE's Proposed Alignment

4.4.5.1 Impacts Common to all Components

The primary long-term impacts of the project on plants and animals are the direct and indirect effects of removing additional mature trees along the existing corridor. As indicated above, most of the overall study area is developed as urban, suburban, and exurban areas, providing limited and low quality wildlife habitat. In addition to the existing habitat conditions, ongoing maintenance activities within and adjacent to the Managed Right-of-Way would continue to occur after the project is built along the existing corridor. These activities include periodic trimming or the removal of trees within the vegetation management zones, in accordance with established management criteria. These activities would be similar to those that would occur under the No Action Alternative.

Significant Trees

Significant trees are defined by the trunk diameter (measured at 4 feet above existing ground), but vary by jurisdiction and tree species:

Redmond and Bellevue – 8-inch-diameter tree

Newcastle – 8-inch-diameter evergreen or 12-inch-diameter deciduous tree.

Renton – 6-inch-diameter tree or 8-inch-diameter alder or cottonwood tree.

Potential Impacts to Plants

The analysis of impacts to plants considered the total number of trees potentially removed in the study area, the percentage of trees removed of those surveyed, and the density of trees removed within given portions of PSE's Proposed Alignment. The analysis also addressed both total trees and *significant* trees. Results are described below for these metrics, which present different ways of considering the potential impacts on plants.

Based on the tree survey data from The Watershed Company, PSE's Proposed Alignment would result in the removal of the least number of trees (up to about 3,600 trees) compared to the other alignments analyzed in the Phase 2 Draft EIS. Figure 4.4-5 shows the total number of trees subject to removal under PSE's Proposed Alignment by segment, as well as the total number of significant trees subject to removal by segment.

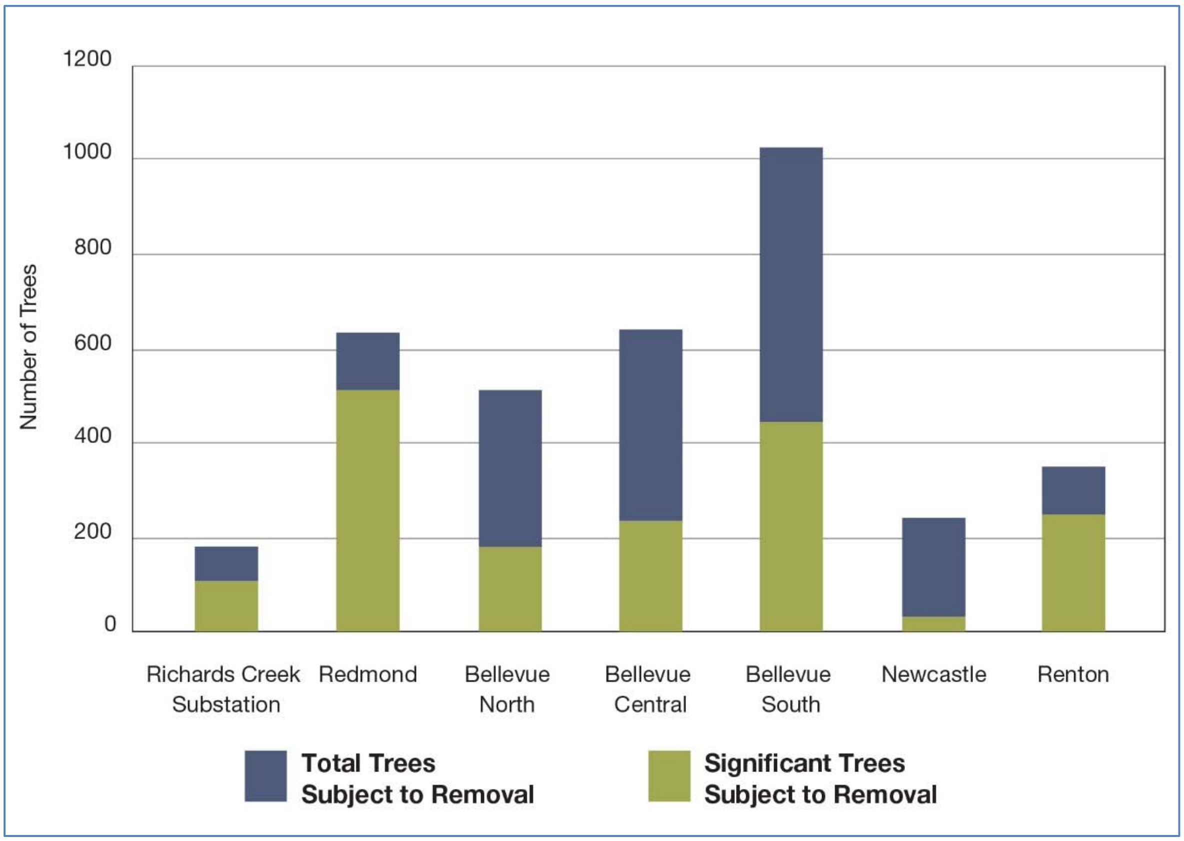
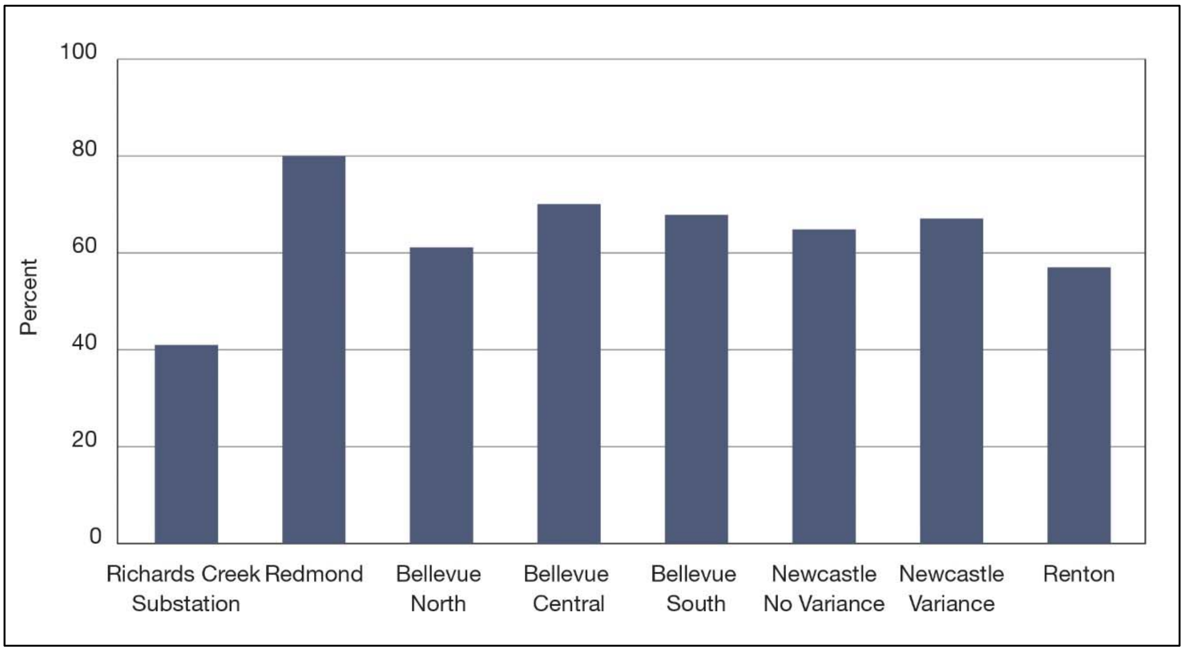


Figure 4.4-5. Total Trees and Significant Trees Subject to Removal, by Segment

The percentage of surveyed trees subject to potential removal ranges between 41 and 80 percent within the project segments (Figure 4.4-6). However, these percentages do not reflect the actual number of trees subject to removal, or the magnitude of the change in habitat quality or quantity (e.g., tree density). Considering the density of potential tree removal, the number of removed trees per acre of area surveyed is less variable than the percentage of trees removed by segment, with most segments ranging between 14 and 26 trees removed per acre (Figure 4.4-7).

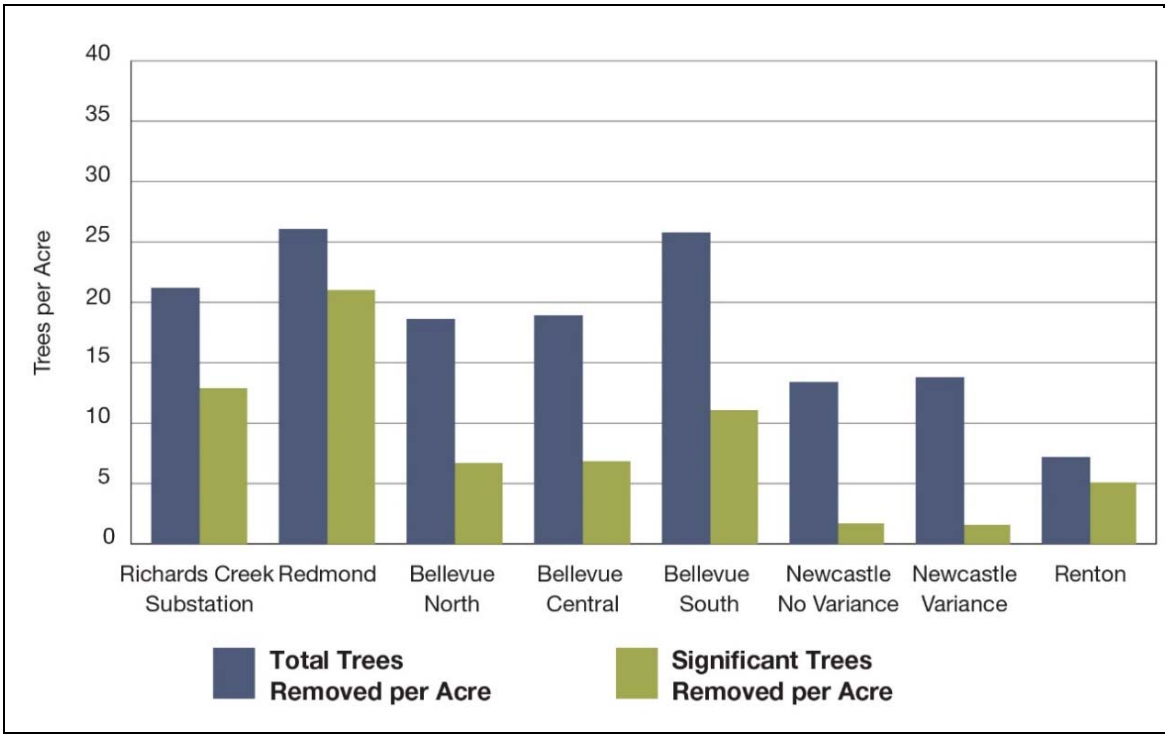
The number of significant trees removed per acre ranges between 2 and 21 in the segments along PSE's Proposed Alignment (Figure 4.4-7), which are typically lower than the other alignment options evaluated in the Phase 2 Draft EIS. Although the amount of potential wildlife habitat (e.g., roosting and nesting) would be reduced within the study area, substantial habitat would continue to be available along much of the corridor, with at least 1,900 inventoried trees retained within the surveyed areas, many of which would be contiguous with trees on adjacent properties (The Watershed Company, 2016a). Selective removal or trimming of trees along the existing corridor would not measurably increase habitat fragmentation, windthrow, or habitat edge effects, because the alignment would remain within the existing Legal Right-of-Way and vegetation management protocols would remain largely unchanged. With the exception of the Richards Creek substation site and an area adjacent to the east side of the Lakeside substation, the amount of forested habitat within and adjacent to the corridor would remain similar to existing conditions.

While about 2.8 acres of forested habitat would be removed at the Richard Creek substation site, a relatively wide (more than 200-foot wide) forested buffer along the east side of the site would be maintained, and edge habitat would only be marginally changed. As a result, the basic character and functions of the habitat in the existing corridor would be maintained. In addition, the habitat is used primarily by urbanized wildlife species, and few protected wildlife species regularly occur in the study area. Therefore, vegetation removal associated with PSE's Proposed Alignment would result in a less-than-significant impact.



Source: The Watershed Company, 2016c, 2017.

Figure 4.4-6. Percentage of Surveyed Trees Subject to Removal, by Segment



Source: The Watershed Company, 2016c, 2017.

Figure 4.4-7. Total Trees and Significant Trees per Acre, Subject to Removal, by Segment

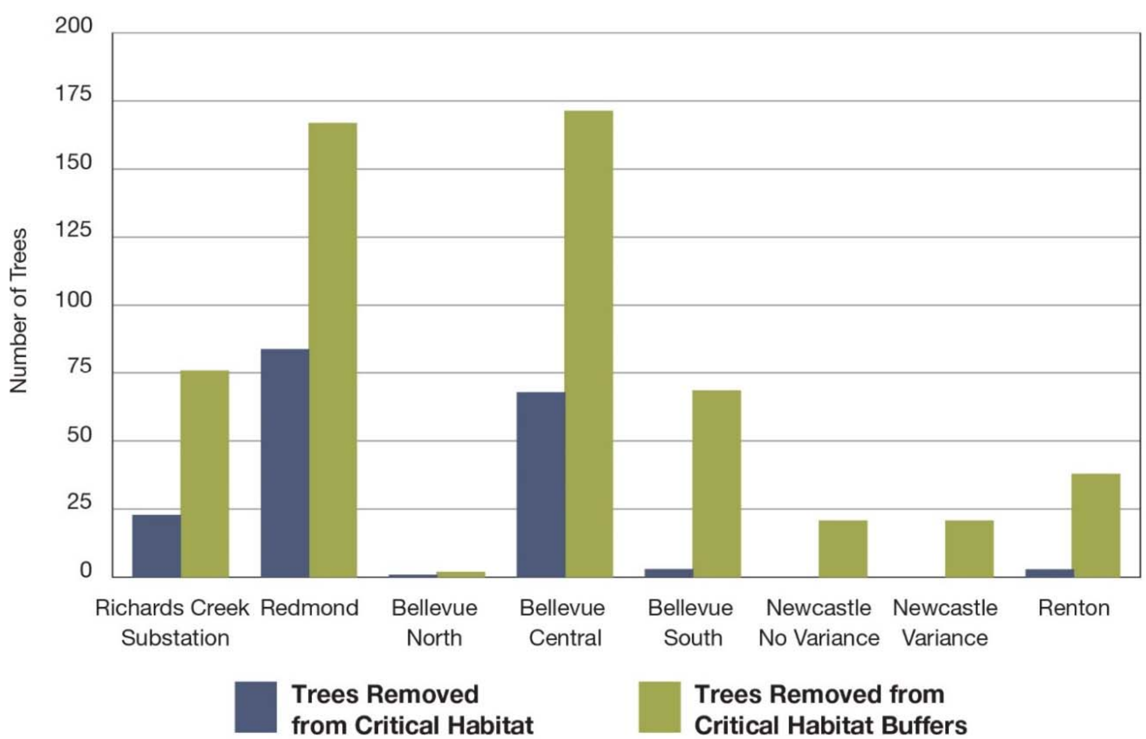
Potential Impacts to Animals and Critical Habitat

Of the approximately 3,600 trees that could potentially be removed along PSEs Proposed Alignment, about 182 of these trees (5 percent) occur in critical areas (primarily wetland habitat), and about 545 trees (15 percent) occur in wetland and stream buffer areas (Figure 4.4-8) (The Watershed Company, 2016c, 2017). This would increase the potential disturbance of these sensitive habitats and reduce the shading provided by the trees. As described above, these numbers are typically based on the strict application of PSE's vegetation management standards (see Section 4.4.1.1), and generally represent a conservatively high (i.e., worst-case) rate of tree removal (see Appendix E-2). PSE has the management flexibility of pruning rather removing trees where adequate clearance can be maintained. To the extent practicable, the number of trees removed from sensitive habitats would be minimized, and any removal would be mitigated as required by local critical area ordinances. With mitigation, the effects of impacts to critical areas would be less-than-significant.

Section 3.3.5 of the Phase 2 Draft EIS describes the impacts of tree removal on streams, and Section 3.4.5 describes the impacts to stream buffers (critical areas). However, few trees would be removed that provide direct canopy shade for streams, with most occurring in the buffer areas away from the actual stream channel. Therefore, changes in the amount of direct shade provided to the stream would likely have no measurable effect on water temperature or instream habitat. Trees would also be selectively cut, leaving smaller and/or preferred species trees (those that would not reach mature heights greater than about 15 feet), as well as understory shrub vegetation in place, to continue to provide stream shade and future wood recruitment functions.

While trees reduce overland stormwater runoff, which can help regulate flows to area waterways during rain events, they also intercept a substantial portion of rain volume (up to more than 20 percent), much of which is subsequently lost to evaporation rather than being available to recharge groundwater resources (Armson et al., 2013; Inkilainen et al., 2013). Groundwater provides important functions for stream habitat conditions by helping to maintain base flows and water temperatures during critical low flow summer and early fall periods. The small trees and understory vegetation that would remain in place would replace some of the rainfall interception capabilities lost through tree removal actions, helping to maintain runoff regulation functions during storm events. Therefore, while the character (species compositions) of vegetation in critical areas would change in some areas of the transmission line corridor, there would be no substantial change in the amount of pervious surface area (overall vegetated area), and much of the vegetation functions would be maintained.

Poles would be replaced in about the same locations as the existing poles, with a small number within or near critical habitat areas. There would also be an overall reduction in the number of poles in critical habitat buffer areas because of the typical change in pole type from paired H-frame structures with multiple poles to a single-pole design in many locations. As a result of the reduced number of new poles, the reduced number of poles in sensitive habitats, the limited habitat disturbance that typically occurs from installing and removing poles, and mitigation required by each jurisdiction, impacts would be less-than-significant.



Source: The Watershed Company, 2016c, 2017.

Figure 4.4-8. Trees in Critical Habitats and Buffers, Subject to Removal, by Segment

Replacing existing poles (typically H-frame structures) with primarily single or tandem monopoles could reduce roosting or nesting opportunities for birds in the study area because poles are sometimes used for these purposes. Habitat reductions along the existing corridor would be due to a decrease in the total number of poles (26 to 57 percent, depending on the segment). Overall, the changes in the number of poles would have less-than-significant impacts because few protected wildlife species occupy the segments, there are no known nests on the existing structures, and PSE typically discourages nesting on the pole structures.

The project would reduce the *electrocution* and *collision* rates for avian species. The most common cause of avian electrocution is when birds simultaneously contact two power phases (wires carrying different charge). Avian electrocutions occur most frequently with lower voltage distribution lines (30 kV or less) because conductors on most these lines are narrowly spaced and can be bridged by birds, particularly those with large wing spans (Dwyer et al., 2013; SCL, 2014). Electrocution incidences are lower with higher voltage transmission lines because of the greater separation between wires. For the Energize Eastside project, spacing of the 230 kV wires would typically be greater than the existing 115 kV lines, which would reduce the electrocution potential. The larger conductor size of the 230 kV lines would also be easier to see, reducing the potential for bird collision (SCL, 2014). In addition, there is some evidence that the avoidance of powerlines may be related to the ability of species to see UV light corona, which can be emitted from powerlines (Tyler et al., 2014). This characteristic could result in the wires being even more detectable to some avian species, thereby potentially further reducing electrocution or collision mortality or injury rates.

In addition, replacing poles along the corridor would provide the opportunity to include the latest system designs for reducing impacts to avian species, in accordance with PSE's Avian Protection Program (PSE, 2016b). This includes using pole types that discourage nesting and perching, and installing wire guards and line markers to reduce the risks of birds coming in contact with system components. Therefore, changes to project-related mortality of avian species would be less-than-significant.

Although electrocution and collision rates are expected to be lower, the higher voltage lines would produce greater electric and magnetic fields and corona light effects than the existing 115 kV transmission lines, resulting in the potential for greater impacts to some wildlife species. Such impacts tend to be variable and often unquantifiable or inconclusive, particularly for free-ranging species in the wild (Fernie and Reynolds, 2005). Electric and magnetic fields generated by power lines could also affect the behavior or migratory/navigational capabilities of some ground-oriented species, such as mammals and insects (WHO, 2005). While the electric and magnetic fields around the 230 kV lines would be stronger than the existing 115 kV lines, the wires would typically be higher off the ground, which is expected to reduce the potential effects on low-flying insects or ground-oriented wildlife species. Therefore, any incremental changes in electric and magnetic fields along PSE's Proposed Alignment are expected to result in less-than-significant effects on these species.

The project would result in less-than-significant impacts to fish or fish habitat, as project activities would not cause direct impacts to stream habitat, and effects on riparian or floodplain habitat functions would be minimized through mitigation to the extent practicable. The project activities would not result in substantial ground disturbance, or a substantial increase in the amount of impervious surface area, so changes in stream water quality and quantity are not expected to occur. In addition, construction BMPs would be implemented to minimize or eliminate impacts from project activities. Finally, PSE will avoid placing poles in streams, floodplains and wetlands, and associated buffers to the extent feasible; see Section 4.3.5.1, *Water Resources*.

Impacts specific to the project components, including the new substation and individual segments, are summarized below. The tree inventory numbers reflect PSE's inventory of trees within the surveyed area, depending on the segment (The Watershed Company, 2016a, 2016b). Tree removal numbers are preliminary and are considered conservatively high numbers as explained above. It is very likely that the number of trees ultimately removed with the project would be less than these conservative estimates.

Consistency with Relevant Plans, Policies, and Regulations

Existing policies and regulations provide exemptions for typical construction and maintenance activities associated with utility corridors, which would include the proposed project. In addition, PSE will continue to implement its existing programs to minimize project operational impacts to fish and wildlife in the study area.

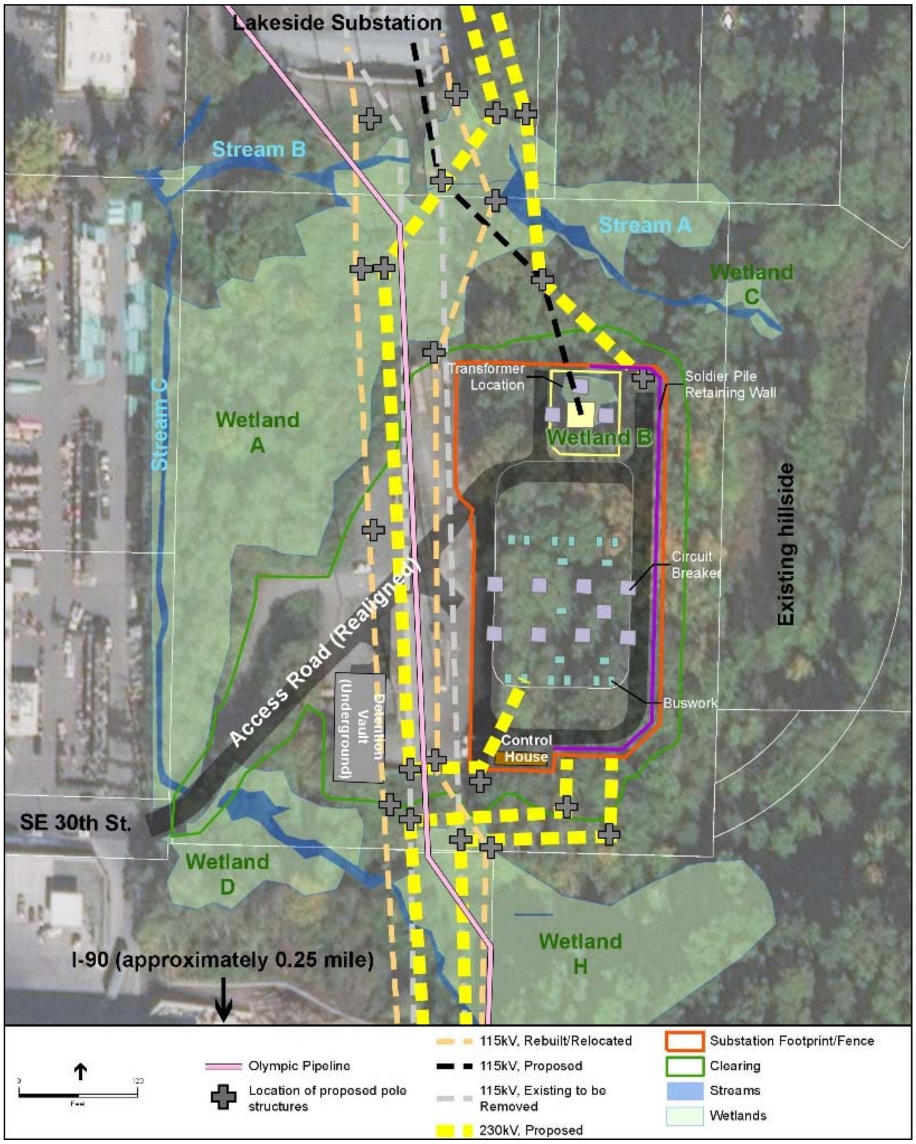
Impact Analysis by Segment in the Final EIS

The following pages summarize the potential impacts on plants and animals for PSE's Proposed Alignment, presented for the Richards Creek substation and by segment. For the Redmond, Bellevue North, Bellevue Central, and Renton Segments, the analysis included a review of refined project design details for PSE's Proposed Alignment, with results revised relative to the Phase 2 Draft EIS to reflect the new information. For these four segments, the new information and analysis have not altered the conclusions presented in Section 3.4.5 of the Phase 2 Draft EIS regarding significant impacts on plants and animals.

For the Richards Creek substation site and the Bellevue South and Newcastle Segments, the analysis also included a review of the project design as presented in the detailed permit applications submitted to Bellevue and Newcastle (PSE, 2017b and 2017c, respectively). The results for these portions of the project are different from the Phase 2 Draft EIS, incorporating the more detailed information in the permit applications on pole locations and critical areas (including wetlands, streams, and their buffers). The conclusions regarding significant impacts on plants and animals, however, are the same as presented in the Phase 2 Draft EIS.

4.4.5.2 New Richards Creek Substation

A portion of the Richards Creek substation site is already cleared of vegetation. In addition, areas to the north and south of the site are already within PSEs existing vegetation management zone. However, the proposed substation would be constructed within the forested section along the east side of the property, resulting in the removal of about 178 trees, 108 of which are categorized as significant trees. Despite the vegetation clearing, impacts to wildlife species are expected to be limited because much of the site is currently disturbed, no protected wildlife species are identified as occurring in this area, and none were observed during project-specific field investigations (The Watershed Company, 2016a, 2016b). Lamprey, a protected aquatic species, are known to occur in streams adjacent to the site, and replacing the existing culverts under the Richards Creek substation site access road (adjacent to SE 30th Street) with a fish passable culvert design would have potential short-term impacts to lamprey during construction (see Section 5.4). However, replacing the existing culverts would improve fish passage conditions, and improving the habitat with the realignment of Stream C (upstream and downstream of the culvert) would benefit this and other aquatic species over the long term. These improvements would also offset other potential wetland and stream impacts related to construction and operation of the substation and associated transmission lines. The critical areas adjacent to the culvert replacement and realigned stream channel would be enhanced by planting native vegetation, further offsetting impacts on other portions of this site. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

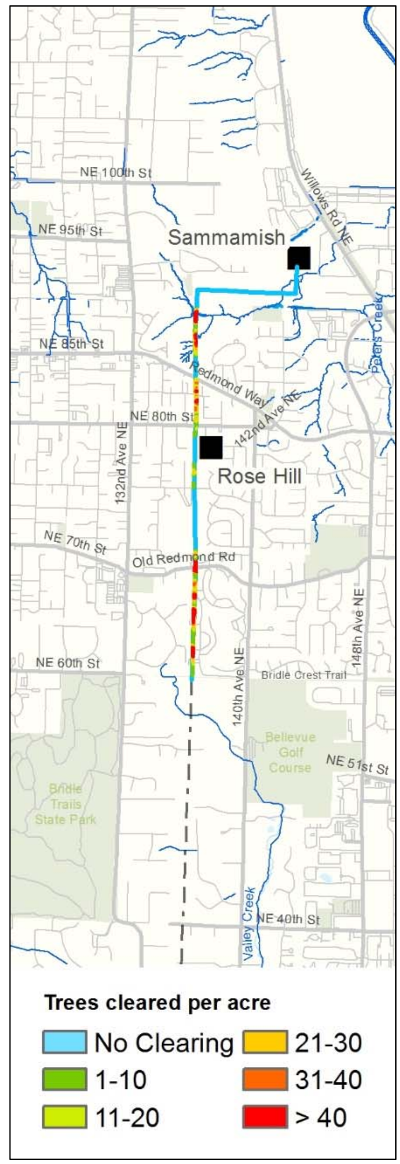


- **Vegetation Clearing:** About 178 (41 percent) of the more than 400 trees on the parcel would be removed, including about 108 significant trees, three dead or dying trees, 23 trees in critical areas, and 76 trees in critical area buffers.
- **Wildlife Habitat:** The substation would occupy about 2 acres (24 percent) of the 8.4 acres at the site, removing about 2.8 acres of forest habitat.
- **Sensitive Species:** No impacts to terrestrial species are expected because protected plant or terrestrial wildlife species are not known to inhabit the study area. One protected fish species (lamprey) occurs in streams adjacent to the Richards Creek substation parcel, and riparian habitat and fish passage improvements would improve stream habitat conditions.

4.4.5.3 Redmond Segment

Although the amount of potential wildlife habitat (e.g., roosting and nesting) would be reduced within this segment, similar habitat would continue to be available in areas adjacent to the study area corridor. As a result, the basic character and functions of the existing habitat in the corridor, which is used primarily by urbanized wildlife species, would be maintained. In addition, few protected wildlife species regularly occur in the study area. The number of trees removed from sensitive habitats would be minimized or avoided, and any removal would be mitigated as required by local critical area ordinances. Although lamprey, a protected aquatic species, occur in streams within this segment, stream and riparian habitat would not be substantially affected. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

- **Vegetation Clearing:** About 630 trees (80 percent of the total surveyed in the segment) could be removed, including the potential removal of about 510 significant trees, as well as about 84 trees from critical areas, 167 trees from critical area buffers, and three landmark trees. In some cases, removal may be avoided by trimming. Tree clearing per acre along the segment is illustrated in the graphic to the right.
- **Wildlife Habitat:** Extensive tree removal would reduce the quality and quantity of wildlife habitat, and the reduction in the number of poles would also reduce potential avian nesting and roosting habitat. However, the reduction in poles would reduce potential impacts to wetland, riparian, or floodplain habitats or functions, which support aquatic-oriented species.
- **Sensitive Species:** No impacts to terrestrial species are expected because protected plant or terrestrial wildlife species are not known to inhabit the study area. One protected fish species (lamprey) occurs in the Willows Creek drainage, but stream habitat is not expected to be affected by the project.



DSD 005606

4.4.5.4 Bellevue North Segment

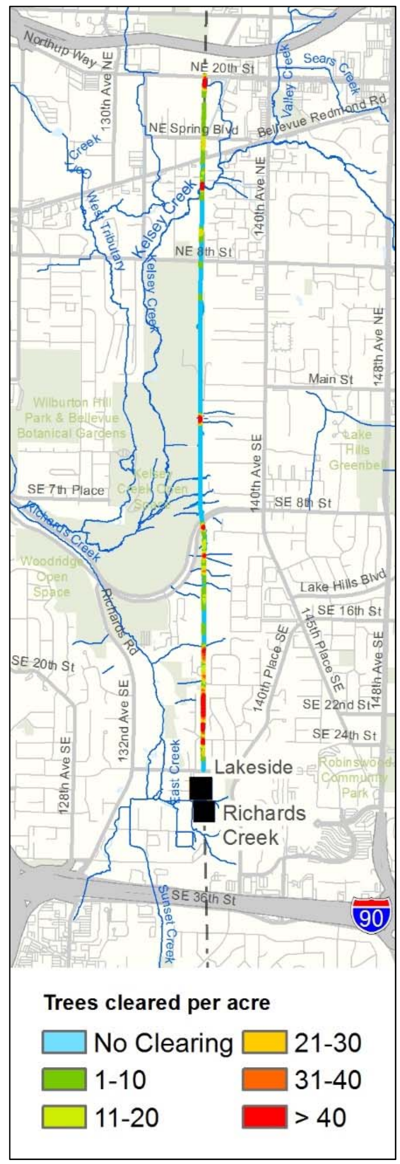
As described for the Redmond Segment, despite the amount of potential tree removal, habitat suitable for the urbanized species that typically occur in the area would remain. In addition, the number of trees removed from sensitive habitats would be minimized or avoided, and any removal would be mitigated as required by local critical area ordinances. Although several protected aquatic species occur in streams within this segment, stream and riparian habitat would not be substantially affected. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

- **Vegetation Clearing:** About 510 trees (61 percent of the total surveyed in the segment) could be removed, including the potential removal of about 181 significant trees, and three trees from critical areas or buffers. In some cases, removal may be avoided by trimming. Tree clearing per acre along the segment is illustrated in the graphic to the right.
- **Wildlife Habitat:** Extensive tree removal would reduce the quality and quantity of wildlife habitat, and the reduction in the number of poles would also reduce potential avian nesting and roosting habitat. However, the reduction in poles would reduce potential impacts to wetland, riparian, or floodplain habitats or functions, which support aquatic-oriented species.
- **Sensitive Species:** No impacts to terrestrial species are expected because protected plant or terrestrial wildlife species are not known to inhabit the study area. Although two protected fish species (Chinook salmon and lamprey) occur in Valley Creek, stream habitat would not be substantially affected by the project.

4.4.5.5 Bellevue Central Segment (Revised Existing Corridor Option)

PSE's Proposed Alignment for the Bellevue Central Segment follows the route of the Existing Corridor Option as described in the Phase 2 Draft EIS, with revised design details for pole types and placement. Although the potential effects of tree removal in this segment would be similar to those described for the Redmond Segment, a lower percentage of trees would be removed. Available habitat in adjacent areas would also continue to provide suitable habitat for the urbanized wildlife species that typically occur in the area. In addition, few protected wildlife species regularly occur in the corridor, and the number of trees removed from sensitive habitats would be minimized or avoided. Any removal would be mitigated as required by local critical area ordinances. Although several protected aquatic species occur in streams within this segment, stream and riparian habitat would not be substantially affected. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

- **Vegetation Clearing:** About 642 trees (70 percent of the total trees surveyed in the segment) could be removed, including the potential removal of about 234 significant trees, as well as about 68 trees from critical areas, and about 172 trees from the buffers. In some cases, removal may be avoided by trimming. Tree clearing per acre along the segment is illustrated in the graphic to the right.
- **Wildlife Habitat:** Tree removal would reduce the quality and quantity of wildlife habitat, and the reduction in the number of poles would also reduce potential avian nesting and roosting habitat. However, the reduction in poles would reduce potential impacts to wetland, riparian, or floodplain habitats or functions, which support aquatic-oriented species.
- **Sensitive Species:** No impacts to terrestrial species are expected because protected plant or wildlife species are not known to inhabit the study area. Although three protected fish species (Chinook salmon, steelhead, and lamprey) occur in Kelsey and Richards creeks, stream habitat would not be substantially affected.



4.4.5.6 Bellevue South Segment (Revised Willow 1 Option)

PSE's Proposed Alignment for the Bellevue South Segment follows the route of the Willow 1 Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. Effects of tree removal in this segment would be similar to those described for the Redmond Segment, although a lower percentage of trees would be removed. In addition, available habitat in areas adjacent to the alignment would continue to provide habitat for the urbanized wildlife species that typically occur in the area. In addition, few protected wildlife species regularly occur in the corridor, and the number of trees removed from sensitive habitats would be minimized or avoided. Any tree removal would be mitigated as required by local critical area ordinances. Although several protected aquatic species occur in streams within this segment, stream and riparian habitat would not be substantially affected. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

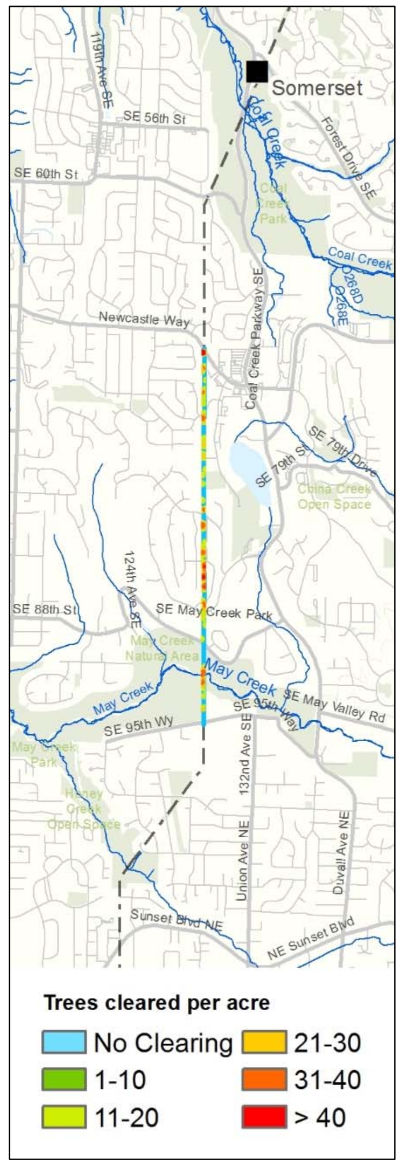
- **Vegetation Clearing:** About 1,030 trees (68 percent of trees surveyed along the segment) could be removed, including the potential removal of about 442 significant trees, three trees from critical areas, and about 69 trees from critical area buffers. In some cases, removal may be avoided by trimming. Tree clearing per acre along the segment is illustrated in the graphic to the right.
- **Wildlife Habitat:** Tree removal would reduce the quality and quantity of wildlife habitat, and the reduction in the number of poles would further reduce potential avian nesting and roosting habitat. The limited number and footprint of poles that may be installed in wetland, riparian, or floodplain habitats would not measurably affect the functions of these habitats or associated species.
- **Sensitive Species:** No impacts to terrestrial species are expected because protected plant or terrestrial wildlife species are not known to inhabit the study area. Although three protected fish species (Chinook salmon, steelhead, and lamprey) occur in East, Sunset, and Coal creeks, stream habitat would not be substantially affected by the project.

4.4.5.7 Newcastle Segment – Both Options 1 and 2

Two options are evaluated for the Newcastle Segment, with Option 1 being identical to what was presented for this segment in the Phase 2 Draft EIS. The second option (Option 2) would differ from Option 1 by installing shorter power poles and allowing some poles to be located closer to the Olympic Pipeline system. Neither of these options is expected to result in substantially different impacts to fish and wildlife species, and vegetation clearing would be similar for both options.

As described for the Redmond Segment, this segment occurs along the existing corridor. Despite the amount of potential tree removal, the basic character and functions of the habitat to support urbanized wildlife species, would be maintained. In addition, few protected wildlife species regularly occur in the corridor, and the number of trees removed from sensitive habitats would be minimized or avoided. Any tree removal would be mitigated as required by local critical area ordinances. Although several protected aquatic species occur in May Creek, stream and riparian habitat would not be substantially affected. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

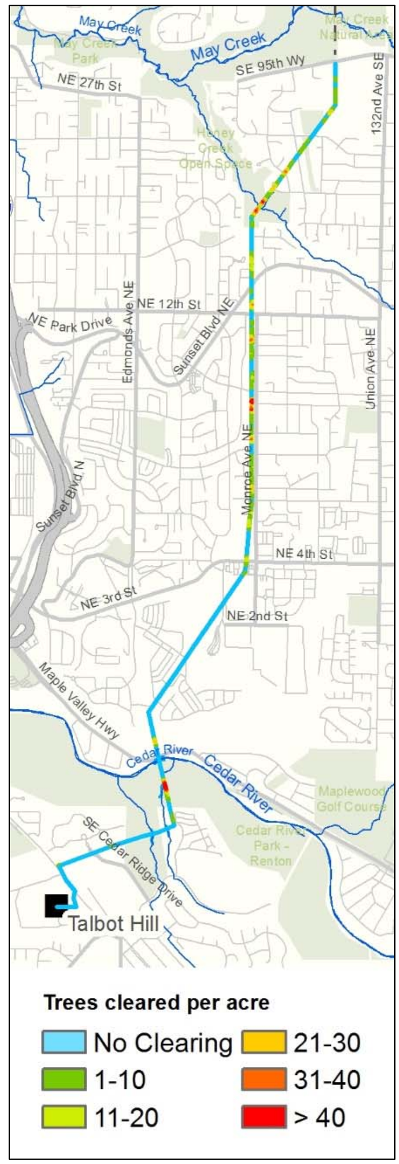
- **Vegetation Clearing:** About 250 trees (approximately 67 percent of the trees surveyed along the segment) could be removed (244 for Option 1 and 251 for Option 2), including the potential removal of about 30 significant trees and about 21 trees from critical area buffers. In some cases, removal may be avoided by trimming. Tree clearing per acre along the segment for Option 2 is illustrated in the graphic to the right.
- **Wildlife Habitat:** Tree removal would reduce the quality and quantity of wildlife habitat, and the reduction in the number of poles would also reduce potential avian nesting and roosting habitat. The limited number and footprint of poles that may be installed in wetland, riparian, or floodplain habitats would not measurably affect the functions of these habitats or associated species.
- **Sensitive Species:** No impacts to terrestrial species are expected because protected plant or terrestrial wildlife species are not known to inhabit the study area. Although three protected fish species (Chinook salmon, steelhead, and lamprey) occur in May Creek, stream habitat would not be substantially affected by the project.



4.4.5.8 Renton Segment

As described for the Redmond Segment, despite the amount of potential tree removal, the basic character and functions of the habitat to support urbanized wildlife species would be maintained. In addition, few protected wildlife species regularly occur in the corridor, and the number of trees removed from sensitive habitats would be minimized or avoided. Any tree removal would be mitigated as required by local critical area ordinances. Although several protected aquatic species occur in the Cedar River, stream and riparian habitat would not be substantially affected. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

- **Vegetation Clearing:** About 350 trees (57 percent of the trees surveyed along the segment) could be removed, including the potential removal of about 250 significant trees, three trees from critical areas, and an estimated 38 from critical area buffers. In some cases, removal may be avoided by trimming. Tree clearing per acre along the segment is illustrated in the graphic to the right.
- **Wildlife Habitat:** Tree removal would reduce the quality and quantity of wildlife habitat, and the reduction in the number of poles would also reduce potential avian nesting and roosting habitat. The limited number and footprint of poles that may be installed in wetland, riparian, or floodplain habitats would not measurably affect the functions of these habitats or associated species.
- **Sensitive Species:** No impacts to terrestrial species are expected because protected plant or terrestrial wildlife species are not known to inhabit the study area. Although four protected fish species (Chinook salmon, steelhead, bull trout, and lamprey) occur in the Cedar River, stream habitat would not be affected by the project.



4.4.6 Mitigation Measures

Federal, state, and local regulations, policies, ordinances, and programs, established to protect natural resources (such as tree protection ordinances and critical areas ordinances), and comprehensive plan policies were reviewed to identify mitigation measures. Mitigation measures specified by code and listed below as regulatory requirements would be required and are not discretionary. Potential mitigation measures listed below are based on comprehensive plan policies and existing PSE programs, and would be at the discretion of the applicant to adopt or the local jurisdictions to impose as a condition of project approval.

4.4.6.1 Regulatory Requirements

During Construction

- Replace trees removed for the project based on tree protection ordinances and critical areas regulations in each jurisdiction; some of these trees would likely be planted off-site or, in the case of the City of Newcastle, mitigated by paying into an in-lieu fee program. Replacement may be based on cross-sectional diameter of trees removed, or on habitat functions lost due to tree removal, depending on applicable regulations.
- In the Bridle Trails Subarea in the City of Bellevue, plant replacement trees as required under the City's Tree Retention and Replacement Code.

During Operation

- Trees removed from critical areas in Bellevue and Renton may require mitigation monitoring.

4.4.6.2 Potential Mitigation

Prior to Construction

- Increasing pole heights to allow greater separation between poles, allowing for some poles to be moved outside of critical areas or buffer.
- Partner with local, state, and federal agencies to identify potential off-site mitigation areas that are currently degraded.
- Develop enhancement plans to convert off-site mitigation areas into thriving ecosystems, with an emphasis on enhancing critical habitat areas and buffers through planting of native trees and shrubs to provide shade to streams and habitat for birds, woody debris for fish and amphibians, foraging habitat for mammals, and nesting habitat for avian species.
- Pay an in-lieu fee to the City of Bellevue for trees removed in the City's right-of-way to offset loss of public amenity.
- Pay an in-lieu fee to the City of Renton if tree replacement ratios cannot be met within the corridor.

During Construction

- Replant disturbed areas using native vegetation that would meet transmission line clearance requirements and would not need to be removed or require maintenance (i.e., trimming) in the future.
- Critical area and buffer trees would be trimmed and not removed if possible, and trimmed branches and trunks at least 4 inches in diameter would be left in place to provide a greater

amount of woody debris for the area streams, compared to the long-term natural recruitment process.

During Operation

- Continue to implement an ecologically based, integrated weed management program, to control the spread of invasive and noxious weeds along the corridor, and at PSE substation facilities, including the removal of existing infestations of invasive species.
- Continue to implement PSE's Avian Protection Program (PSE, 2016b), and mitigate for the direct loss of nesting and roosting habitat for protected species (i.e., eagles, osprey, and other raptors). This mitigation typically occurs by providing nesting platforms in isolated areas away from power lines when nests of species protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act need to be removed from the power structures. Any such removal/replacement would occur outside of the nesting season to minimize the disturbance of the birds. In addition, PSE will continue to proactively discourage and minimize the use of the power structures by all avian species by retrofitting existing structures with wire guards, flight diverter devices, and bird guards.
- During tree maintenance activities, critical area and buffer trees would be trimmed and not removed if possible, and trimmed branches and trunks at least 4 inches in diameter would be left in place to provide a greater amount of woody debris for the area streams, compared to the long-term natural recruitment process.

4.5 GREENHOUSE GASES

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because, like a greenhouse, they capture heat radiated from the earth. The accumulation of GHGs is a driving force in global climate change. Definitions of *climate change* vary among regulatory authorities and the scientific community. In general, however, climate change can be described as the changing of the earth's climate caused by natural fluctuations and human activities that alter the composition of the global atmosphere. This section quantifies major sources of GHG emissions associated with the Energize Eastside project.

While GHG concentrations are global and not localized, the study area for this analysis consists of the areas where the project would directly or indirectly result in GHG emissions or where the project could result in a reduction of carbon *sequestration* rates (defined in Section 4.5.2).

Key Changes from the Phase 2 Draft EIS

The GHG assessment was revised in this Final EIS to explain recent changes in regulatory guidance and to incorporate the latest available data into the description of existing GHGs. However, these updates were minimal and did not require changes to the impact analysis or result in new findings. Tree removal would be the same as was assessed in the Phase 2 Draft EIS for the Redmond, Bellevue North, and Redmond Segments, but updated tree removal data were available for the Bellevue Central and Bellevue South Segments and both Newcastle options (see Appendix L). In addition, modifications were made to the model used for the Phase 2 Draft EIS regarding how carbon is calculated. Therefore, impacts were reassessed to account for changes to the model. The Final EIS presents the potential GHG emissions that may result from PSE's Proposed Alignment.

4.5.1 Greenhouse Gas Compounds Considered in this Analysis

The principal GHGs of concern include the following:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Sulfur hexafluoride (SF_6)

Electrical utilities, including PSE, often use SF_6 in electrical equipment at substations because of its effectiveness as an insulating gas.

Each of the principal GHGs has a long atmospheric lifetime, existing in the atmosphere for 1 year to several thousand years. In addition, the potential heat-trapping ability of each of these gases varies significantly. For example, CH_4 is 28 times as potent as CO_2 at trapping heat, while SF_6 is 22,800 times more potent than CO_2 (IPCC, 2013; EPA, 2017). The ability of these gases to trap heat is called global warming potential.

Methods for Studying the Affected Environment

Emissions of GHGs at the state and county level have been estimated and published by Ecology and King County as well as Bellevue, Redmond, and Renton in the study area.

In emissions inventories, GHG emissions are typically reported in terms of metric tons of CO_2 equivalents (CO_2e). CO_2e are calculated as the product of the mass emitted of a given GHG and its specific global warming potential. While CH_4, N_2O, and SF_6 have much higher global warming potential than CO_2, CO_2 is emitted in such vastly higher quantities

DSD 005614

that it accounts for the majority of GHG emissions in CO_2e, both from residential developments and human activity in general.

The primary human activities that release GHGs include combustion of *fossil fuels* for transportation, heating, and electricity; agricultural practices that release CH_4, such as livestock production and decomposition of crop residue; and industrial processes that release smaller amounts of gases with high global warming potential such as SF_6. Deforestation and land cover conversion also contribute to global warming by reducing the earth's capacity to remove CO_2 from the air and altering the earth's albedo (surface reflectance), thus allowing more solar radiation to be absorbed.

4.5.2 Carbon Sequestration

Terrestrial carbon sequestration is the process in which atmospheric CO_2 is taken up into plants or soil and subsequently "trapped." Terrestrial sequestration can occur through planting trees, restoring wetlands, land management, and forest fire management. This Final EIS analysis focuses on the terrestrial sequestration associated specifically with trees and shrubs, as related to the project.

Trees and shrubs act as both *carbon sinks* and carbon sources. Vegetation can act as a carbon sink by absorbing CO_2 from the atmosphere, releasing oxygen through photosynthesis, and retaining the carbon within the vegetation. Trees also act as a carbon source when they are dying and decomposing; the carbon that was stored in the trees is released and reacts with oxygen in the air to form CO_2. Younger trees that are growing rapidly can store more carbon in their leaves than older trees. However, the total amount of carbon sequestered annually by healthy, large trees is greater than younger trees because the greater number of leaves compensates for the lower productivity of larger trees (USDA, 2011; Stephenson et al., 2014).

Trees suffering from disease will slow and eventually arrest the process of photosynthesis, thus limiting the ability of the affected tree to act as a carbon sink. Therefore, maintaining healthy trees keeps carbon stored in trees; however, certain landscape maintenance activities can generate modest GHG emissions (USDA, 2011). For example, water use, fertilizer use, exhaust from gas- and diesel-powered landscape equipment, and vehicle trips for maintenance crews result in CO_2 emissions. Carbon sequestration varies with both the species of trees as well as the age of trees; as a general example, 1,000 pine trees sequester approximately 32 metric tons of CO_2e per year (CAPCOA, 2013).

4.5.3 Greenhouse Gases in the Study Area

Ecology estimated that in 2013, Washington produced about 94 million gross metric tons (about 104 million U.S. tons) of CO_2e (Sandlin, 2016). Sources of GHG emissions in the state are shown in Figure 4.5-1.

King County last inventoried countywide GHG emissions for the year 2012. Community consumption-based emissions (which include some *lifecycle emissions* associated with food consumed within the county but grown elsewhere) totaled 55 million metric tons of CO_2e (King County, 2015), although only about 15 million metric tons were emitted within the county.

As described on page 4-9 of the Phase 1 Draft EIS, the cities of Bellevue and Renton have developed GHG inventories.

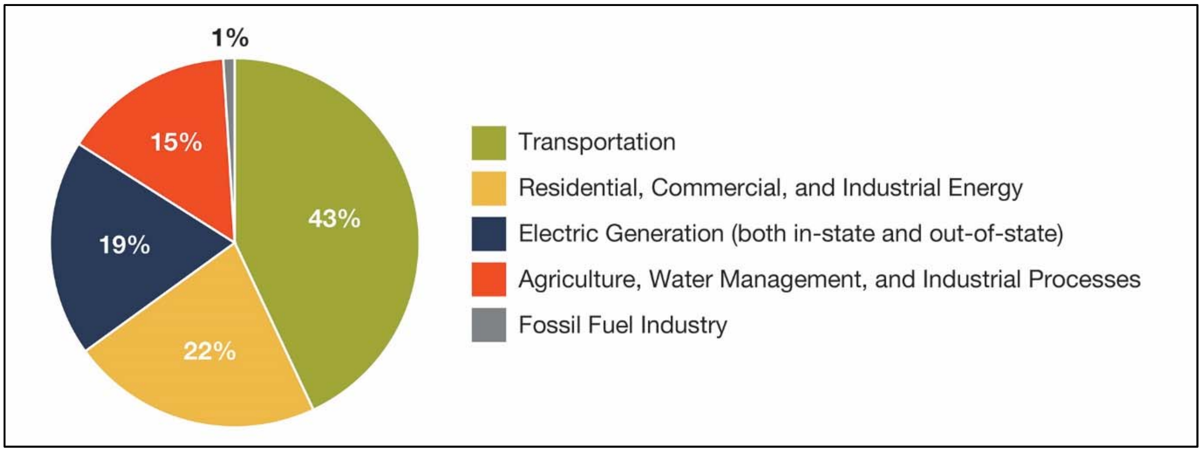


Figure 4.5-1. Sources of GHG Emissions in Washington State

4.5.4 Relevant Plans, Policies, and Regulations

The Phase 1 Draft EIS provided an overview of the planning policies and regulations pertinent to GHG emissions. For the Phase 2 Draft EIS, the policies and regulations considered were updated to be applicable to the project-level analysis (see Section 3.4.2 of the Phase 2 Draft EIS). On April 5, 2017, the Council on Environmental Quality (CEQ) withdrew its *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* (CEQ, 2016) for further review. Consideration of GHG sources identified in the guidance was used in the impact assessment; however, the GHG sources used are typical to those used in other land use planning analyses, such as the General Reporting Protocol of the Climate Registry (The Climate Registry, 2016) and the Bay Area Air Quality Management District's CEQA Air Quality Guidelines (BAAQMD, 2017). Therefore, no changes have been made to the GHG impact assessment methodology for this Final EIS.

4.5.5 Long-term (Operation) Impacts Considered

4.5.5.1 Methods for Analyzing Long-term Impacts

The Energize Eastside project could result in an increase of GHG emissions from the potential loss of sequestered carbon from the removal of trees and vegetation to accommodate the new powerlines and substation. The potential loss of carbon sequestration from tree removal is based on tree inventory data prepared for PSE (The Watershed Company, 2016, 2017) for each project segment. Tree removal for the Newcastle Options (i.e., Option 1 – No Code Variance and Option 2 – Code Variance) would be roughly the same because, despite their differing pole placement and configurations, the required clearing area would be the same. Sequestration calculations were made using the i-Tree model. i-Tree is a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban and rural forestry analysis and benefits assessment tools (USFS, 2017). See Section 4.10, *Economics*, for information about the i-Tree model and for a discussion of the monetary value of lost *ecosystem services* due to reduced tree cover. This analysis compares the estimated change in GHG emissions for the project to the State of Washington GHG reporting thresholds (Chapter 173-441 WAC, *Reporting of Emissions of Greenhouse Gases*). The analysis of GHG emissions represents a cumulative impact analysis because impacts are only important due to cumulative effects that GHG emissions have had and are having on global climate. Impacts are assessed based on the project's potential to result in a cumulatively considerable contribution to the state and overall global GHG burden. Potential mitigation measures to minimize or eliminate GHG emissions associated with the project are considered, as warranted.

A quantitative assessment of GHG emissions of sulfur hexafluoride (SF_6) is also included in the analysis. SF_6 is a potent GHG used as an electrical insulator in some high-voltage equipment in substations and is 22,800 times more potent than carbon dioxide as a GHG (EPA, 2017). The analysis describes the state of fugitive SF_6 control that is currently used in electrical equipment manufacturing standardized by the International Electrotechnical Commission in Standard 62271-1 in 2004 (Carey, 2013), and predicts fugitive emission rates associated with large-scale electrical substations, and estimates fugitive SF6 emissions based on a standardized leakage rate.

Operational GHG impacts would result primarily from the removal of trees and vegetation that would reduce ongoing sequestration of CO_2 from the atmosphere. To a lesser degree, GHG emissions impacts would result from employee vehicle trips to maintain the new facilities. Additionally, there may be some fugitive emissions from substation equipment that use SF_6 as an insulating gas.

The following specifically defines project-level long-term (operational) impacts to GHGs:

- **Less-than-Significant** – The project would result in operational GHG emissions below the State of Washington reporting threshold of 10,000 metric tons of CO_2e in a given year.
- **Significant** –The project (after implementing mitigation measures) would result in operational GHG emissions at or above the State of Washington reporting threshold of 10,000 metric tons of CO_2e in a given year.

4.5.6 Long-term Impacts: No Action Alternative

The assessment of impacts to GHG emissions under the No Action Alternative is the same as presented in the Phase 2 Draft EIS. Under the No Action Alternative, no infrastructure improvements, changes to vegetation management activities, or new or relocated utility yards would be required. No new employee vehicle trips are envisioned under the No Action Alternative. While there would be GHG generated by ongoing maintenance and operation activities, selecting the No Action Alternative would neither increase nor decrease such activities. Consequently, there would be no operational GHG impacts associated with the No Action Alternative.

4.5.7 Long-term Impacts: PSE's Proposed Alignment

The following pages summarize the potential impacts on GHGs for PSE's Proposed Alignment, presented for the Richards Creek substation and by segment. For the Redmond, Bellevue North, Bellevue Central, and Renton Segments, the analysis was unchanged from the Phase 2 Draft EIS. For the Richards Creek substation site and the Bellevue South and Newcastle Segments, the analysis included a review of the project design as presented in the permit applications submitted to Bellevue and Newcastle (PSE, 2017b and 2017c, respectively). The results below have been revised relative to the Phase 2 Draft EIS, incorporating the more detailed information in the permit applications on tree removal. The new information and analysis have not altered the conclusions presented in the Phase 2 Draft EIS regarding significant impacts to GHG.

4.5.7.1 Impacts Common to all Components

Construction of any of the segments and the Richards Creek substation site would result in some level of sequestration losses due to tree removal. Additionally, PSE's Proposed Alignment would result in fugitive SF_6 emissions from gas-insulated circuit breakers at the Richards Creek, Sammamish, and Talbot Hill substations. PSE's Proposed Alignment would result in a project-wide sequestration loss of 134 metric tons of CO_2e per year. However, the emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant. Figure 4.5-2 presents the sequestration losses associated with each segment, and the following narrative describes the tree losses associated with each segment.

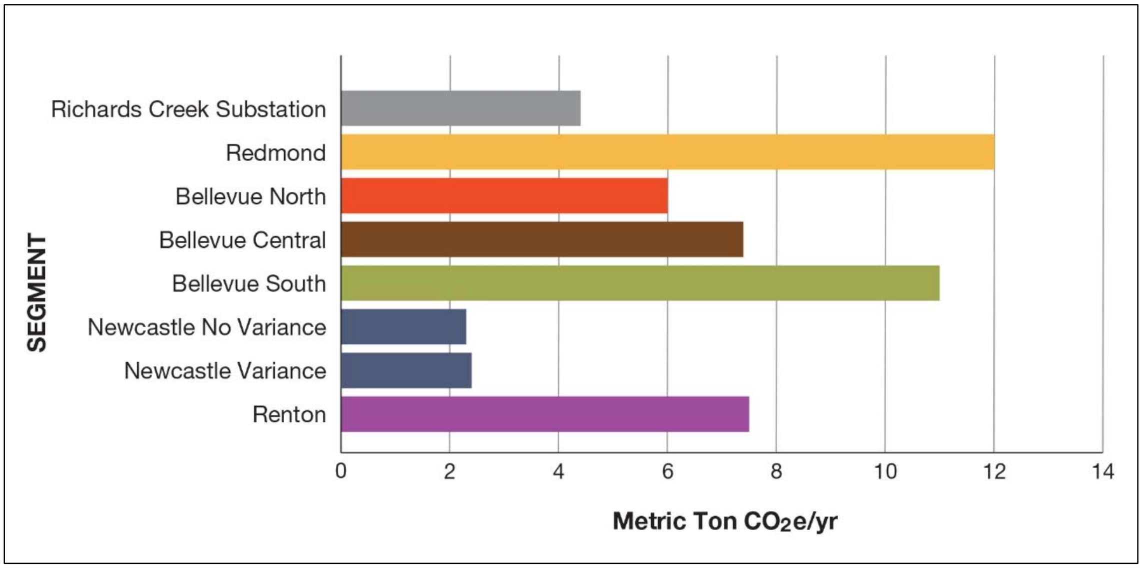


Figure 4.5-2. Estimated GHG Sequestration Losses in Project Segments

4.5.7.2 New Richards Creek Substation and other Substation Improvements

The assessment below has been updated to incorporate permit-level data for the Bellevue Central Segment, Richards Creek substation site, and the Bellevue South Segment. Analysis for the other segments has not changed. The total lot area for the substation site is 8.4 acres in size, and the substation yard would cover 1.9 acres within a fenced lot. Approximately 178 trees would be removed to allow for the installation of the substation and equipment (The Watershed Company, 2017). The loss of annual CO_2 sequestration associated with the removal of trees was estimated using the i-Tree model. Tree removal at the Richards Creek substation site would result in 4.4 metric tons of CO_2e per year in sequestration losses. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

A small number of vehicle trips are expected to be generated when the completed substation is operational. As described in the Phase 1 Draft EIS (Chapter 4, *Greenhouse Gas Emissions*), such trips would be infrequent and would not result in appreciable GHG emissions. Therefore, such trips would have a negligible effect on GHG emissions.

The substation would include a 115 kV circuit breaker with a *nameplate capacity*[1] of 128 pounds of SF_6 and five 230 kV circuit breakers, each with a nameplate capacity of 161 pounds. Additionally, one 230 kV circuit breaker would be installed at the Sammamish substation and two 230 kV circuit breakers would be installed at the Talbot Hill substation, each with a nameplate capacity of 161 pounds. At the Rose Hill substation, PSE would rebuild the existing substation from a 115 kV to 12.5 kV substation to a 230 kV to 12.5 kV substation in order to operate both lines at 230 kV such that two 230 kV circuit breakers would be installed, each with a nameplate capacity of 161 pounds. Consequently, all new breakers would total an SF_6 load of approximately 1,738 pounds. Average leakage rate for gas-insulated switchgear equipment is 0.5 percent per year as standardized by the International Electrotechnical Commission in Standard 62271-1 in 2004 (Blackman et al., 2006). This would result in fugitive SF_6 emissions of approximately 8.69 pounds per year, which is equivalent to 90 metric tons of CO_2e per year.

4.5.7.3 Redmond Segment

The assessment below is the same as presented in the Phase 2 Draft EIS, as the analysis has not changed. Approximately 632 trees would be removed to allow for the installation of power lines and poles along the Redmond Segment (The Watershed Company, 2016). Tree removal along the Redmond Segment would result in 12 metric tons of CO_2e per year in sequestration losses. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

4.5.7.4 Bellevue North Segment

The assessment below is the same as presented in the Phase 2 Draft EIS, as the analysis has not changed. Approximately 509 trees would be removed to allow for the installation of power lines and poles along the Bellevue North Segment (The Watershed Company, 2016). Tree removal along the Bellevue North Segment would result in 6.0 metric tons of CO_2e per year in sequestration losses. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

4.5.7.5 Bellevue Central Segment (Revised Existing Corridor Option)

PSE's Proposed Alignment for the Bellevue Central Segment follows the route of the Existing Corridor Option as described in the Phase 2 Draft EIS. The number of trees that would be removed is the same as what was presented in the Phase 2 Draft EIS for the Existing Corridor Option, except it also includes permit-level tree data for the Lakeside substation (see Appendix L). Approximately 642 trees would be removed to allow for the installation of power lines and poles along the Bellevue Central Segment (The Watershed Company, 2016, 2017). Tree removal along the Existing Corridor Option would result in 7.39 metric tons of CO_2e per year in sequestration losses. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

4.5.7.6 Bellevue South Segment (Revised Willow 1 Option)

PSE's Proposed Alignment for the Bellevue South Segment follows the route of the Willow 1 Option as described in the Phase 2 Draft EIS. The number of trees that would be removed is the same as what was presented in the Phase 2 Draft EIS for the Willow 1 Option. Approximately 1,030 trees would be removed to allow for the installation of power lines and poles along the Bellevue South

[1] The total SF_6 containing capacity (lbs.) in installed equipment during a year. Note, that "total nameplate" capacity refers to the manufacturer recommended full and proper charge of the equipment, rather than to the actual charge, which may reflect leakage.

Segment (The Watershed Company, 2016, 2017). Tree removal along the Bellevue South Segment would result in 11 metric tons of CO_2e per year in sequestration losses. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

4.5.7.7 Newcastle Segment (Option 1, No Code Variance)

Under Option 1, approximately 244 trees would be removed to allow for the installation of power lines and poles along the Newcastle Segment (The Watershed Company, 2017). Tree removal along the Newcastle Segment would result in 2.3 metric tons of CO_2e per year in sequestration losses. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

4.5.7.8 Newcastle Segment (Option 2, Code Variance)

Under Option 2, approximately 251 trees would be removed to allow for the installation of power lines and poles along the Newcastle Segment (The Watershed Company, 2017). Tree removal along the Newcastle Segment would result in 2.4 metric tons of CO_2e per year in sequestration losses. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

4.5.7.9 Renton Segment

Approximately 351 trees would be removed to allow for the installation of power lines and poles along the Renton Segment (The Watershed Company, 2016). Tree removal along the Renton Segment would result in 7.5 metric tons of CO_2e per year in sequestration losses. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

4.5.8 Mitigation Measures

For GHG, regulations and state and local GHG reduction programs were reviewed to identify mitigation measures. Mitigation measures specified by code would be required, whereas mitigation measures based on state and local programs would be at the discretion of PSE to adopt or the local jurisdictions to impose as a condition of project approval.

4.5.8.1 Regulatory Requirements

Although there are no regulations specifically limiting GHG emissions, PSE would need to comply with applicable federal, state, and local regulations that apply to other resources, some of which would mitigate the potential for long-term adverse GHG impacts (e.g., regulations that protect tree coverage in critical areas). Mitigation measures required for compliance with these other regulations are not discretionary.

As described in Section 4.4.6, *Plants and Animals*, PSE would provide mitigation for impacts to plant resources, using on- and off-site habitat enhancements, developed in coordination with local, state, and federal agencies. The following measure is identified in Section 4.4.6, *Plants and Animals*, and would potentially offset the long-term sequestration loss impacts.

- Replace trees removed for the project based on tree protection ordinances and critical areas regulations in each jurisdiction; some of these trees would likely be planted off-site or, in the case of the City of Newcastle, mitigated by paying into an in-lieu fee program. Replacement may be based on the cross-sectional diameter of trees removed, or on habitat functions lost due to trees removal, depending on applicable regulations.

4.5.8.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on review of ongoing efforts to reduce GHG emissions related to gas-insulated switchgear throughout the U.S. Long-term operational GHG impacts would be less-than-significant, and no mitigation measures are required. However, the following BMP could be implemented to reduce GHG contributions:

Prior to Construction

- Install SF6-filled equipment with manufactured guaranteed leakage rate of 0.1 percent at the Richards Creek, Sammamish, and Talbot Hill substations. Installation of such equipment could reduce fugitive SF6 emissions by up to 80 percent over older equipment types.

4.6 RECREATION

This section provides a project-level analysis of potential impacts to recreation sites in the study area including parks, natural areas, open spaces, trails, and playfields, as well as amenities such as community centers, playground equipment, school play fields, and private recreation facilities (e.g., golf clubs). For the purpose of this analysis, informal recreation includes activities that take place outside of designated recreation sites (e.g., bicycling on a street). Additionally, analysis of visual impacts from recreation sites is found in Section 4.2, *Scenic Views and Aesthetic Environment*. The study area for recreation resources includes PSE's existing corridor and adjacent parcels (Figure 4.6-1).

Key Changes from the Phase 2 Draft EIS

The options that would have required an easement and resulted in the conversion of recreation land purchased with restricted funds for non-recreation purposes are no longer being considered. Thus there would be no significant impacts to recreation from PSE's Proposed Alignment. No poles would be placed in recreation sites where none currently are located.

4.6.1 Relevant Plans, Policies, and Regulations

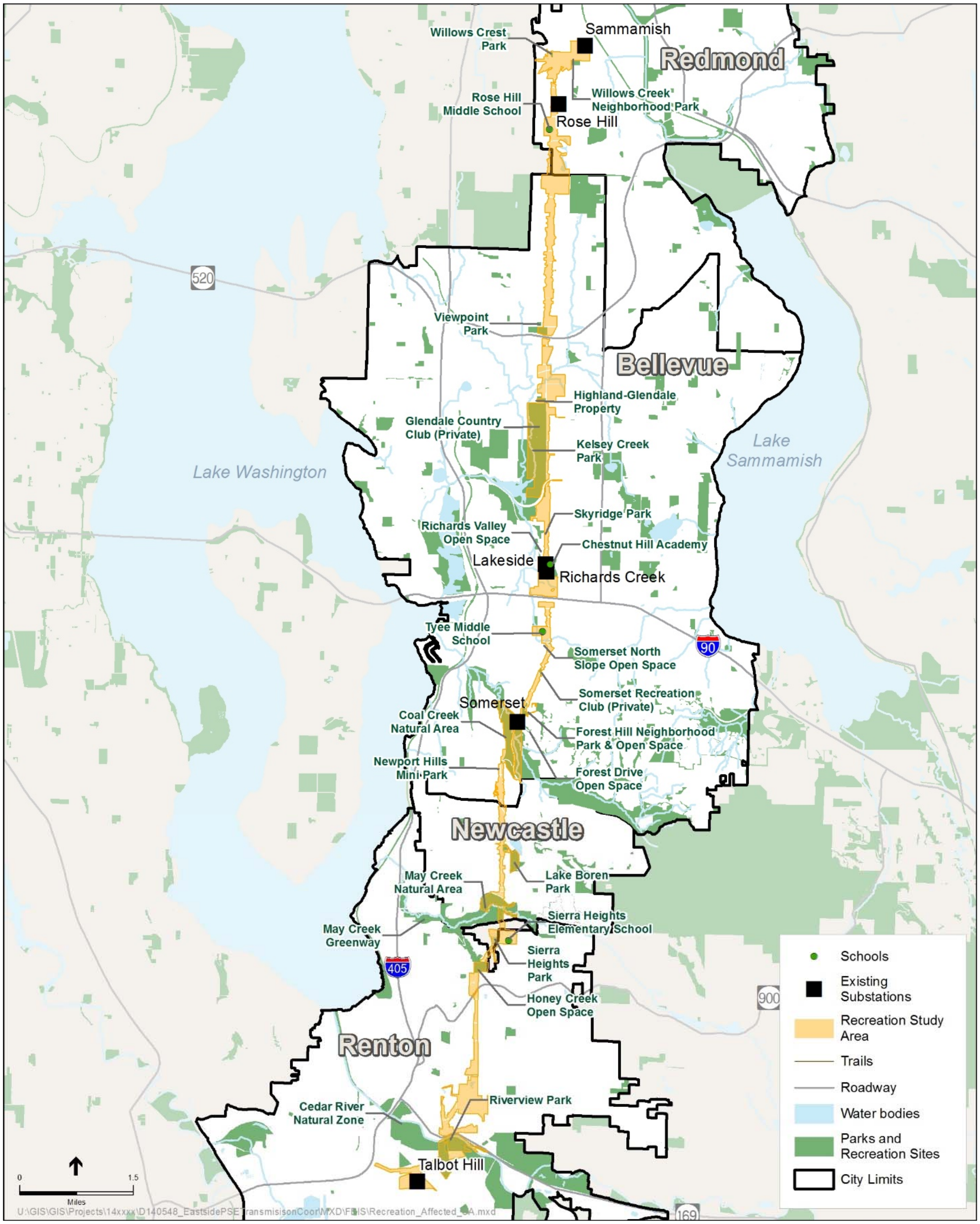
Public recreation sites in the study area are managed by King County, the City of Bellevue, City of Newcastle, City of Redmond, and City of Renton. Table 12-1 in the Phase 1 Draft EIS lists the plans for the *study area communities*. Additional applicable plans included in the Phase 2 Draft EIS are the City of Bellevue Parks & Open Space System Plan (City of Bellevue, 2016) and Redmond's Transportation Master Plan (2013). PSE's Proposed Alignment would not require the conversion of recreation lands to a non-recreation use. Thus, the City of Bellevue's Comprehensive Plan (2015) policy that requires a public review process for proposed conversions of park property to a non-recreational use would not be applicable.

4.6.2 Recreation Resources in the Study Area

The recreation study area for the Final EIS contains approximately 18 recreation sites plus many miles of trails, shown on Figure 4.6-1. This encompasses approximately 475 acres in recreation sites owned and operated primarily by local governments, and includes four schools and two privately owned recreation clubs. The sites provide a variety of recreational opportunities, ranging from small neighborhood or "pocket" parks to large natural park areas and regional trails that extend across the study area. Recreation Resources in the study area are described in more detail in the Phase 2 Draft EIS.

Methods for Studying the Affected Environment

The EIS Consultant Team collected maps and other information available from the Partner Cities and King County to describe existing recreational resources. Plans and policies for each Partner City were reviewed to evaluate goals and priorities for recreation in the study area and to identify planned improvements and expansions.



Note: Trails are not labeled here but are shown in the maps of individual segments in Section 4.6.5, below.

Source: King County, 2015; Ecology, 2014; Bellevue, 2015; Newcastle, 2015; Renton, 2015; Kirkland, 2015; Redmond, 2015.

Figure 4.6-1. Recreation Sites in the Study Area

4.6.3 Long-term (Operation) Impacts Considered

Potential impacts to recreation include the loss of use of a recreation site; or a substantive change in the overall user enjoyment or recreational experience (generally related to visual resources, such as views of a pole or change in vegetation structure). The following specifically defines project-level long-term (operational) impacts to recreation:

- **Less-than-Significant** – Long-term impacts to recreation would be less-than-significant if there is no permanent change to a recreation site or the current use of the site is not permanently lost. For example, a change to existing infrastructure within a recreation site (e.g., a change in pole types) or a change in vegetation type from forested to low-growing vegetation that does not change the use of the recreation site would be considered a less-than-significant impact.
- **Significant** – Impacts would be significant if the current use of the recreation site is permanently lost, or if the conversion of vegetation type (e.g., from forested to low-growing vegetation) would substantively change or negatively impact user enjoyment of a recreation site such that it would preclude the use of the site. Non-compliance with recreation plans and policies, including the acquisition of publicly owned recreation land for transmission line easements, would be a significant impact.

Methods for Studying Long-term Impacts

To determine long-term (operational) impacts, the EIS Consultant Team overlaid the segments on maps of recreation sites in the study area. The following factors were used to determine impacts to recreation: the presence of existing electrical infrastructure; existing recreational uses and available amenities; frequency of use; and existing vegetation as well as proposed pole size, height, and location. Changes in vegetation, amenities, or other features that would reduce user enjoyment of a recreation sites were considered. The potential need to obtain easements within a recreation site was also considered.

4.6.4 Long-term Impacts: No Action Alternative

There would be no changes to recreation sites or opportunities from the No Action Alternative because no new utility infrastructure would be constructed. Under the No Action Alternative, recreation sites (including trails) may be temporarily closed during maintenance of the existing transmission lines.

4.6.5 Long-term Impacts: PSE's Proposed Alignment

4.6.5.1 Impacts Common to all Components

Recreation sites are located within and adjacent to PSE's existing corridor. PSE has easements or owns the parcels outright along the existing corridor and would not acquire new easements as part of PSE's Proposed Alignment. Within PSE's existing corridor, poles would be replaced in generally the same location as the existing poles (i.e., usually within 25 feet up or down the line). The existing H-frame structures are approximately 60 feet tall. Where poles are replaced in or adjacent to a recreation site, the visual appearance of the infrastructure would be different than existing conditions, as the poles would be taller. However, there would be fewer (or the same number of) poles in or adjacent to each recreation site. This change would not negatively affect the experience of park users, and impacts would be less-than-significant. Similar to the No Action Alternative, recreation sites (primarily trails along the corridor) may be temporarily closed during maintenance of the new transmission lines.

Vegetation is currently managed within the existing corridor; however, due to more stringent North American Electric Reliability Corporation (NERC) requirements for 230 kV transmission lines, PSE's Proposed Alignment would require a substantial number of trees to be removed (see *Vegetation Management* in Section 4.4.1.1, *Plants and Animals*). The clearing of vegetation would diminish the enjoyment of recreationists at some recreation sites. At many parks, there would be no change to existing vegetation, whereas at others many trees would be removed. At some recreation sites, tree removal would not be visible to recreationists from within the recreation site and thus no change would be perceived.

Other potential impacts under PSE's Proposed Alignment would be less-than-significant for all recreation sites, as none would be permanently lost or substantively altered such that use is precluded. Potential impacts to specific sites are described below, by component, segment, and option.

The following pages summarize the potential impacts on recreation for PSE's Proposed Alignment, presented for the Richards Creek substation and by segment. For the Redmond, Bellevue North, Bellevue Central, and Renton Segments, the analysis included a review of refined project design details for PSE's Proposed Alignment, with results revised relative to the Phase 2 Draft EIS to reflect the new information. For these segments, the new information and analysis have not altered the conclusions presented in the Phase 2 Draft EIS regarding significant impacts on recreation.

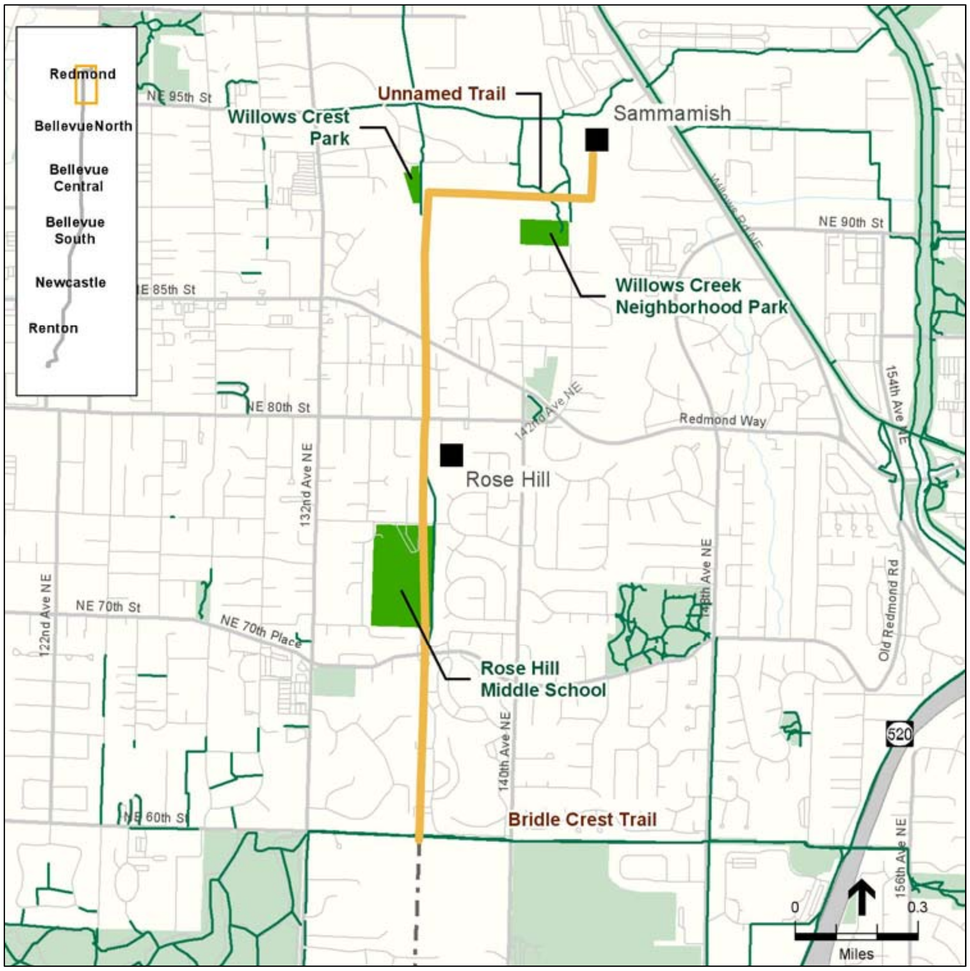
For the Richards Creek substation site and the Bellevue South and Newcastle Segments, the analysis included a review of the project design as presented in the permit applications submitted to Bellevue and Newcastle (PSE, 2017b and 2017c, respectively). The results below have been revised relative to the Phase 2 Draft EIS, incorporating the more detailed information in the permit applications on pole locations and vegetation clearing. The conclusions regarding significant impacts on recreation, however, are the same as presented in the Phase 2 Draft EIS, with one exception. In the Phase 2 Draft EIS, impacts from Bypass Options 1 and 2 would have been significant because PSE would need to obtain easements on publicly owned recreation sites, which is not in agreement with City of Bellevue park plans and policies. The Bypass Options evaluated in the Phase 2 Draft EIS are not analyzed the Final EIS because they are not part of PSE's Proposed Alignment.

4.6.5.2 New Richards Creek Substation

There would be no long-term impacts to recreation from operation of the substation because there are no recreation sites on or adjacent to the proposed substation site. The Chestnut Hill Academy is beside the Lakeside substation and near the proposed Richards Creek substation site (approximately 300 feet to the north). The new substation may be visible from recreation facilities at the school; however, some of the forested area between the school and the proposed substation site would remain. Impacts would be less than significant.

4.6.5.3 Redmond Segment

Impacts to recreation in the Redmond Segment would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. Potential impacts are summarized below, by recreation site. PSE's Proposed Alignment follows the route of the Redmond Segment as evaluated in the Phase 2 Draft EIS but includes refined design details for pole types and placement.



- **Willows Crest Park:** The taller poles with a differing pole configuration would be visible from the park, but the change would be less-than-significant. This park is outside of the existing corridor and would not be affected by vegetation clearing.
- **Willows Creek Neighborhood Park:** This park is outside of the corridor and would not be affected by vegetation clearing. The taller poles in the corridor would not be visible from the park, and there would be no impacts to the park.
- **Trails on the Corridor (unnamed, on corridor, between the Sammamish substation and where the corridor turns south):** Each existing set of two H-frames (four poles) would be replaced with either two approximately 90-foot or two 110-foot steel monopoles (this differs from the design evaluated in Phase 2 Draft EIS, which replaced the two H-frames with one monopole). Note that not all poles in this location would be removed, only those for the existing

115 kV lines that would be replaced as part of this project. The poles would look different than existing conditions. Although vegetation greater than 15 feet tall would be removed, most existing vegetation in the section of the corridor containing these trails is shrub height, and changes would therefore be small. These changes would not affect the experience of trail users, and impacts would be less-than-significant.

- **Rose Hill Middle School:** The existing H-frame structures would be replaced with one approximately 100-foot monopole (the same pole configuration as the Phase 2 Draft EIS). The taller poles would look different than the existing poles, but the recreation experience at the playfields would be maintained. Vegetation clearing would be similar to existing conditions as the area already has low-growing vegetation, primarily lawn, in the existing corridor. No trees would be removed on the school property. The existing H-frame structures immediately south of the school property would be replaced with one approximately 110-foot monopole. Impacts would be less-than-significant. The existing 115 kV lines and monopoles to the east of the project would not change.

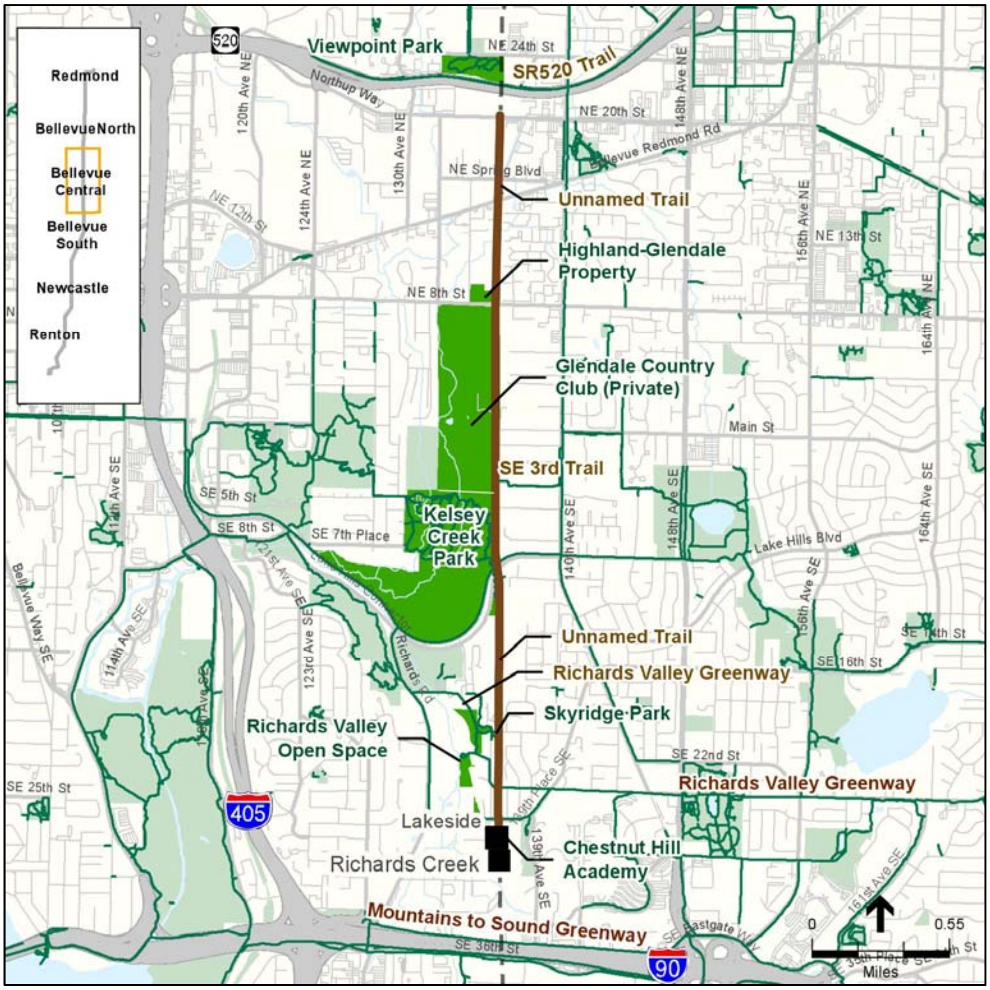
4.6.5.4 Bellevue North Segment

Impacts to recreation in the Bellevue North Segment would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. Potential impacts are summarized below, by recreation site. PSE's Proposed Alignment follows the route of the Bellevue North Segment as evaluated in the Phase 2 Draft EIS but includes refined design details for pole types and placement.

- **Bridle Crest Trail, Trail along NE 52nd Ln, and SR 520 Trail:** All of these trails cross the corridor perpendicularly. Vegetation in the corridor is already maintained for the existing 115 kV lines; however, vegetation taller than 15 feet may need to be removed within the managed right-of-way. Three trees would be removed on Bridle Crest Trail. Poles and changes in vegetation may be visible to trail users as they approach the crossing. There would be little change in the user experience of these trails as the corridor is only a small portion of the experience, and impacts would be less-than-significant.
- **Viewpoint Park:** The existing corridor crosses the east edge of the park, and the two H-frames would be replaced with two approximately 110-foot monopoles (this is different than the design evaluated in Phase 2 Draft EIS, which replaced the two H-frames with one monopole). Vegetation in the corridor is already maintained for the existing 115 kV lines, and no trees would be removed. Other vegetation in the right-of-way taller than 15 feet may need to be removed. Vegetation clearing would only occur within the existing corridor and would not affect the majority of the park. The user experience would be maintained and impacts would be less-than-significant.

4.6.5.5 Bellevue Central Segment (Revised Existing Corridor Option)

PSE's Proposed Alignment for the Bellevue Central Segment follows the route of the Existing Corridor Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. Impacts to recreation from the project in the Bellevue Central Segment would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. Potential impacts are summarized below, by recreation site.



- **Unnamed Trail (on Corridor at Bel-Red Road and NE Spring Boulevard):** There would be no change to this segment of trail, and thus no impact.
- **Highland-Glendale Property:** The existing corridor crosses the east edge of the park, but no poles are located within the park and no new poles are proposed. The portion of the park within the existing corridor is maintained lawn, and thus there would be no change to vegetation. The user experience would be maintained and impacts would be less-than-significant.

- **Glendale Country Club (private):** The existing corridor crosses the east edge of the country club. Six approximately 100-foot tall monopoles would be placed in similar locations as the existing poles. There would be one pole at each site rather than two H-frames, but poles would be taller and more visible from the country club property. Vegetation within the corridor is maintained for the existing lines, and consists of lawn for approximately half the length of the country club. In other areas, vegetation clearing would be more noticeable and approximately 35–40 trees may be removed. There would be no changes to the amenities offered by the club or to the experience of golfers. Impacts would be less-than-significant.
- **Unnamed Trails along the Corridor (between SE 10th Street and SE 20th Street), 10th Avenue Trail, and SE 3rd Trail:** There would be fewer poles (one approximately 100- to 110-foot monopole at each location instead of two H-frames) and more vegetation cleared. Up to 125 trees would be removed that may visible from the trail. Removal of trees would change the user experience, but the trail would still be enjoyable. Impacts would be less-than-significant.
- **Kelsey Creek Park:** The existing corridor is located within Kelsey Creek Park, on its east edge. There would be three approximately 100- to 110-foot monopoles placed near existing poles (with this design, the poles may be taller than was evaluated in the Phase 2 Draft EIS for this location). The poles would be taller, but there would be fewer within the park (one monopole at each location instead of two H-frames). Vegetation is currently managed for the existing 115 kV lines and no trees are proposed to be removed. These changes would not alter the user experience, and impacts would be less-than-significant.
- **Skyridge Park:** The existing poles (two H-frame structures) on the east edge of the park in the existing easement would be replaced with an approximately 100-foot monopole. The pole would be taller but there would be fewer poles. The majority of the existing easement in the park is maintained lawn; however, up to six trees would be removed. The park may look different, but these changes would not affect the user experience. Impacts would be less-than-significant.
- **Richards Valley Greenway:** The proposed greenway would cross the existing corridor along SE 24th Street. The poles in this location would be taller, but there would be fewer poles than existing. The taller poles would not change the experience of future users. Impacts would be less-than-significant.
- **Richards Valley Open Space:** It is unlikely that the taller poles with a differing pole configuration would be visible from the park because it heavily vegetated and downslope from PSE's corridor. This park is outside of the existing corridor and would not be affected by vegetation clearing. Impacts would be less-than-significant.

4.6.5.6 Bellevue South Segment (Revised Willow 1 Option)

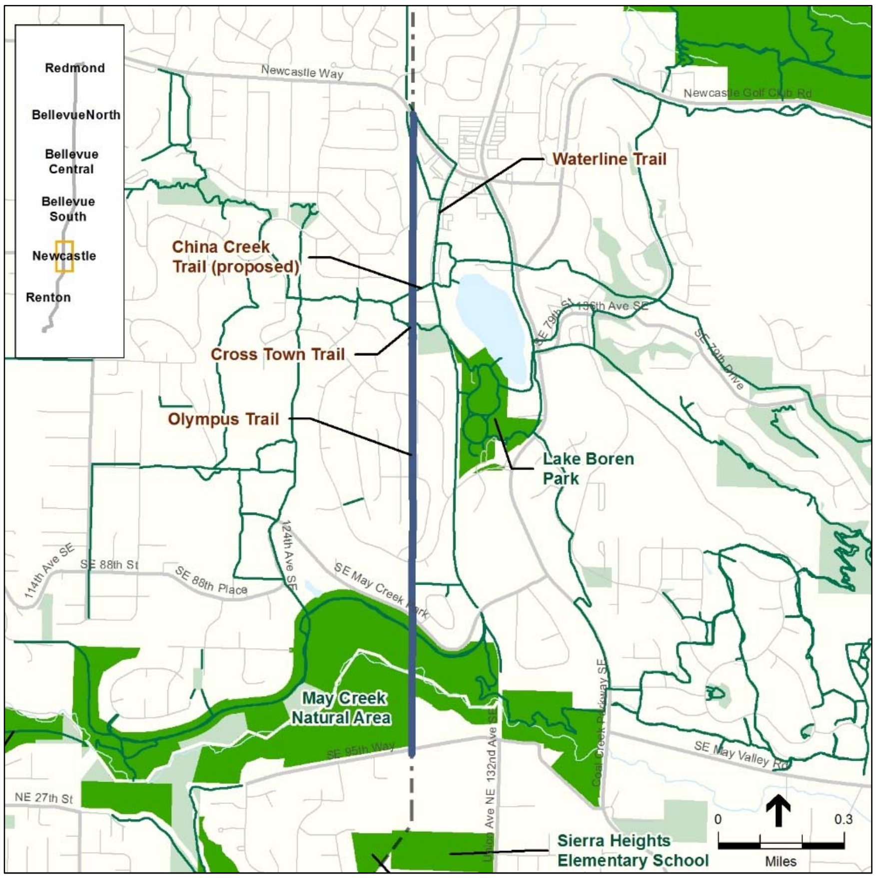
PSE's Proposed Alignment for the Bellevue South Segment follows the route of the Willow 1 Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. Impacts to recreation from PSE's Proposed Alignment in the Bellevue South Segment would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. Potential impacts are summarized below, by recreation site.

- **Mountains to Sound Greenway I-90 Trail:** The Bellevue South Segment crosses the trail perpendicularly. Poles and wires may be visible to trail users as they approach the crossing. However, trail users would not likely perceive a change, and the impact would be less-than-significant.
- **Tyee Middle School:** The more northern H-frame structures would be replaced with a 100-monopole; the H-frame structure near SE Allen Road would be replaced with two approximately 110-foot monopoles. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated a single monopole replacing each set of H-frame structures. Most of the area is already maintained with low-growing vegetation, and vegetation management would be similar to existing conditions. However, four trees near SE 40th Street, one adjacent to the school, and approximately 12 trees near SE Allen Road would be removed. These changes would be noticeable but not affect recreation opportunities and uses, and impacts would be less-than-significant.

- **Somerset North Slope Open Space:** No poles are currently within the existing easement through the open space, and no poles would be placed within or adjacent to the open space. The Phase 2 Draft EIS evaluated placing a pole within and adjacent to the open space. Vegetation would be removed, including one tree within the managed right-of-way that was not previously affected. The change in vegetation would be noticed by people near the park; however, the site is fenced and thus not used by the public. Impacts would be less-than-significant.
- **Somerset Recreation Club (private):** Two approximately 90-foot poles would be placed in a similar location to the existing two H-frame structures on the site, and approximately 4 to 8 trees would be removed. The new poles would be taller, but there would be no change to recreational uses, and impacts would be less-than-significant.
- **Forest Hill Neighborhood Park & Open Space:** The two 60-foot H-frame structures would be replaced with two approximately 90-foot tall monopoles. There would be more vegetation clearing than existing conditions; including the removal of approximately 13 trees. Park users may notice a change in vegetation and pole type. The play area and open space to the east of the corridor would not be affected. There would be no change to the experience of park users, and impacts would be less-than-significant.
- **Forest Drive Open Space:** There would be no change to the open space and thus no impacts.
- **Coal Creek Natural Area:** The Coal Creek Natural Area is on both sides of Coal Creek Parkway south of Coal Creek, and PSE's existing corridor crosses through the natural area. The existing pairs of 60-foot H-frames would be replaced with 100-foot monopoles or two approximately 110-foot tall poles. The new poles and lines would be placed in similar locations to the existing 115 kV lines. This would result in three poles within the natural area, plus four along Coal Creek Parkway north of the Coal Creek Natural Area parking lot. Approximately 25–30 trees would be cleared (mostly near Coal Creek Parkway), and users of trails along or crossing the corridor would notice reduced vegetation and a change in pole configuration (the change from four to two taller poles). This could change the experience of trail users along the corridor; however, the impact would be less-than-significant because opportunities and uses would be maintained.
- **Newport Hills Mini Park:** The two H-frame structures in Newport Hills Mini Park have three poles each (six poles total). These would be replaced with two approximately 110-foot tall poles. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated two 85-foot tall poles at this location. Vegetation would be cleared to PSE standards and approximately 10 trees would be removed. Much of the park is already cleared of vegetation, but park users would notice the change in vegetation and pole type. However, impacts would be less-than-significant because the opportunities in and uses of the park would be maintained.
- **Waterline Trail:** The trail runs parallel to PSE's existing corridor in a Seattle Public Utilities (SPU) easement. Taller poles and cleared vegetation in the adjacent easement would be visible from the trail, but there would be no change to the trail itself or the Seattle Public Utilities (SPU) easement. These changes may affect the user's experience but would be less-than-significant as the opportunities in and uses of the trail would be maintained.

4.6.5.7 Newcastle Segment – Option 1 (No Code Variance)

The impacts to recreation would be the same with both options for the Newcastle Segment. The appearance of the poles (height and spacing) would be different between options, but vegetation clearing would be similar between the two options. Neither option would result in significant impacts to recreation. Impacts in the Newcastle Segment Option 1 would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. Potential impacts are summarized below, by recreation site.

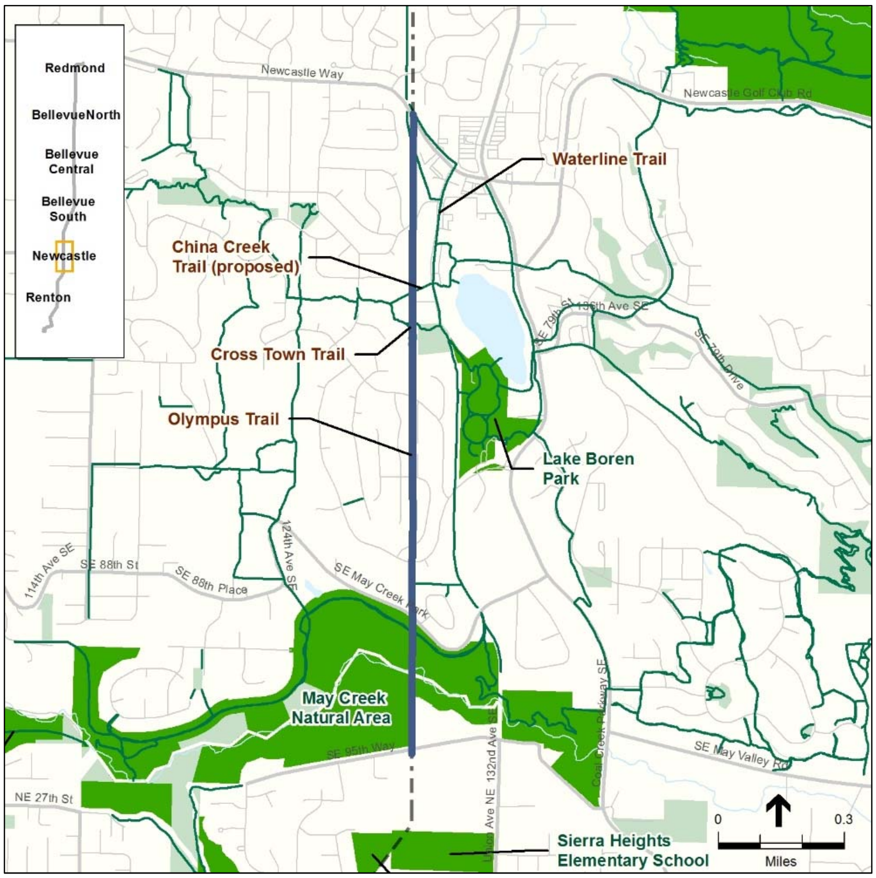


- **Waterline, Cross Town, China Creek (proposed), and Olympus Trails:** At each pole site, the existing two H-frames would be replaced with two approximately 95-foot tall poles. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated two 85-foot tall poles at this location. Vegetation taller than 15 feet would be removed within the managed right-of-way. In areas not previously cleared along the trails, areas with trees removed would be visible to trail users. The poles would be taller, and there would be fewer poles than existing conditions. This may change the user experience, but the use of the trail would remain; thus, the impact would be less-than-significant.
- **Lake Boren Park:** The park is not adjacent to the corridor and would not be impacted.

- **May Creek Natural Area:** At each pole site, the two existing H-frames would be replaced with two approximately 95-foot tall monopoles in the corridor through the May Creek Natural Area. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated two 85-foot tall poles at this location. There would be two pairs of two poles in the corridor through the natural area. Vegetation is currently maintained for the existing transmission lines, but vegetation that could grow taller than 15 feet would be removed, including approximately 45 trees. The poles would be taller and there would be fewer poles than existing conditions. These changes may affect the user experience, but the opportunities in and uses of the park would be maintained; thus, the impact would be less-than-significant.

4.6.5.8 Newcastle Segment – Option 2 (Code Variance)

The impacts to recreation would be the same with both options in the Newcastle Segment. The appearance of the poles (height and spacing) would be different between options, but vegetation clearing would be quite similar between the two options. Neither option would result in significant impacts. Impacts in the Newcastle Segment Option 2 would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. Potential impacts are summarized below, by recreation site.



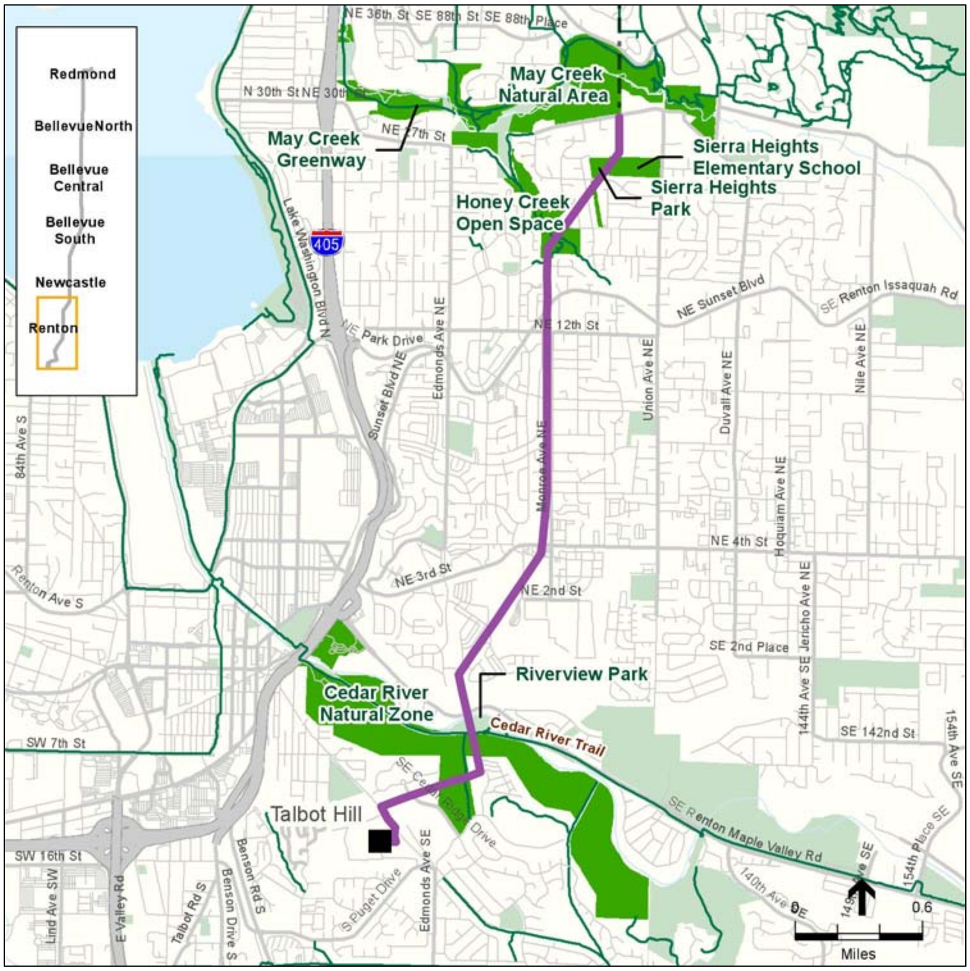
- **Waterline, Cross Town, China Creek (proposed), and Olympus Trails:** At each pole site, the existing two H-frames would be replaced with two approximately 80-foot tall poles. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated two 85-foot tall poles at this location. Vegetation taller than 15 feet would be removed within the managed right-of-way. In areas not previously cleared along the trails, areas with trees removed would be visible to trail users. The poles would be taller, and there would be fewer poles than existing conditions. This may change the user experience, but the use of the trail would remain; thus, the impact would be less-than-significant.
- **Lake Boren Park:** The park is not adjacent to the corridor and would not be impacted.

DSD 005635

- **May Creek Natural Area:** At the more northern pole site, the two existing H-frames would be replaced with two approximately 95-foot tall monopoles. At the more southern pole site, the two existing H-frames would be replaced with two 80-foot tall monopoles. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated 85-foot tall poles at this location. Vegetation is currently maintained for the existing transmission lines, but vegetation that could grow taller than 15 feet would be removed, including approximately 45 trees. The poles would be taller and there would be fewer poles than existing conditions. These changes may affect the user experience, but the opportunities in and uses of the park would be maintained; thus, the impact would be less-than-significant.

4.6.5.9 Renton Segment

Impacts to recreation in the Renton Segment would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. Potential impacts are summarized below, by recreation site. PSE's Proposed Alignment follows the route of the Renton Segment as evaluated in the Phase 2 Draft EIS but includes refined design details for pole types and placement.



- **Sierra Heights Park:** Three pairs of H-frames are currently located in the park. The H-frame structure in the north part of the park would be replaced with two approximately 95-foot tall poles, and the other two would be replaced with two approximately 50-foot tall poles at each pole site. There would be a total of six poles in the park. The 50-foot pole pairs are used in this location to cross underneath the SCL poles and wires. The SCL poles and wires that also cross the park would not be changed. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated 85-foot and 100-foot poles at this location (see Section 3.6 in the Phase 2 Draft EIS for details). Vegetation would be maintained to PSE standards of 15 feet in height, including the removal of four trees. These changes may alter the experience of park users, but the opportunities in and uses of the park would be maintained and impacts would be less-than-significant.

- **Sierra Heights Elementary School:** The PSE corridor crosses the northwest corner of the school property. The school sports fields are separated from the corridor by a forested area. Approximately 10 trees would be removed but the cleared area would not be visible from the school. The poles would unlikely be noticed from the sports fields, and there would be no change to recreation at the school and no impact.
- **May Creek Greenway:** The portion of the May Creek Natural Area in Renton (May Creek Greenway) is not near the corridor and would not be affected.
- **Honey Creek Open Space:** The two H-frames (four poles) would be replaced with two approximately 95-foot tall poles. The poles would be taller, but there would be fewer poles than existing conditions. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated one 100-foot tall monopole at this location. Honey Creek is in a deep ravine and the vegetation in the ravine would not be affected. Vegetation near the top of the slopes would be removed, including 45–50 trees. The change in vegetation would be visible to users of the portion of the trail on top of the slope and may change the visual experience. The opportunities in and uses of the park would be maintained, and thus impacts would be less-than-significant.
- **Cedar River Natural Zone including Riverview Park and the Cedar River Trail:** The two H-frames would be replaced with one approximately 100-foot tall monopole, with two poles located within the natural area. This is different than the design evaluated in the Phase 2 Draft EIS, which evaluated four 100-monopoles poles within the natural area. The poles would be taller but fewer in number than existing conditions. Vegetation is already maintained within the corridor, but 50–55 trees would be removed. The Cedar River is in a deep ravine, and only vegetation near the top of the slopes would be removed (no trees would be removed in Riverview Park). The changes would be visible to users of the Cedar River Trail along the top of the ravine, but the opportunities in and uses of the natural area would be maintained and impacts would be less-than-significant.

4.6.6 Mitigation Measures

For recreation, regulations, comprehensive plan policies, and park plans were reviewed to identify mitigation measures. Mitigation measures specified by code would be required, whereas mitigation measures based on review of park plans and comprehensive plans would be at the discretion of the applicant to adopt or the local jurisdictions to impose as a condition of project approval.

4.6.6.1 Regulatory Requirements

None of the Partner Cities have regulations that would require mitigation of project-related impacts to recreational resources.

Prior to Construction

- Avoid placement of infrastructure within or adjacent to recreation sites where there is none currently to the extent possible.

4.6.6.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on review of the applicable park plans and comprehensive plans. Although not all of the planning documents provided policies that directly address mitigation of impacts to recreational resources, general policies in all communities support application of the measures listed below. The applicable policies are presented based on the stage at which they would be applied.

Prior to Construction

- Use vegetation outside of any area required to be cleared to screen poles and wires where transmission infrastructure is placed within a recreation site.
- Work with each Partner City to determine mitigation for tree removal within recreation sites in its jurisdiction.

4.7 HISTORIC AND CULTURAL RESOURCES

This section provides a project-level analysis of potential impacts to known and probable *historic and cultural resources* in the study area. See Sections 3.7.1 and 3.7.2 of the Phase 2 Draft EIS for a discussion of the methodology for the analysis and a description of the affected environment.

Key Changes from the Phase 2 Draft EIS

- Updated the analysis to reflect PSE's Proposed Alignment.
- Added analysis of the new Newcastle Segment, Option 2.
- Revised the analysis of potential impacts to historic resources based on refined design details, such as pole height and placement (and associated distance to existing resources).

Historic and cultural resources exist belowground and aboveground and can be archaeological sites, *traditional cultural properties*, buildings, structures, or objects. Historic and cultural resources can be *listed on historic registers,* recommended eligible for listing, or *determined eligible for listing*; collectively, these are referred to hereafter as "*significant historic resources.*" Archaeological resources can also be listed on historic registers. A *historic archaeological resource* must be determined eligible for listing in the National Register of Historic Places before it is considered "protected," while all *precontact cultural resources* are protected regardless of eligibility determinations; archaeological resources meeting these criteria are collectively referred to hereafter as "protected archaeological resources." Historic and cultural resources that are not listed or lack eligibility recommendations and determinations can be qualified for consideration of their potential historic significance due to their age. Historic and cultural resources not listed but qualified due to their age are referred to hereafter as "*unevaluated historic resources*."

4.7.1 Relevant Plans, Policies, and Regulations

Since publication of the Phase 2 Draft EIS, no new state laws have been enacted or official historic preservation registers established that would apply to the historic and cultural resources in the cities of Bellevue, Redmond, Newcastle, and Renton, or unincorporated King County. Relevant historic registers are the National Register of Historic Places (NRHP), Washington Heritage Register (WHR), Washington Heritage Barn Register (WHBR), and King County Local Landmarks List (KC Landmarks). Resources listed on the NRHP, WHR, and WHBR are managed by the Washington State Department of Archaeology and Historic Preservation (DAHP). Resources on the KC Landmarks register are managed jointly by King County Historic Preservation Program and the cities where the resources are located. For more details, see Section 3.7.1 of the Phase 2 Draft EIS.

PSE's cultural resources consulting firm (Historical Research Associates, Inc.) completed a historic property survey for the project and is currently in the process of submitting the resulting historic property inventory forms and associated report to DAHP. DAHP will review the results and provide eligibility determinations. As of this writing (January 2018), DAHP has not made eligibility determinations for these resources.

PSE is conducting a cultural resources pedestrian and subsurface survey in two phases. The first phase began on August 24, 2017. The first phase includes subsurface shovel probes at specific proposed pole locations; the majority of this has been completed with some exceptions due to property access. The second phase will survey staging areas, laydown areas, stringing sites, and access roads once PSE has more information on these locations. As of this writing, the second survey

DSD 005640

has not begun. PSE initiated consultation under Section 106 of the National Historic Preservation Act with DAHP, the City of Redmond, King County Historic Preservation Program, Duwamish Tribe, Muckleshoot Tribe, Snoqualmie Nation, Stillaguamish Tribe, Suquamish Tribe, and Tulalip Tribes via letter on June 21, 2017. The consultation letters define the Area of Potential Effect for locations where a Section 10 permit from the U.S. Army Corps of Engineers will be required. They acknowledge that a separate EIS is being prepared for the project under SEPA. They also state that PSE sent project notification letters in April 2017 to "agencies, potentially interested parties, and Native American Tribes including: DAHP, King County Historic Preservation Program, and municipal governments." Copies of these documents are provided in Appendix G.

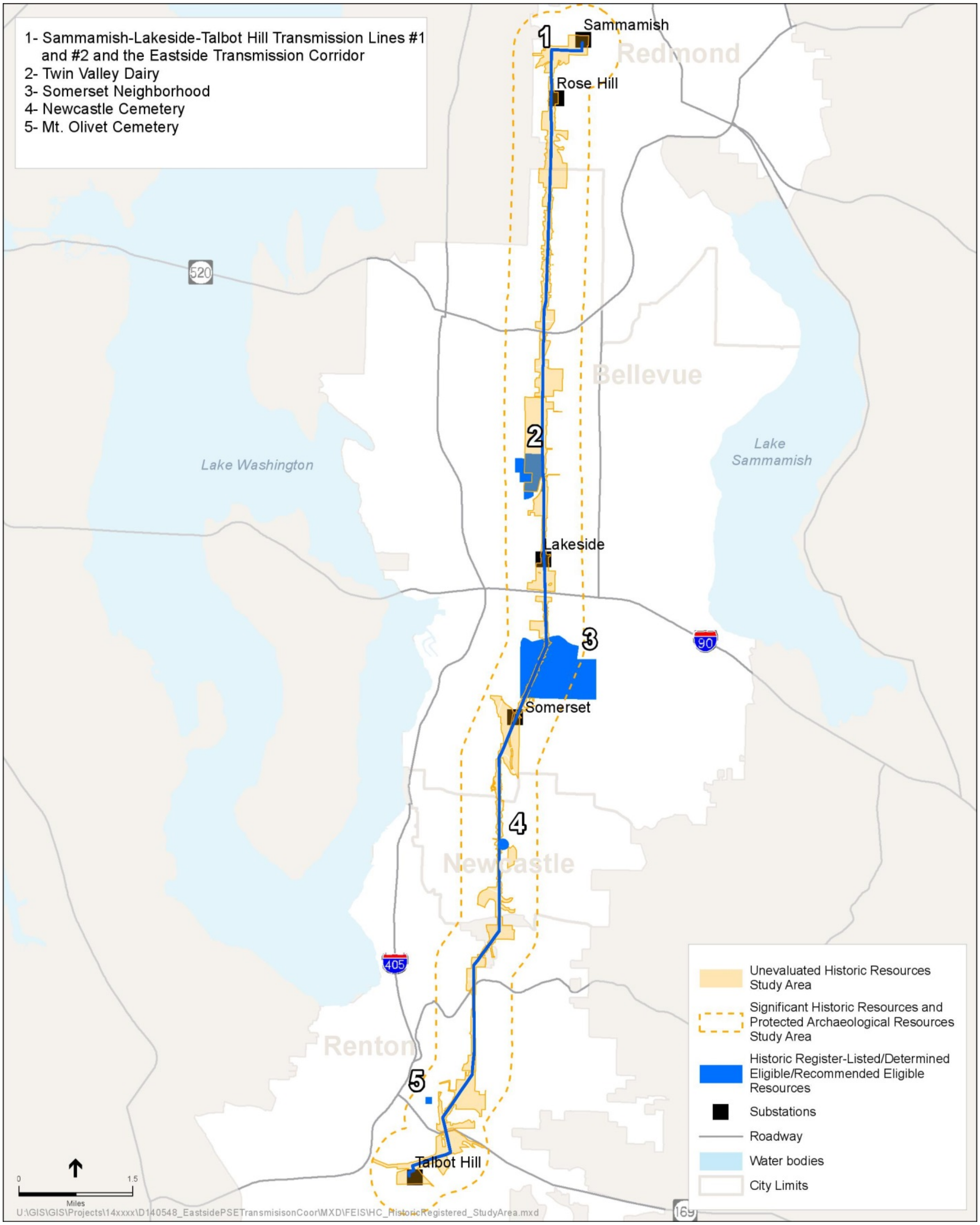
4.7.2 Historic and Cultural Resources in the Study Area

The study area for historic and cultural resources has a high sensitivity for containing unevaluated historic cultural resources, based on an analysis of published ethnographies, local histories, historical maps, and the Statewide Predictive Model (see Phase 2 Draft EIS, Figure 4.7-2). There is a recorded archaeological site within 2 miles of the Redmond Segment that dates to the earliest known time period of human occupation in the region.

For the identification of significant historic resources and protected archaeological resources, the study area for the Final EIS includes all resources within 0.5 mile of PSE's Proposed Alignment (see Figure 4.7-1). The study area contains one protected archaeological site (the Columbia & Puget Sound Railroad), five significant historic resources (resources that are either historic register-listed, *recommended eligible for listing,* or determined eligible for listing in a historic register), and hundreds of unevaluated historic resources (see Figure 4.7-1). The five significant historic resources are:

- Eastside Transmission System (recommended eligible for listing in a historic register).
- Twin Valley Dairy Barn/Kelsey Creek Farm (listed in a historic register).
- Somerset Neighborhood (recommended eligible for listing in a historic register).
- Newcastle Cemetery (listed in a historic register).
- Mt. Olivet Cemetery (recommended eligible for listing in a historic register).

For detailed descriptions of these resources, see Section 3.7.2, *Historic and Cultural Resources in the Study Area*, of the Phase 2 Draft EIS.



Source: King County, 2015; Ecology, 2014; HRA, 2016.

Figure 4.7-1. Study Area for Historic and Cultural Resources

DSD 005642

4.7.3 Long-term (Operation) Impacts Considered

Potential long-term impacts to archaeological and historic resources from operation of the Energize Eastside project are defined and described below.

4.7.3.1 Archaeological Resources (belowground)

The following specifically defines project-level long-term (operational) impacts to archaeological resources:

Less-than-Significant–Long-term impacts would be considered less-than-significant if no protected archaeological resources are disturbed as a result of the project.

Significant–Archaeological resources are non-renewable, and any impact to the depositional integrity (i.e., context) of a protected archaeological resource would be considered a significant long-term impact. Any ground-disturbance or modifications to the ground surface that impacts a protected archaeological site would be significant. Depending on the archaeological resource, impacts could be mitigated through resource-specific measures (e.g., minimizing the amount of disturbance, avoidance, documentation, or data recovery).

Proposed activities that have the potential to significantly impact an archaeological site, if present, are any ground disturbance from pole removal, pole installation, grading, substation construction, access roads, preparation of equipment staging areas, and relocating existing distribution lines underground. Significant impacts to archaeological sites, if present, can also result from ground surface alterations during vegetation clearing, and ground compression from the use or movement of heavy machinery equipment and storage of equipment within staging areas and at construction sites.

Methods for Analyzing Long-term Impacts

The analysis considers the cumulative impacts and potential mitigation measures to minimize or avoid project impacts to historic and cultural resources. Potential impacts were assessed by reviewing the known or potential presence of historic and cultural resources within each study area.

How is "Significant" used in this Section?

The term "significant" is used in the SEPA regulations and as a standard to evaluate historic resources. In SEPA, the term significant is related to environmental impacts that are more than moderate. For historic resources, a significant building, structure, site, or object is historically important and meets the criteria for inclusion on a historic register. To reduce confusion, the EIS Consultant Team consistently refers to significant impacts and significant historic resources.

4.7.3.2 Historic Resources (aboveground)

Thresholds for potential impacts to significant historic resources were defined based on the criteria used to assess adverse effects for resources listed or eligible for listing in the NRHP (36 CFR Part 800, Protection of Historic Properties). The following specifically defines project-level long-term (operational) impacts to significant historic resources:

- **Less-than-Significant**–Less-than-significant operational impacts to significant historic resources are defined in this analysis as those that are permanent but would not impact a resource's integrity of setting or feeling, or if impacts to the integrity of the resource's setting and feeling can be sufficiently mitigated through design choices (e.g., using vegetation screening or adjusting pole locations to avoid visual impacts to a resource).

- **Significant**–Significant operational impacts to significant historic resources are defined in this analysis as those that cannot be mitigated and would permanently impact the historic register eligibility of the resource. Significant impacts would either prevent a potentially eligible resource from meeting criteria for listing in a historic register, or reduce the ability of a register-listed resource to convey its historic significance.

Operational impacts that may result in significant impacts to significant historic resources depend on the type of resource being impacted and the characteristics that define its historic significance. For example, installation of monopoles in the vicinity of a cemetery or farm could impact the integrity of setting and feeling for that resource, if pole locations are within view of the resource.

4.7.4 Long-term Impacts: No Action Alternative

Under the No Action Alternative, ground disturbance would occur as part of routine pole replacement, which is anticipated to take place along the existing Sammamish to Talbot Hill transmission corridor. In most cases, wood poles could be replaced by steel poles, and H-frame structures could be replaced by monopoles. Any ground disturbance has the potential for impacting protected archaeological resources, if present. The Eastside Transmission System is recommended eligible for listing in the NRHP as a historic district (as described in more detail in Section 3.7.2.1 of the Phase 2 Draft EIS). The existing H-frame structures are recommended as a contributing element; removal has the potential to be significant because it would be permanent and would minimize the integrity of elements that contribute to the resource's historic register eligibility. If the Eastside Transmission System is determined eligible by DAHP for listing in the NRHP, pole replacement could be a significant impact, but it is possible that the impacts could be mitigated.

4.7.5 Long-term Impacts: PSE's Proposed Alignment

4.7.5.1 Impacts Common to all Project Components

Historic and cultural resources are located along and adjacent to PSE's existing corridor. For most locations, the infrastructure in the existing corridor includes two sets of 115 kV lines, each supported by wooden H-frame structures. A typical H-frame structure is made of two poles with a crossbeam that supports the wires; in some cases, an H-frame structure has three poles. In the existing corridor, each H-frame structure would be replaced with either one steel monopole or two steel monopoles (see Section 2.1.2.2, and Tables 2-1 and 2-2). Poles would be replaced in generally the same location as the existing poles (i.e., within 25 feet up or down the line). The visual appearance of the infrastructure would be different than existing conditions, as the poles would be taller and made of steel instead of wood.

PSE's Proposed Alignment would result in both less-than-significant and potentially significant impacts to significant historic resources. Depending on the resource, it is probable that significant impacts could be mitigated.

The Eastside Transmission System is recommended eligible for listing in the NRHP as a historic district. The H-frame structures are recommended as a contributing element; removal has the potential to be significant because it would be permanent and would minimize the integrity of elements that contribute to the resource's historic register eligibility. In PSE's Proposed Alignment, all of the existing H-frame structures would be removed; this would have significant impacts to the Eastside Transmission System, if impacts cannot be mitigated. PSE is evaluating this resource as part of a historic property inventory and will request an eligibility determination from DAHP. If determined eligible by DAHP, impacts to contributing elements would be significant if unable to be mitigated. Mitigation measures will be developed by PSE and DAHP that address significant features of the resource. In the experience of the EIS Consultant Team, retention of H-frame structures is not a typical mitigation measure.

Two historic cemeteries are in the study area. In the Newcastle Segment (both Option 1 and Option 2), poles would be constructed approximately 60 feet southwest and 320 feet northwest of the Newcastle Cemetery parcel boundaries. In the Renton Segment, poles would be constructed approximately 890 feet southeast and 1,000 feet southeast of Mt. Olivet Cemetery. Both cemeteries contain graves dating to the 1870s, and cemeteries of this age often have unmarked graves outside of the dedicated boundaries. Disturbance of a historic cemetery could impact unmarked graves located outside of the dedicated boundaries. If graves are discovered during the project, this would be a significant impact and if disturbance is unavoidable, an excavation permit from DAHP would be required. Cemeteries and unmarked graves are protected under state law (Chapters 68.60 RCW, 68.50 RCW, 27.44 RCW, and 68.60.50 RCW).

All segments and options in PSE's Proposed Alignment are adjacent to or contain unevaluated historic resources. Installation of new poles could result in indirect impacts to these resources through visual changes to their setting. Impacts to unevaluated historic resources will be known when the historic property inventory is completed and eligibility concurrence is determined by DAHP, which is not anticipated prior to the Final EIS. If determined eligible, impacts would be significant if unable to be mitigated; however, it is probable that not all would be determined eligible. If none are determined eligible, there would be no impacts to these resources. If eligible resources are proposed for relocation or demolition, mitigation would be determined if there are significant impacts. No relocation sites have been identified since there is no known need for relocation.

Using King County Assessor data, the EIS Consultant Team identified 479 unique unevaluated historic resources within PSE's Proposed Alignment that are at least 40 or 45 years in age, depending on jurisdiction over the location (see the discussion below, as well as Appendix G in the Phase 2 Draft EIS).

All segments and options in PSE's Proposed Alignment have the potential for significant impacts to protected archaeological resources if an archaeological site is identified during construction of the project. Disturbance of a protected archaeological site would be a significant impact, but it is probable that these impacts could be mitigated. In all segments and options, ground disturbance would occur through pole removal and installation, and construction of access roads. Access road construction and ground compaction from continued use have the potential to disturb archaeological sites. Ground disturbance from the removal, installation, and relocation of fences, and the removal and replanting of vegetation also has the potential to disturb archaeological sites.

With one exception described below in the Redmond Segment, all segments and options are situated on landforms composed of Vashon-stade glacial till, drift, and outwash (Troost and Booth, 2008), which have a very low sensitivity for archaeological resources due to their extreme age and the environmental conditions under which they were deposited. Since the end of the last Ice Age, these landforms have remained sufficiently stable for the glacial deposits to form soils, primarily Alderwood, Everett, and Arents gravelly sandy loam (NRCS, 2016). As described below, the northern terminus of the Redmond Segment is situated on a Holocene-aged landform with a higher sensitivity for archaeological resources.

DSD 005645

The following pages summarize the potential impacts on historic and cultural resources for PSE's Proposed Alignment, presented for the Richards Creek substation and by segment. For the Redmond, Bellevue North, Bellevue Central, and Renton Segments, the analysis included a review of refined project design details for PSE's Proposed Alignment, with results revised relative to the Phase 2 Draft EIS to reflect the new information. For these segments, the new information and analysis have not altered the conclusions presented in the Phase 2 Draft EIS regarding significant impacts on historic and cultural resources.

For the Richards Creek substation site and the Bellevue South and Newcastle Segments, the analysis included a review of the project design as presented in the permit applications submitted to Bellevue and Newcastle (PSE, 2017b and 2017c, respectively).

No new historic and cultural resources have been recorded in the study area since completion of the Phase 2 Draft EIS. The more detailed information in the permit applications on pole locations and vegetation clearing does not show work occurring within the boundaries of any recorded archaeological site. It is assumed that PSE is providing its subconsultant, HRA, with the information in the permit applications so that the subsurface archaeological resources survey addresses the current design. The conclusions regarding significant impacts on historic and cultural resources are the same as presented in the Phase 2 Draft EIS.

4.7.5.2 New Richards Creek Substation

The New Richards Creek substation would require new connections to the existing Eastside Transmission System and the Lakeside substation. No additional protected archaeological or significant historic resources are known at or adjacent to the proposed site.

Lakeside substation looking southeast

- **Eastside Transmission System:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. The Lakeside substation is recommended as a contributing element to the Eastside Transmission System. If determined eligible, impacts from an adjacent new substation and new lines to interconnect with the existing 115 kV system would be significant if unable to be mitigated.
- **Unevaluated Historic Resources:** These are analyzed as part of the Bellevue South Segment, below.
- **Archaeological Resources:** There are no recorded archaeological resources within or adjacent to the Richards Creek substation site. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

4.7.5.3 Redmond Segment

In the Redmond Segment, the project would replace existing H-frame structures of the Eastside Transmission System. No additional protected archaeological or significant historic resources are known at or adjacent to the proposed pole locations.

Existing transmission line H-frame structure

- **Eastside Transmission System:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. If determined eligible, impacts to contributing elements would be significant, if unable to be mitigated. It is probable that impacts could be mitigated.
- **Unevaluated Historic Resources:** There are 118 unevaluated historic resources in this segment, primarily detached single-family residences constructed in the 1960s and 1970s. Impacts to these resources will be determined when the historic property inventory is completed and eligibility is determined by DAHP. It is probable that not all would be determined eligible; if none are determined eligible there would be no impacts. If some are determined eligible, impacts to these could be significant if the change in pole types reduces the ability of these resources to convey their historic significance and impacts are unable to be mitigated.
- **Archaeological Resources:** There are no recorded archaeological resources in this segment. Based on geology and soils conditions, the sensitivity for archaeological resources is very low, except for the Sammamish substation area, which has a very high sensitivity due to being a Holocene-aged landform and within 2 miles of an archaeological site that dates to the earliest known time period of human occupation in the region. For example, ground disturbance could destroy the depositional integrity of an archaeological site, which is non-renewable.

4.7.5.4 Bellevue North Segment

In the Bellevue North Segment, the project would replace existing H-frame structures of the Eastside Transmission System. There are no additional protected archaeological sites or significant historic resources at or adjacent to the proposed pole locations.

Existing transmission line, looking north from NE 24th Street

- **Eastside Transmission System:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. If determined eligible, impacts to contributing elements would be significant, if unable to be mitigated. It is probable that impacts could be mitigated.
- **Unevaluated Historic Resources:** There are 58 unevaluated historic resources in this segment, primarily detached single-family residences constructed in the 1960s. Impacts to these resources will be determined when the historic property inventory is completed and eligibility is determined by DAHP. It is probable that not all would be determined eligible; if none are determined eligible there would be no impacts. If some are determined eligible, impacts to these could be significant if the change in pole types reduces the ability of these resources to convey their historic significance and impacts are unable to be mitigated.
- **Archaeological Resources:** There are no recorded archaeological resources in this segment. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

4.7.5.5 Bellevue Central Segment (Revised Existing Corridor Option)

PSE's Proposed Alignment for the Bellevue Central Segment follows the route of the Existing Corridor Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. In the Bellevue Central Segment, the project would replace existing H-frame structures of the Eastside Transmission System. One significant historic resource is within 0.5 mile of the proposed pole locations (the Twin Valley Dairy Barn/Kelsey Creek Farm). No protected archaeological resources are known to be at or adjacent to the proposed pole locations.

Existing transmission line, looking north on 136th Avenue NE

Twin Valley Dairy Barn.
Source: DAHP, 2016.

- **Eastside Transmission System:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. If determined eligible, impacts to contributing elements would be significant, if unable to be mitigated. It is probable that impacts could be mitigated.
- **Twin Valley Dairy Barn/Kelsey Creek Farm:** Impacts would be less-than-significant, as the resource is not immediately adjacent to the existing corridor, and the project would not result in direct effects to this resource.
- **Unevaluated Historic Resources:** There are 64 unevaluated historic resources in this segment. These are primarily detached single-family residences constructed in the 1950s and 1960s. Impacts to these resources will be determined when the historic property inventory is completed and eligibility is determined by DAHP. It is probable that not all would be determined eligible; if none are determined eligible there would be no impacts. If some are determined eligible, impacts to these could be significant if the change in pole types reduces the ability of these resources to convey their historic significance and impacts are unable to be mitigated.
- **Archaeological Resources:** There are no recorded archaeological resources along this segment. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

4.7.5.6 Bellevue South Segment (Revised Willow 1 Option)

PSE's Proposed Alignment for the Bellevue South Segment follows the route of the Willow 1 Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. In the Bellevue South Segment, the project would replace existing H-frame structures of the Eastside Transmission System with steel monopoles and would cross through the Somerset neighborhood. Poles within this potential historic district would be replaced with taller poles. Proposed poles would have a typical height of 85 feet and maximum height of 109 feet (slightly shorter than those described in the Phase 2 Draft EIS). No protected archaeological sites are known to be at or adjacent to the Bellevue South Segment.

- **Eastside Transmission System:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. If determined eligible, impacts to contributing elements would be significant, if unable to be mitigated. It is probable that impacts could be mitigated.
- **Somerset Neighborhood:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. If determined eligible, impacts to contributing elements of this potential historic district would be significant, if unable to be mitigated.

Somerset Neighborhood

- **Unevaluated Historic Resources:** There are 125 unevaluated historic resources along this segment. These are primarily detached single-family residences constructed in the 1950s and 1960s. Impacts to these resources will be determined when the historic property inventory is completed and eligibility is determined by DAHP. It is probable that not all would be determined eligible; if none are determined eligible there would be no impacts. If some are determined eligible, impacts to these could be significant if the change in pole types reduces the ability of these resources to convey their historic significance and impacts are unable to be mitigated.
- **Archaeological Resources:** There are no recorded archaeological resources along this segment. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

4.7.5.7 Newcastle Segment – Option 1 (No Code Variance)

Both options in the Newcastle Segment propose revised pole locations that are farther from the Newcastle Cemetery. In the Newcastle Segment, Option 1, the proposed poles would be the same height as described in the Phase 2 Draft EIS, while Option 2 proposes slightly shorter poles.

In the Newcastle Segment, Option 1, the project would replace existing H-frame structures of the Eastside Transmission System. The Newcastle Cemetery is listed on the WHR and is a KC Landmark, and poles are proposed within approximately 320 feet northwest and 60 feet southwest of the current western boundary of the cemetery. No known protected archaeological sites are at or adjacent to the proposed pole locations near this cemetery; however, cemeteries can contain archaeological resources. Due to the age of the Newcastle Cemetery, the EIS Consultant Team considers the area around the cemetery to have a high risk for containing unmarked graves. Disturbance of unmarked graves would be a significant impact. Alterations to the views from the cemetery would be less-than-significant impacts if they are mitigated through design choices such as screening or adjustments to the locations of new poles.

Existing transmission line, looking north at Newcastle Cemetery (on right).

Newcastle Cemetery, 1999 view to west.
Source: DAHP, 2016.

- **Eastside Transmission System:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. If determined eligible, impacts to contributing elements would be significant, if unable to be mitigated. It is probable that impacts could be mitigated.
- **Newcastle Cemetery:** Impacts to unmarked graves would be significant, if unable to be mitigated.
- **Unevaluated Historic Resources:** There are 31 unevaluated historic resources in this option. These are primarily detached single-family residences constructed in the 1970s. Impacts to these resources will be determined when the historic property inventory is completed and eligibility is determined by DAHP. It is probable that not all would be determined eligible; if none are determined eligible there would be no impacts. If some are determined eligible, impacts to these could be significant if the change in pole types reduces the ability of these resources to convey their historic significance and impacts are unable to be mitigated.
- **Archaeological Resources:** There are no recorded archaeological resources in this option. Based on geology and soils conditions, the sensitivity for archaeological resources is very low, except as noted around the Newcastle Cemetery.

4.7.5.8 Newcastle Segment – Option 2 (Code Variance)

In the Newcastle Segment, Option 2, the project would replace existing H-frame structures of the Eastside Transmission System, using poles with a typical height of 82 feet and a maximum height of 97 feet (slightly shorter than the poles in Option 1). The Newcastle Cemetery is listed on the WHR and is a KC Landmark, and poles are proposed within approximately 320 feet northwest and 60 feet southwest of the current western boundary of the cemetery. No known protected archaeological sites are at or adjacent to the proposed pole locations near this cemetery; however, cemeteries can contain archaeological resources. Due to the age of the Newcastle Cemetery, the EIS Consultant Team considers the area around the cemetery to have a high risk for containing unmarked graves. Disturbance of unmarked graves would be a significant impact. Alterations to the views from the cemetery would be less-than-significant impacts if they are mitigated through design choices such as screening or adjustments to the locations of new poles.

- **Eastside Transmission System:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. If determined eligible, impacts to contributing elements would be significant, if unable to be mitigated. It is probable that impacts could be mitigated.
- **Newcastle Cemetery:** Impacts to unmarked graves would be significant, if unable to be mitigated.
- **Unevaluated Historic Resources:** There are 31 unevaluated historic resources in this segment. These are primarily detached single-family residences constructed in the 1970s. Impacts to these resources will be determined when the historic property inventory is completed and eligibility is determined by DAHP. It is probable that not all would be determined eligible; if none are determined eligible there would be no impacts. If some are determined eligible, impacts to these could be significant if the change in pole types reduces the ability of these resources to convey their historic significance and impacts are unable to be mitigated.
- **Archaeological Resources:** There are no recorded archaeological resources in this segment. Based on geology and soils conditions, the sensitivity for archaeological resources is very low, except as noted around the Newcastle Cemetery.

4.7.5.9 Renton Segment

In the Renton Segment, the project would replace a portion of the existing H-frame structures of the Eastside Transmission System, pass within view of the Mt. Olivet Cemetery, and span a segment of the Columbia & Puget Sound Railroad. The Renton Segment would also pass in close proximity to the Greenwood Memorial Park, which is an unevaluated historic resource. Poles are proposed at approximately 890 feet southeast and 1,000 feet southeast of Mt. Olivet Cemetery, and approximately 250 feet northwest and 230 feet southwest of Greenwood Memorial Park's northwest corner. No additional protected archaeological sites are known to be at or adjacent to the Renton Segment; however, cemeteries can contain archaeological resources.

Impacts to Mt. Olivet and the Columbia & Puget Sound Railroad will be determined when an eligibility determination is made by DAHP; however, impacts are anticipated to be less-than-significant due to Mt. Olivet's distance from the corridor and due to the conversion of the Columbia & Puget Sound Railroad into a developed trail.

Due to the ages of the Mt. Olivet Cemetery and Greenwood Memorial Park, the EIS Consultant Team considers the areas around these cemeteries to have a high risk for containing unmarked graves. Disturbance of unmarked graves would be a significant impact, but mitigation measures to identify unmarked graves without ground disturbance are available and locations of proposed new poles could be adjusted. Alterations to the visual setting of the cemeteries would be a less-than-significant impact, as it would not prevent the potentially eligible resources from meeting criteria used for listing in a historic register, or reduce their ability to convey their historic significance, which is associated with the individuals buried there, not their integrity of setting, place, and feeling.

Existing transmission line, looking northwest from Greenwood Memorial Park

Mt. Olivet Cemetery.
Source: King County Assessor, 2016.

- **Eastside Transmission System:** Impacts to this resource will be determined when the historic property inventory is completed and eligibility is determined by DAHP. If determined eligible, impacts to contributing elements would be significant, if unable to be mitigated. It is probable that impacts could be mitigated.
- **Mt. Olivet Cemetery:** Impacts to graves would be significant, if unable to be mitigated; however, due to the distance of the resource from the proposed poles, impacts are unlikely.

DSD 005654

- **Unevaluated Historic Resources:** There are 83 unevaluated historic resources in this segment. These are primarily detached single-family residences constructed in the 1960s. Impacts to these resources will be determined when the historic property inventory is completed and eligibility is determined by DAHP. It is probable that not all would be determined eligible; if none are determined eligible there would be no impacts. If some are determined eligible, impacts to these could be significant if the change in pole types reduces the ability of these resources to convey their historic significance and impacts are unable to be mitigated.
- **Archaeological Resources:** There is one recorded archaeological site (a part of the Columbia & Puget Sound Railroad) along this segment; impacts are anticipated to be less-than-significant because it is now a developed trail. No other recorded archaeological resources are present in the segment. Based on geology and soils conditions, the sensitivity for archaeological resources is very low, except within the Cedar River crossing and Maple Valley Highway areas, which have a very high sensitivity. Proposed pole locations do not extend into the valley floors and as such, are outside of the very high sensitivity areas.

4.7.6 Mitigation Measures

For cultural resources, state laws and local ordinances were reviewed to recommend potential mitigation measures. Mitigation measures required under state law and local ordinances would need to be met and cannot be appealed, although in some cases, mitigation measures are negotiated with Tribes and agencies prior to permit issuance. Additional mitigation measures may be developed through consultation between the SEPA lead agency, DAHP, affected Tribes, King County Historic Preservation Program (KCHPP), and any other stakeholders. Such potential mitigation measures can be adopted voluntarily by the applicant or imposed as conditions by the jurisdictions as part of the permit process. These would need to be implemented prior to and during construction of the project.

Typically, mitigation measures are designed to avoid, minimize, document, or interpret the impacted resource. Measures could include, but are not limited to, documentation, preservation, publically distributed materials that interpret the resource, or preparation of historic context statements for the impacted region. For impacts to historic districts, which the Eastside Transmission System and Somerset Neighborhood are recommended to be, mitigation measures could include documentation to determine contributing and non-contributing elements to the district and preparation of publically available district-specific historic context statements.

It is probable that significant impacts (e.g., loss or destruction) to protected archaeological resources and significant historic resources could be mitigated. Mitigation measures would be developed through consultation between PSE and DAHP, with involvement from KCHPP, municipal governments, and affected Tribes as applicable to the resource. Typical mitigation measures could include avoidance, minimizing impacts, documentation, or interpretation of the impacted resource.

4.7.6.1 Regulatory Requirements

Prior to Construction

- Develop resource-specific mitigation measures during consultation with DAHP, affected Tribes, KCHPP, and other appropriate stakeholders if a protected archaeological resource is identified during pre-construction archaeological survey or historic property inventory.
- Apply for an archaeological excavation permit from DAHP (WAC 25-48-060) if impacts to a protected archaeological resource cannot be avoided.
- Request an eligibility determination from DAHP for resources listed as eligible for listing in the NRHP (Eastside Transmission System, Somerset Neighborhood, Newcastle Cemetery, Mt. Olivet Cemetery, and the Columbia & Puget Sound Railroad). If any are determined eligible, mitigation measures specific to those resources will be developed during consultation with DAHP, affected Tribes, and any other appropriate stakeholders.
- Obtain a *Certificate of Appropriateness (COA)* from KCHPP (KCC 20.62) if there are potential impacts to a designated KC Landmark.
- Avoid cemeteries in accordance with state law (Chapters 68.60 RCW and 68.50 RCW).
- Avoid graves outside of the dedicated boundaries of a cemetery in accordance with state law (Chapters 27.44 RCW and 68.60.050).

During Construction

- Develop mitigation measures during consultation with DAHP, affected Tribes, and any other appropriate stakeholders if a protected archaeological resource is identified during construction. In accordance with RWC 27.53, an archaeological resource identified during construction is protected until DAHP determines whether it is eligible for listing in the NRHP.[1]
- Follow procedures dictated by state law (RCW 27.44) if human skeletal remains are discovered.
- Obtain an excavation permit from DAHP if unmarked graves would be disturbed.

4.7.6.2 Potential Mitigation Measures

General mitigation measures for impacting a protected archaeological or significant historic resource are developed through consultation with the SEPA lead agency, DAHP, affected Tribes, and any other stakeholders, and would need to be implemented prior to construction of the project. Typical potential mitigation measures are listed below. Many of these measures will be developed during the pre-construction consultation process. Depending on the results of the selected alternative and results of the pre-construction consultation, these mitigation measures may also be necessary; however, the necessity for conducting these measures has not been finalized.

No mitigation measures have been identified to date. PSE initiated consultation under Section 106 of the National Historic Preservation Act with DAHP, the City of Redmond, King County Historic Preservation Program, Duwamish Tribe, Muckleshoot Tribe, Snoqualmie Nation, Stillaguamish Tribe, Suquamish Tribe, and Tulalip Tribes via letter on June 21, 2017. The consultation letters define the Area of Potential Effect for locations where a Section 10 permit from the U.S. Army Corps of Engineers will be required. They acknowledge that a separate EIS is being prepared for the project under SEPA. They also state that PSE sent project notification letters in April 2017 to “agencies, potentially interested parties, and Native American Tribes including: DAHP, King County Historic Preservation Program, and municipal governments.” Copies of these documents are provided in Appendix G. PSE states that the Snoqualmie Nation Cultural Resources Department has expressed interest in participating in cultural resources survey fieldwork, as able.

Prior to Construction

- Conduct a historic property inventory (field work is complete; resulting forms and associated report are being submitted to DAHP for review).
- Conduct archaeological resource surveys for the selected route that include subsurface testing (pedestrian and subsurface survey of the 16-mile alignment and specific proposed pole locations began in August 2017 and is still ongoing as of this writing [January 2018]; PSE will conduct a second pedestrian and subsurface survey to assess staging areas, laydown areas, stringing sites, and access roads once more information on these locations is available; as of this writing, this has not started).
- Prepare an Inadvertent Discovery Plan (IDP) for the project and discuss the IDP during pre-construction meeting(s).

---

[1] Isolated (single) artifacts, either precontact or historic, are not protected because they do not meet the definition of a “site” under state law (WAC 25-48-020(9)).

- Conduct subsurface testing.
- Consult with DAHP and any other appropriate stakeholders to develop resource-specific mitigation measures for impacts to significant cultural resources.
- Preserve or add screening at proposed pole sites to minimize potential impacts to the viewsheds of historic cemeteries.
- Adjust the proposed pole locations to reduce potential direct impacts to historic cemeteries.
- Conduct ground penetrating radar analysis in areas adjacent to Newcastle Cemetery, if conditions are determined appropriate.

During Construction

- Follow the procedures identified in the IDP if any cultural resources are encountered during construction.

4.8 ENVIRONMENTAL HEALTH - ELECTRIC AND MAGNETIC FIELDS

This section provides project-level discussion and analysis of potential health and safety impacts related to power frequency electric and magnetic fields (EMF), which are generated by power lines[1]. The Phase 1 Draft EIS describes typical magnetic field levels associated with overhead and underground transmission lines for the Energize Eastside project and provides a detailed discussion of environmental health studies related to EMF. The Phase 2 Draft EIS describes magnetic field values for representative areas along the segment and option routes. This Final EIS section presents magnetic field values associated with PSE's Proposed Alignment.

Key Changes from the Phase 2 Draft EIS

The EMF analysis was revised to show magnetic field values associated with PSE's Proposed Alignment. Calculated magnetic field values are below the magnetic field values presented in the Phase 2 Draft EIS, and well below reference guidelines.

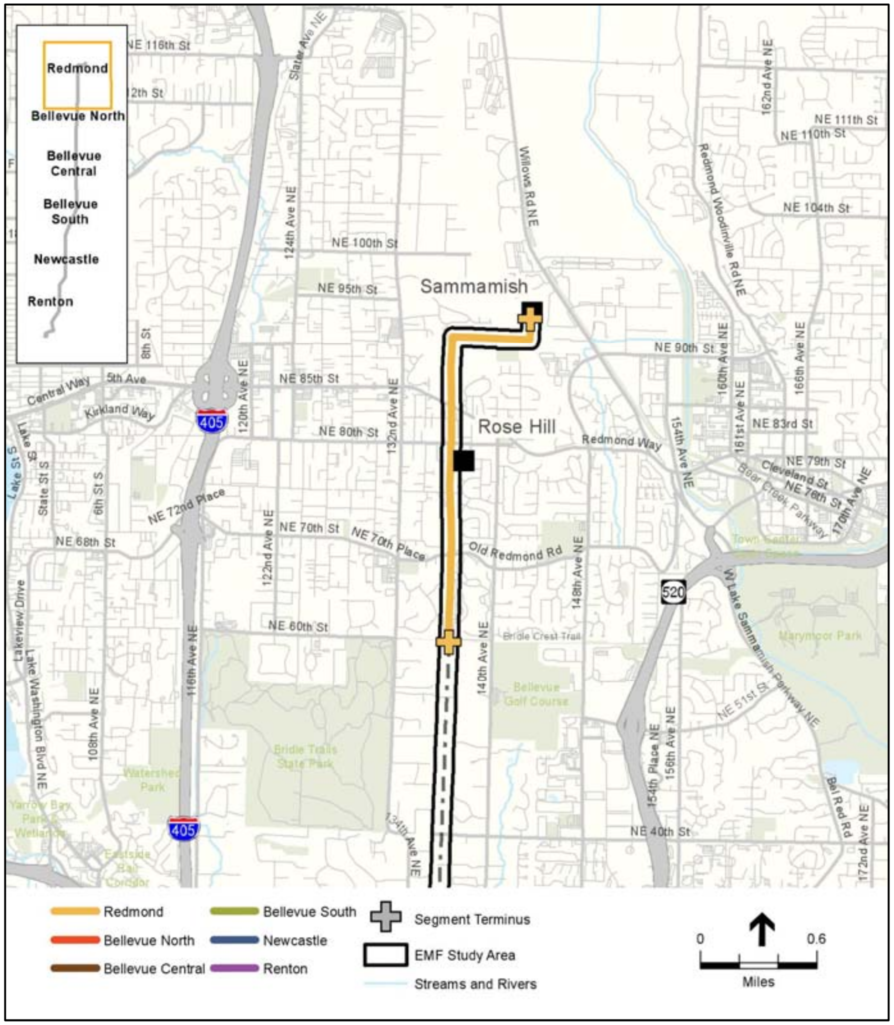
The methodology for the Final EIS assessment is the same as the assessment described in the Phase 2 Draft EIS; the study area is the area immediately under and adjacent to the transmission lines, including areas within 250 feet from the centerline of the transmission line corridor, consistent with the study area used by Power Engineers (2017a) (Figure 4.8-1) (also see the *Methods for Studying the Affected Environment*, to the right). This study area of 250 feet from the centerline of the corridor is the distance generally necessary for magnetic field values to drop down to or near typical background levels of magnetic field strength in most residential settings[2], and is wider than PSE's existing right-of-way.

4.8.1 Relevant Plans, Policies, and Regulations

Policies adopted by the Cities of Bellevue and Redmond addressing EMF exposure are described in both the Phase 1 Draft EIS (Section 8.2.3) and the Phase 2 Draft EIS (Section 3.8). Section 8.2.3 of the Phase 1 Draft EIS also identifies the only two states in the U.S. (Florida and New York) that have enacted their own standards for magnetic fields from overhead transmission line (see Table 8-1 of the Phase 1 Draft EIS). The State of Washington does not have adopted EMF guidelines or standards for electric transmission lines.

[1] The term EMF in this section refers to electric and magnetic fields at extreme low frequencies (ELF). EMF can be used in a much broader sense as well, encompassing *electromagnetic* fields with low or high frequencies. In the ELF range, electric and magnetic fields are not coupled or interrelated the same way that they are at higher frequencies. This is why the term is described as "electric and magnetic fields" and not "electromagnetic fields."

[2] Most people in the United States are exposed to magnetic fields that average less than 2 milligauss (mG) in strength, although exposures for each individual vary. Average magnetic field levels within rooms are approximately 1 mG based on several large surveys, while in the immediate area of appliances, the measured values range from 9–20 mG (Severson et al., 1988; Silva et al., 1988). An EPRI study of 992 homes reported the average residential magnetic field value at 0.9 mG (Zaffanella, 1993).

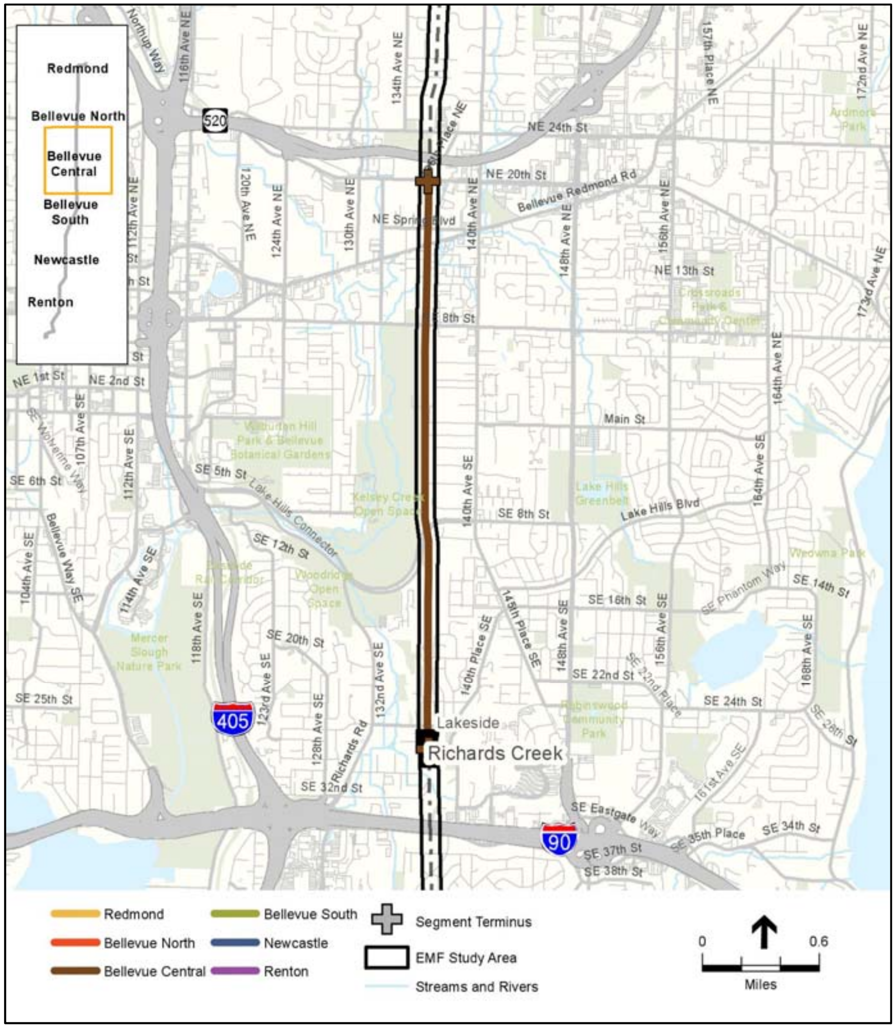


Redmond Segment

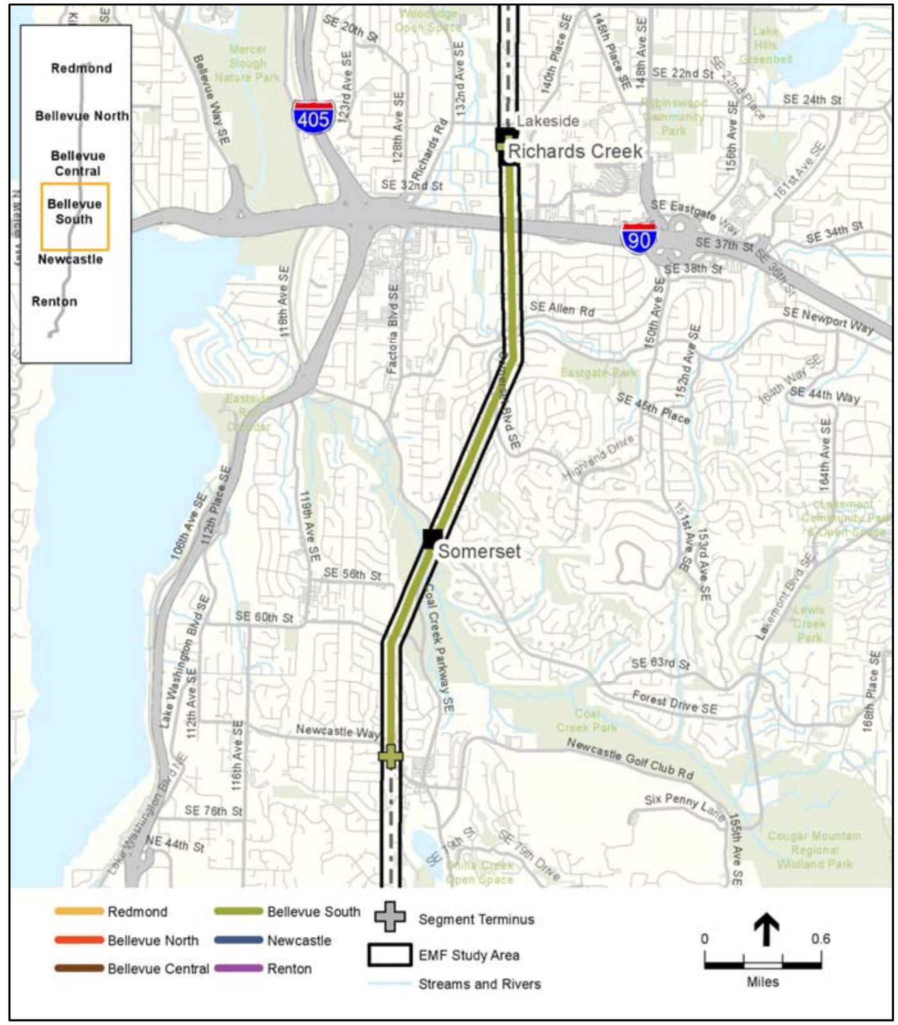
Bellevue North Segment

Sources: King County, 2015; Ecology, 2014

Figure 4.8-1. Study Area for the EMF Analysis



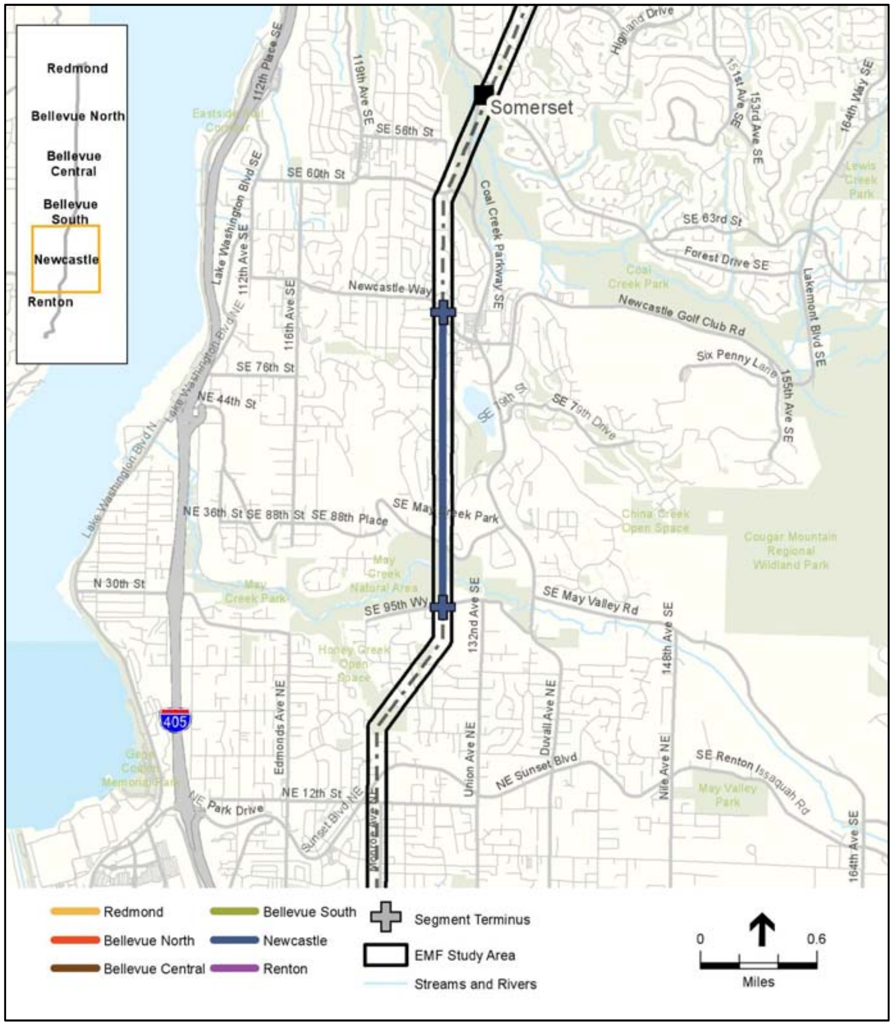
Bellevue Central Segment (Revised Existing Corridor Option)



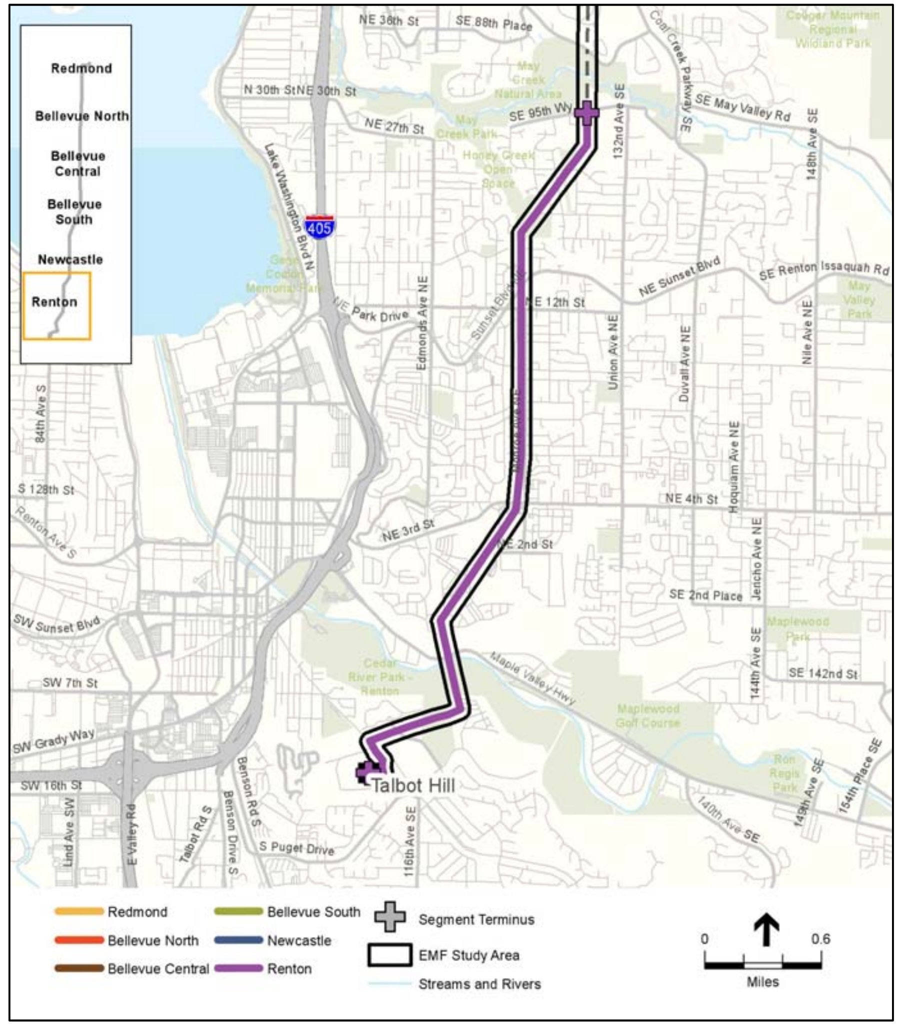
Bellevue South Segment (Revised Willow 1 Option)

Sources: King County, 2015; Ecology, 2014

Figure 4.8-1. Study Area for the EMF Analysis (continued)



Newcastle Segment, Option 1 and Option 2



Renton Segment

Sources: King County, 2015; Ecology, 2014

Figure 4.8-1. Study Area for the EMF Analysis (continued)

There are reference guidelines for limiting magnetic field exposure. Guidelines have been adopted by three organizations:

1. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) is a non-profit organization that provides scientific advice and guidance on the health and environmental effects of electromagnetic radiation (including EMF) to protect people and the environment from detrimental exposure.
2. The American Council of Governmental Industrial Hygienists (ACGIH) is a non-profit organization with the core purpose of advancing occupational and environmental health.
3. The Institute of Electrical and Electronics Engineers (IEEE) Standards Association is a technical professional organization for engineering, computing, and technology information focused on advancing technology for the benefit of humanity.

These three organizations have developed guidelines for limiting magnetic field exposure based on known biological effects from very high fields, such as occur in some occupations. The guidelines are presented in Table 4.8-1 to provide context for understanding the calculated magnetic fields for the Energize Eastside project. These guidelines are generally accepted to protect the health of workers and/or the general public based on expert review of the available science. The guidelines are expressed in terms of the maximum levels of exposure that should be allowed for various groups based on the expected length of exposure (typically 8 hours for Occupational and 24 hours for General Public) (WHO, 2002) and the sensitivity of the group. The strength of magnetic fields is measured in units referred to as milligauss (mG).

Table 4.8-1. Exposure Guidelines and Levels from the ICNIRP, ACGIH, and IEEE

Exposure (60 Hz)	Magnetic Field
ICNIRP Exposure Guidelines	
Occupational	10,000 mG
General public	2,000 mG
ACGIH Exposure Guidelines	
Occupational exposure should not exceed:	10,000 mG
Exposure of workers with cardiac pacemakers should not exceed:	1,000 mG
IEEE International Committee on Electromagnetic Safety Exposure Levels	
General public should not exceed:	9,040 mG
Controlled environments should not exceed:	27,100 mG

ACGIH = American Council of Governmental Industrial Hygienists; Hz = hertz; ICNIRP = International Commission on Non-Ionizing Radiation Protection; IEEE = Institute of Electrical and Electronics Engineers; mG = milligauss.

Source: ICNIRP, 2010; ACGIH, 2009; IEEE, 2002.

4.8.2 Magnetic Fields in the Study Area

The existing magnetic field values within the study area are described in Section 3.8.2 of the Phase 2 Draft EIS. Section 3.8.2 also identifies unique sites, such as schools and recreation facilities, within the study area and describes the relationship between land uses and the length of exposure to magnetic fields. The information in Section 3.8.2 has not changed since publication of the Phase 2 Draft EIS and is incorporated in the Final EIS by reference with one exception: an error regarding the reason for higher magnetic field values in Renton compared to the rest of the existing transmission line corridor has been corrected in Chapter 3, *Errata*, of this Final EIS.

Methods for Studying the Affected Environment

Electric fields that would occur as a result of the Energize Eastside project are described in the Phase 1 Draft EIS and are not further evaluated here. To evaluate changes in magnetic fields as a result of the project, PSE retained Power Engineers to calculate existing magnetic fields at locations along the transmission line corridor (Power Engineers, 2017a and 2017b). Methodologies used by Power Engineers were reviewed by the EIS Consultant Team to verify compliance with industry standards (Enertech Consultants, 2017).

4.8.3 Long-term (Operation) Impacts Considered

Magnetic field calculations were performed to generally characterize changes in magnetic field levels within the study area that could occur under the No Action Alternative and PSE's Proposed Alignment. Power Engineers calculated potential magnetic field levels from the transmission lines based on the following load current scenarios that were provided by PSE:

1) Average and peak loads for winter 2017/2018 and summer 2018 under the No Action Alternative.
2) Average and peak loads for winter 2017/2018 and summer 2018 under PSE's Proposed Alignment.
3) Average and peak loads for winter 2027/2028 and summer 2028 under the No Action Alternative.
4) Average and peak loads for winter 2027/2028 and summer 2028 under PSE's Proposed Alignment (Power Engineers, 2017b).

To evaluate the worst-case scenario, the EIS presents only the magnetic field levels for winter or summer peak loads (whichever is highest), even though peak loads occur only for a few hours of the day over a few days of each year. The magnetic field strengths calculated based on average loads will be the more common levels expected for the project. Summer peak loads under PSE's Proposed Alignment are typically 33 percent higher than summer average loads, and winter peak loads are typically 66 percent higher than winter average loads. The EIS presents the peak loads for 2027/2028 for both the No Action and PSE's Proposed Alignment because loads for PSE's Proposed Alignment are expected to be at their highest at that time based on projected electrical demand. Electrical load scenarios during 2027/2028 for the No Action Alternative are not anticipated to increase beyond the load scenarios in 2017/2018. Although the electrical demand is projected to increase, the existing transformers feeding the 115 kV lines are not designed to handle more amperage than what would be carried during peak loads in 2017/2018 (Kothapalli, pers. comm., 2017).

Magnetic fields from electrical equipment at the Richards Creek substation were not evaluated for the Final EIS because the magnetic fields associated with the overhead transmission lines entering or leaving the substation are anticipated to be higher than the magnetic fields from electrical equipment located within the substation (EPRI, 2005).

4.8.3.1 Magnitude of Impact

The magnitude of the potential impacts from magnetic fields on environmental health is classified as less-than-significant or significant, defined as follows:

- **Less-than-Significant** – Impacts from magnetic fields would be considered less-than-significant if the projected levels are below the guidelines established by the ICNIRP, ACGIH, and the IEEE International Committee on Electromagnetic Safety.
- **Significant** – Impacts from magnetic fields would be considered significant if, after mitigation were applied, levels in areas of human exposure could exceed the guidelines established by the ICNIRP, ACGIH, and the IEEE International Committee on Electromagnetic Safety to protect human health.

Methods and Approach for Studying the Long-term (Operation) Impacts

Power Engineers calculated potential magnetic fields at 35 representative calculation locations along the transmission line corridor for multiple load current scenarios (Power Engineers, 2017a, 2017b). The methodology and assumptions used by Power Engineers to calculate magnetic fields were reviewed by the EIS Consultant Team to verify compliance with industry standards and verify accuracy and technical soundness of the analysis (Enertech Consultants, 2017).

Magnetic field levels for PSE's Proposed Alignment are presented by segment and option and compared to the No Action Alternative. Magnetic field levels are presented for the winter 2027/2028 and summer 2028 peak periods (whichever is highest) at the centerline of the transmission right-of-way and at the edge of right-of-way.

4.8.4 Long-term Impacts: No Action Alternative

Under the No Action Alternative, PSE would continue to operate its existing 115 kV transmission lines as described in Chapter 2. Although the arrangement and spacing of the lines, distance of the lines above ground, and voltage would stay the same, the load (amperes) would change over time to accommodate changes in electrical demand. The change in load would increase the magnetic field levels during winter peak periods and decrease levels during summer peak periods for segments south of the Lakeside substation (Bellevue South, Newcastle, and Renton Segments). The change in load would decrease magnetic field levels during winter and summer peak periods in the segments north of the Lakeside substation (Redmond, Bellevue North, and Bellevue Central Segments). The load south of the Lakeside substation in winter peak periods is expected to be 6 to 8 times higher than the load north of the Lakeside substation in winter peak periods, resulting in a corresponding magnitude of difference in magnetic field values, as presented below.

Table 4.8-2 presents calculated magnetic field levels for the No Action Alternative based on load current scenarios during the winter 2027/2028 and summer 2028. Calculated magnetic field levels were computed as a function of distance away from the centerline of the existing transmission line corridor. The results are reported at one meter (3.28 feet) above the ground (based on standard industry practice). The maximum magnetic field levels would typically occur within the transmission line corridor and drop in value at the edge of the transmission right-of-way. Transmission lines north of the Lakeside substation would have the highest magnetic field levels during the summer peak condition, while transmission lines south of the Lakeside substation would have the highest magnetic field levels during the winter peak condition.

There are no known health effects from power frequency EMF. The magnetic field levels indicate that the existing corridor under the No Action Alternative would have calculated magnetic field levels well below reference guidelines (Power Engineers, 2017a). Therefore, under the No Action Alternative, impacts would be less-than-significant. Please refer to Chapter 8 of the Phase 1 Draft EIS for the complete discussion (in particular, Section 8.6.2).

Table 4.8-2. Calculated Magnetic Fields along the Existing Transmission Line Corridor based on 2027–2028 Loading

	Maximum		At Edge of Right-of-Way	
Segments	Summer Peak (mG)	Winter Peak (mG)	Summer Peak (mG)	Winter Peak (mG)
Redmond	71	27	47	18
Bellevue North	71	27	47	18
Bellevue Central	71	27	47	18
Bellevue South	61	177	41	120
Newcastle	61	177	41	120
Renton	61–75*	177–219*	41–53*	120–155*

*Varies depending on the calculation location.
Source: Power Engineers, 2017a.

4.8.5 Long-term Impacts: PSE's Proposed Alignment

4.8.5.1 Impacts Common to all Components

All parts of the Energize Eastside project would have associated magnetic fields during operation. Magnetic field levels would vary depending on the electrical load being transmitted and the pole type proposed, including pole height and the arrangement and spacing of the lines. For a discussion on pole type and configuration, see Chapter 2 of this Final EIS. As discussed, although the electrical demand is projected to increase, the existing transformers feeding the 115 kV lines are not designed to handle more amperage than what would be carried during peak loads in 2017/2018 (Kothapalli, pers. comm., 2017). For this reason, the expected magnetic field levels are considerably less than those presented in the Phase 2 Draft EIS, as described in greater detail below.

Magnetic field levels diminish with distance from the source. Therefore, the greater the distance from the centerline of the transmission line, the lower the magnetic field levels. Taller poles would generally result in lower magnetic field levels at the measured height of one meter from the ground than would shorter poles carrying the same power lines. The configuration of lines also affects magnetic field levels, because the field from one line can "cancel out" the field from another line, depending on the geometric arrangement of the lines that make up a complete circuit. The loading (amperes) of the line can vary depending on seasonal electrical demands (winter versus summer), and the operational year (beginning of the project versus in 10-years' time). For these reasons, the expected magnetic field levels would vary by segment and option, as described in greater detail below.

Each segment of PSE's Proposed Alignment is presented in the following pages, which show the magnetic field levels as bar graphs for the 35 representative locations where calculations were performed. The representative locations presented are the same as what were presented in the Phase 2 Draft EIS. The magnetic field level numbers in the Final EIS are different from the Phase 2 Draft EIS. The Final EIS magnetic field level numbers reflect calculations with both transmission lines operating at 230 kV, rather than one line at 230 kV and one line at 115 kV.

The bar graphs provide the estimated magnetic field levels (in mG) for the highest peak period in 2027/2028 (winter or summer, whichever is highest), at the centerline of the transmission line right-of-way (shown as "Max.") and at the edge of the right-of-way for both the No Action Alternative and PSE's Proposed Alignment. The magnetic field values would generally drop below 5 mG toward the outermost edge of the study area. (See the Power Engineers report dated March 7, 2017 for graphs that depict the magnetic field levels as a function of distance. These graphs represent the segment and options presented in the Phase 2 Draft EIS which represent higher mG levels than PSE's Proposed Alignment). This level of magnetic field strength is higher than typical background levels away from power lines, but lower than the levels in the current transmission corridor. One bar chart is provided for multiple calculation locations when the calculated magnetic field levels are identical across those locations.

Operation of the proposed transmission lines would result in a decrease of magnetic field levels for PSE's Proposed Alignment relative to the No Action Alternative. The proposed configuration of the phase conductors (wires) is in a vertical arrangement, while the existing structures under the No Action Alternative use a horizontal arrangement. A vertical arrangement results in a narrower magnetic field profile (pole types and wire arrangement are shown in Table 2-2).

The proposed poles also provide a higher minimum clearance for the lowest hanging phase conductors (wires) than the existing structures under the No Action Alternative. Raising phase conductors higher allows more room for magnetic field levels to decrease before they reach the ground.

PSE's Proposed Alignment would be consistent with the policies in the Bellevue and Redmond Comprehensive Plans that address EMF exposure because the project design results in reduced magnetic field strength compared to the No Action Alternative. The calculated magnetic field levels would be substantially less than the reference guidelines and avoid known health effects, and therefore are consistent with Bellevue and Redmond policies.

As discussed in the Phase 1 Draft EIS, there are no known health effects from power frequency EMF at the levels expected from the No Action Alternative or PSE's Proposed Alignment. For all segments and options in PSE's Proposed Alignment, the calculated magnetic field levels would be at least 1,900 mG below the lowest reference guideline for magnetic field exposure for the general public (Power Engineers, 2017a)[3]. This includes all of the unique sites listed in Table 4.8-4 of the

[3] The highest calculated magnetic field level for the Proposed Alignment would be 65 mG (see Newcastle Segment). The lowest reference guideline established for general public exposure to magnetic fields is 2,000 mG.

Phase 2 Draft EIS that are near PSE's Proposed Alignment (see Appendix H for a map of unique sites). Therefore, for all segments and options under PSE's Proposed Alignment, impacts would be less-than-significant. Please refer to Chapter 8 of the Phase 1 Draft EIS for the complete discussion.

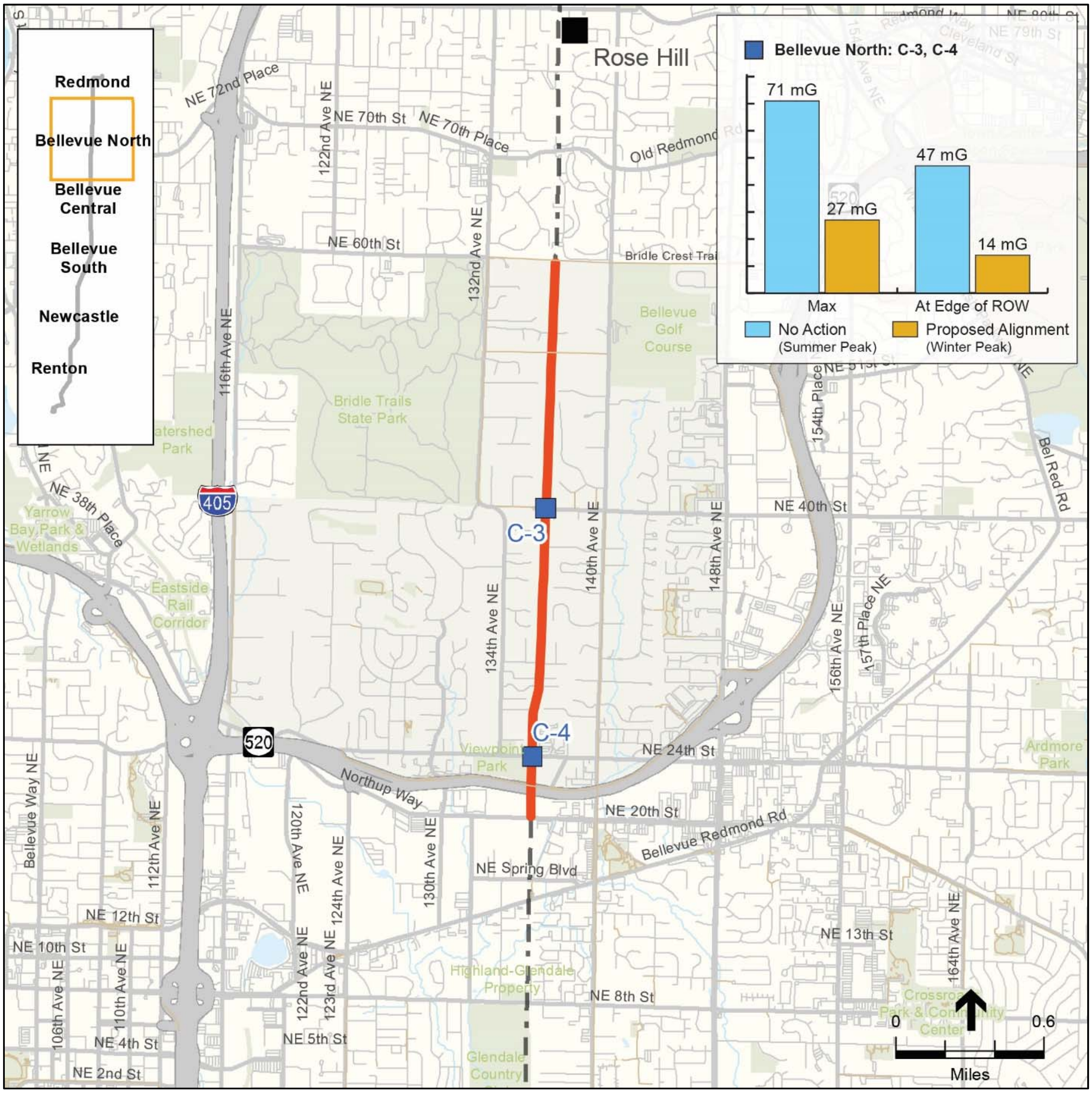
4.8.5.2 Redmond Segment

Relative to the No Action Alternative, magnetic field levels would decrease under PSE's Proposed Alignment in the Redmond Segment. The calculated magnetic field levels generated by the project along the Redmond Segment would be well below reference guidelines; therefore, impacts would be less-than-significant.

DSD 005668

4.8.5.3 Bellevue North Segment

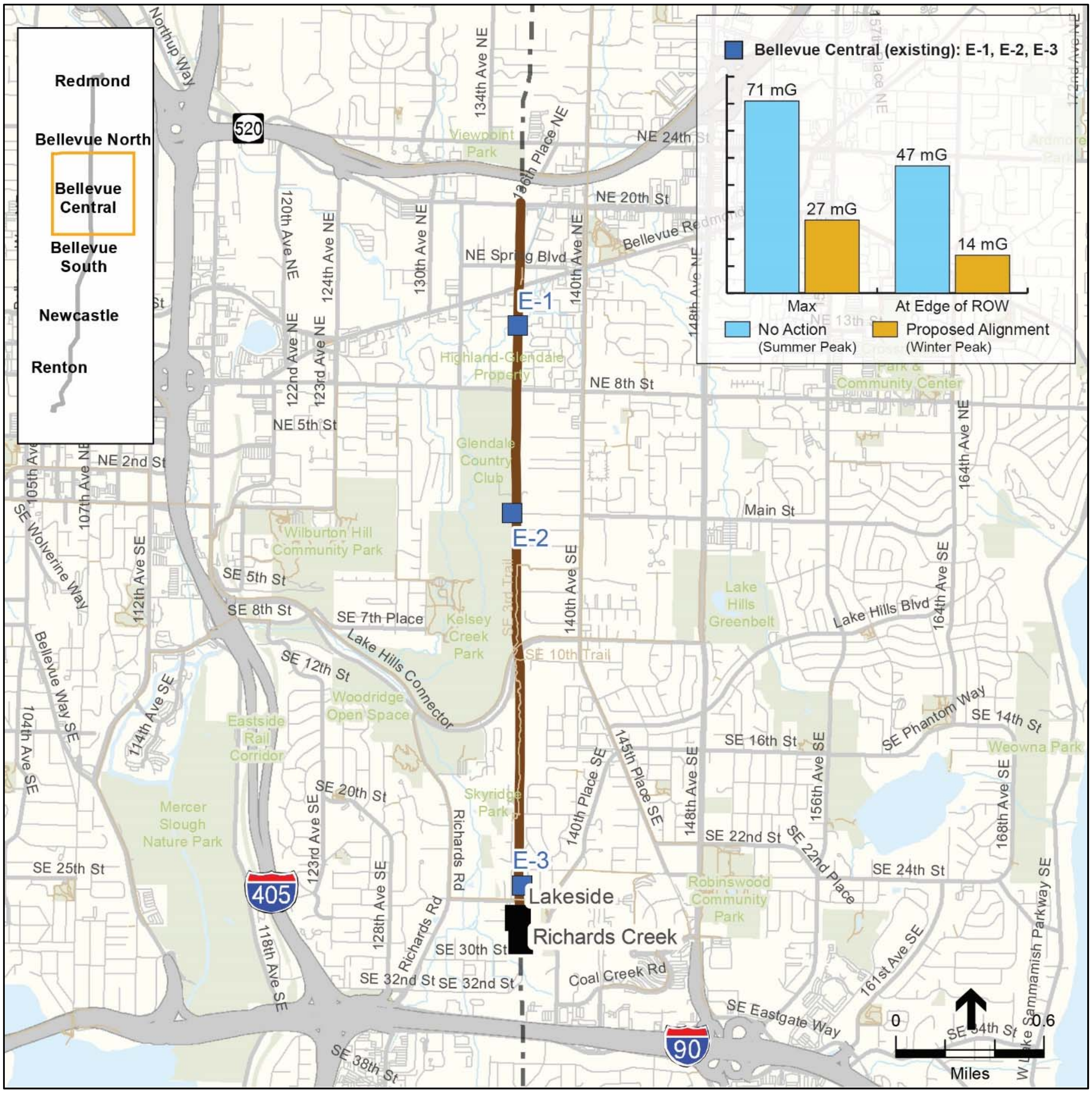
Relative to the No Action Alternative, magnetic field levels would decrease under PSE's Proposed Alignment in the Bellevue North Segment. The calculated magnetic field levels generated by the project along the Bellevue North Segment would be well below reference guidelines; therefore, impacts would be less-than-significant.



DSD 005669

4.8.5.4 Bellevue Central Segment (Revised Existing Corridor Option)

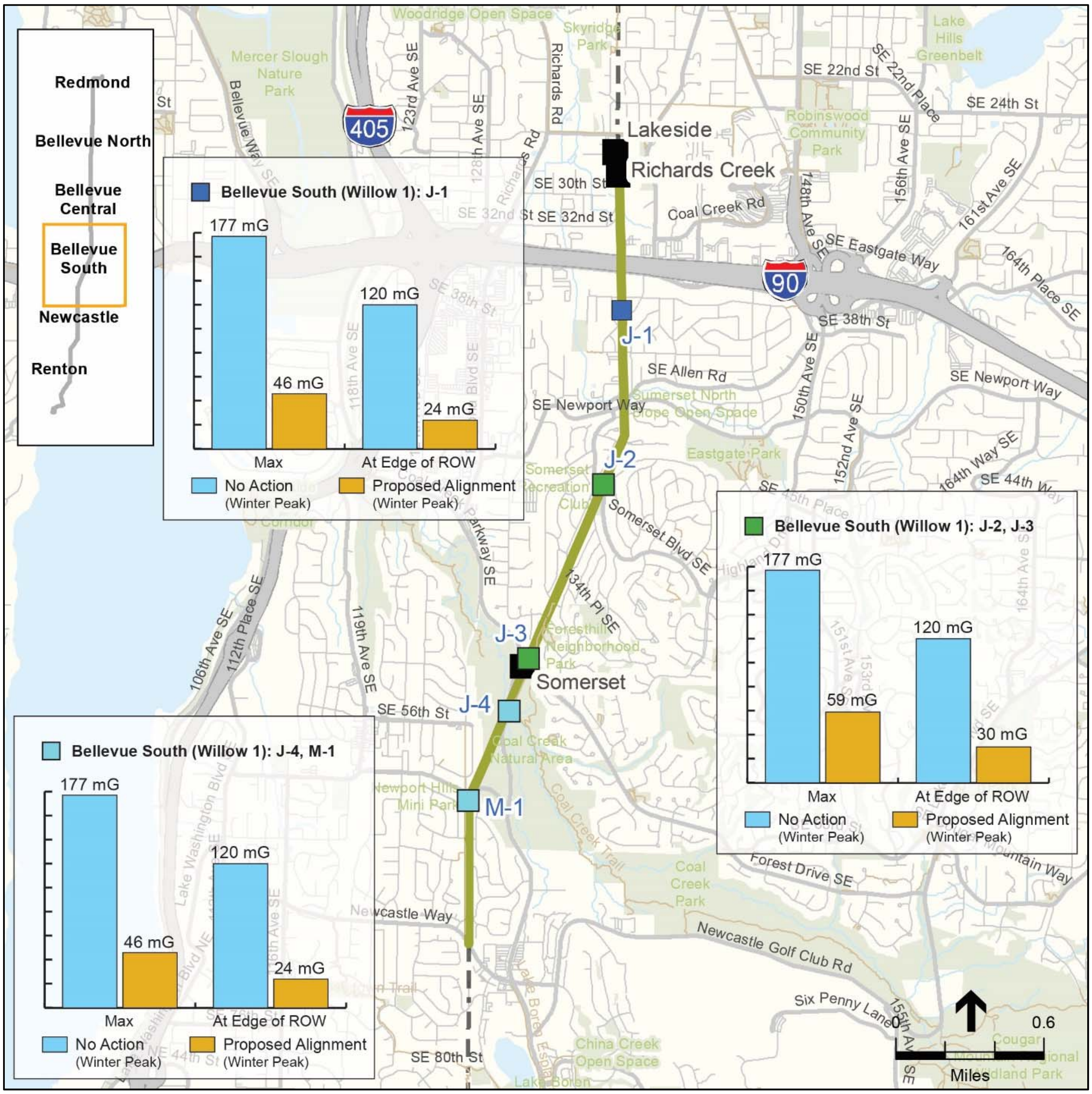
PSE's Proposed Alignment for the Bellevue Central Segment follows the route of the Existing Corridor Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. Relative to the No Action Alternative, magnetic field levels would decrease under PSE's Proposed Alignment in the Bellevue Central Segment. The calculated magnetic field levels generated by the project along the Bellevue Central Segment would be well below reference guidelines; therefore, impacts would be less-than-significant.



DSD 005670

4.8.5.5 Bellevue South Segment (Revised Willow 1 Option)

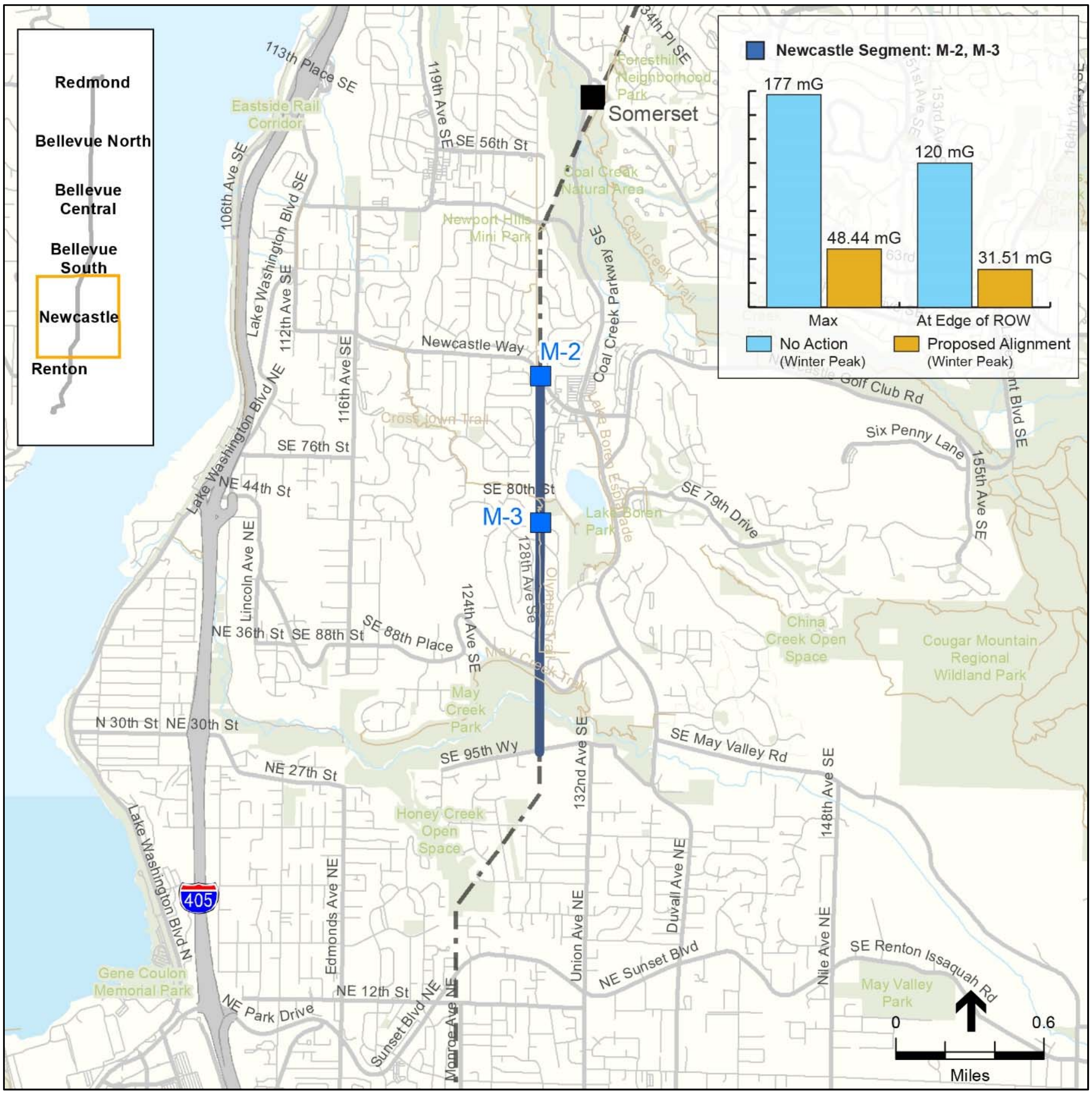
PSE's Proposed Alignment for the Bellevue South Segment follows the route of the Willow 1 Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. Relative to the No Action Alternative, magnetic field levels would decrease under PSE's Proposed Alignment in the Bellevue South Segment. The calculated magnetic field levels generated by the project along the Bellevue South Segment would be well below reference guidelines; therefore, impacts would be less-than-significant.



DSD 005671

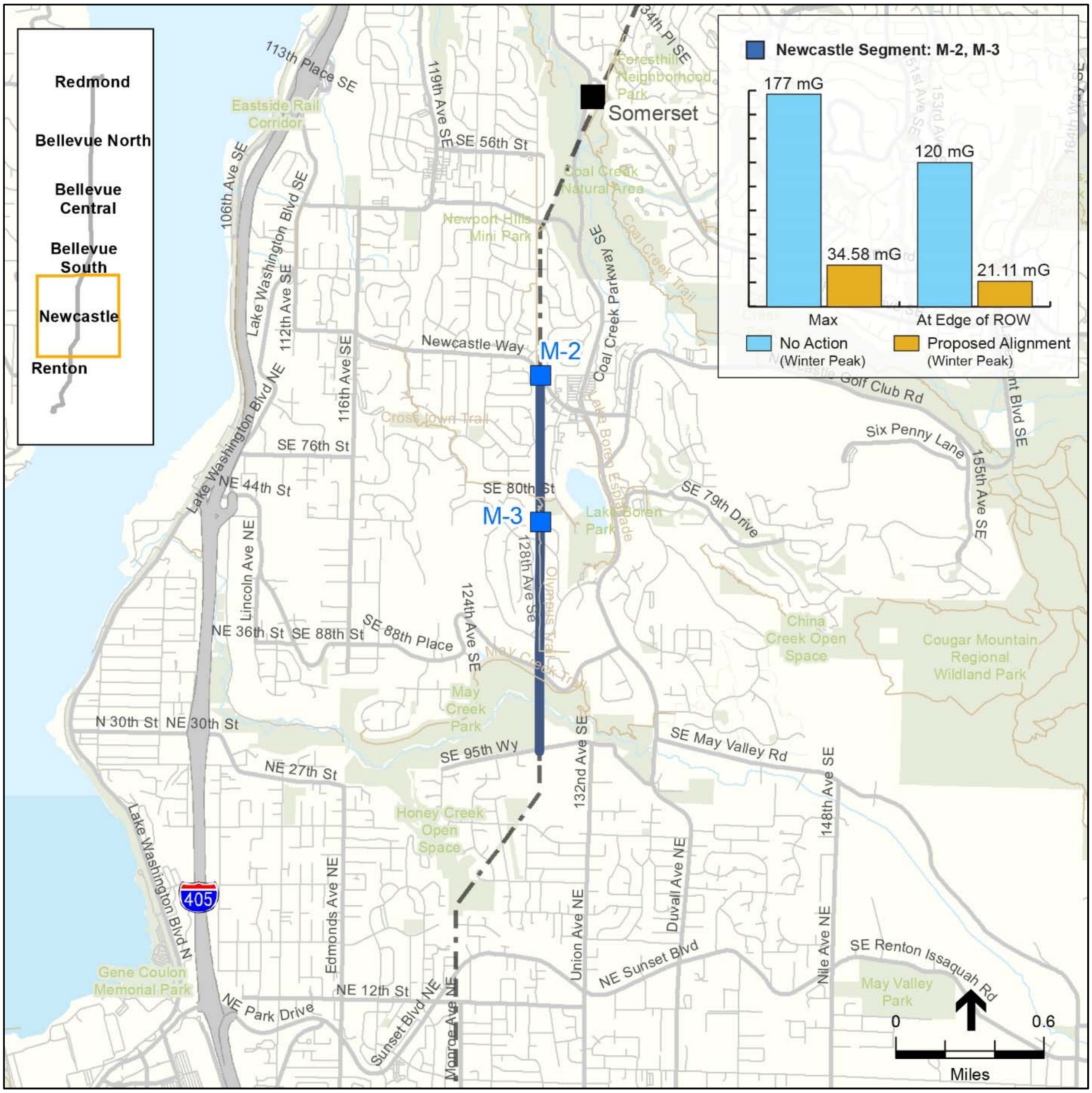
4.8.5.6 Newcastle Segment – Option 1 (No Code Variance)

Relative to the No Action Alternative, magnetic field levels would decrease under PSE's Proposed Alignment in the Newcastle Segment, Option 1. Calculated magnetic field values presented below represent a 230 kV/115 kV configuration based on Alternative 1 presented in the Phase 2 Draft EIS. Therefore, the values that are presented are higher than what would be generated by PSE's Proposed Alignment, which has a cancellation effect because both lines would operate under a 230kV. Even with these higher magnetic field levels generated by the project along the Newcastle Segment, Option 1 would be well below reference guidelines; therefore, impacts would be less-than-significant.



4.8.5.7 Newcastle Segment – Option 2 (Code Variance)

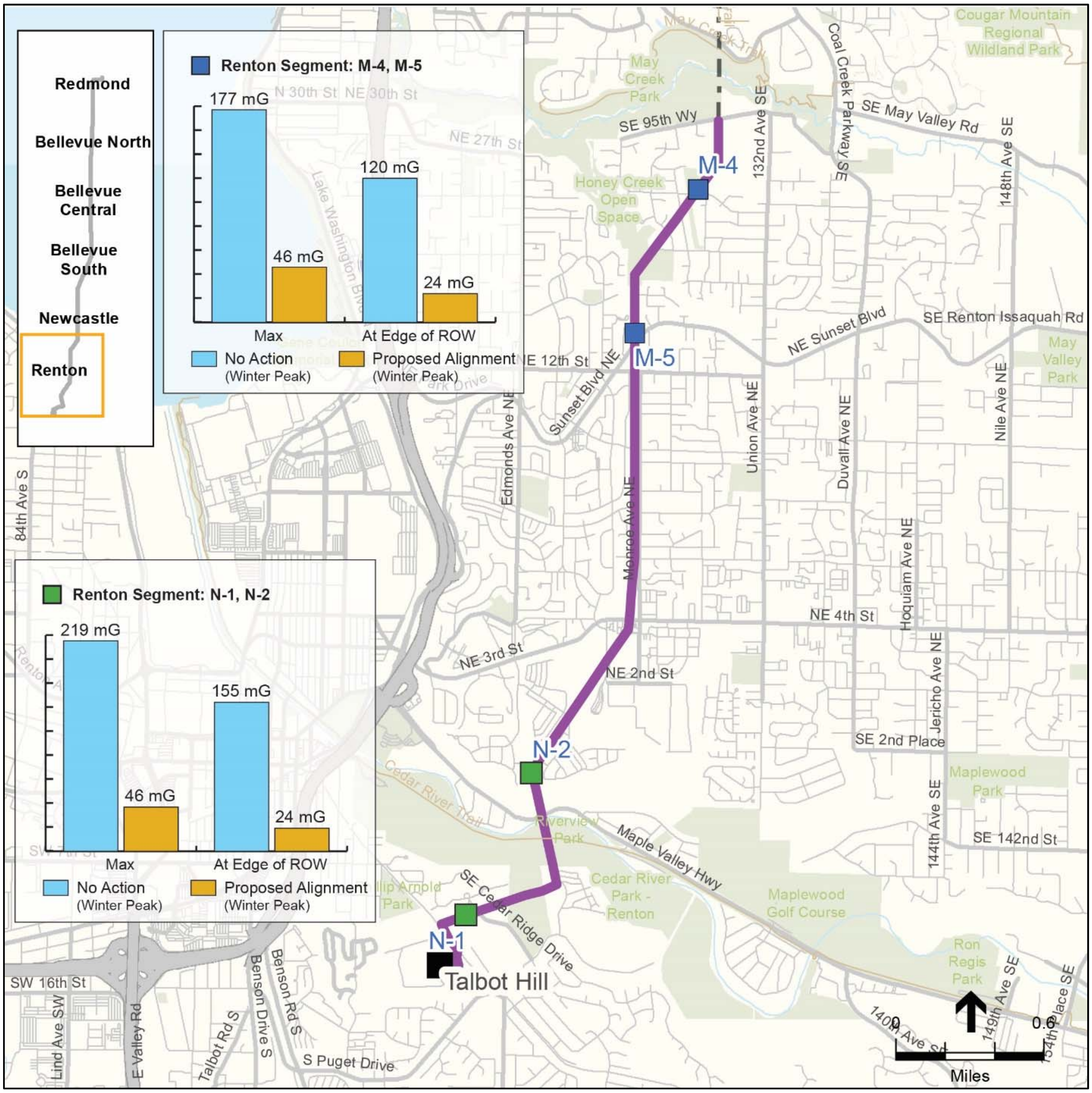
Relative to the No Action Alternative, magnetic field levels would decrease under PSE's Proposed Alignment in the Newcastle Segment, Option 2. The calculated magnetic field levels generated by the project along the Newcastle Segment, Option 2 would be well below reference guidelines; therefore, impacts would be less-than-significant. Option 2 has magnetic field values that are lower than Option 1 because the values presented here reflect the cancellation effect associated with both lines operating at 230kV.



DSD 005673

4.8.5.8 Renton Segment

Relative to the No Action Alternative, magnetic field levels would decrease under PSE's Proposed Alignment in the Renton Segment. The calculated magnetic field levels generated by the project along the Renton Segment would be well below reference guidelines; therefore, impacts would be less-than-significant.



4.8.6 Mitigation Measures

No adverse impacts from magnetic fields are expected.

If radio frequency interference is found, PSE would de-tune pole structures by installing hardware (such as arresters).

Mitigation for potential corrosion of the pipeline is discussed in Section 4.9.8, *Mitigation Measures* (for Pipeline Safety). Mitigation for potential corrosion of the pipeline could include optimizing the geometry of the phase conductors in a triangular pattern, which results in higher cancellation of magnetic fields, as discussed in the Phase 2 Draft EIS (Section 3.8.5.1) (DNV GL, 2016). If that mitigation is incorporated into the project, it would further reduce magnetic field levels at the ground level from the proposed transmission lines.

4.9 ENVIRONMENTAL HEALTH – PIPELINE SAFETY

This section evaluates the human health, safety, and environmental risks associated with the existing Olympic Pipeline system within PSE's corridor, and identifies the incremental change in these risks associated with the Energize Eastside project. The analysis in the Phase 2 Draft EIS included the following two components:

1. Risk assessment results
2. Long-term impacts on resources

The Phase 2 Draft EIS presented the results of a *probabilistic pipeline risk assessment* conducted by EDM Services, a firm specializing in pipeline safety, on the existing corridor and on the proposed 230 kV corridor. The risk assessment evaluated what could go wrong (causes of pipeline *incidents*), how likely those are to occur (*probability* of incidents), and what the consequences could be (estimated human fatalities) if there were an unintentional release from the pipelines. The results of an *electrical interference* study conducted by the firm DNV GL, an engineering consultant working for PSE on the Energize Eastside project (DNV GL, 2016), were considered in the risk assessment. The EIS Consultant Team retained Stantec Consulting Services Inc. (Stantec) to perform an independent technical review of the AC Interference Study completed by DNV GL. Based on Stantec's experience and industry standards, it is their opinion that the technical approach used to achieve an optimal transmission line route and powerline conductor configuration to minimize the AC interference risks on the Olympic Pipeline system is consistent with industry practice. However, Stantec recommended that additional analysis be performed in the detailed design stage of the project to verify mitigation needs for the project prior to transmission line energization (Stantec, 2017). These measures were incorporated into Section 3.9.7.2 of the Phase 2 Draft EIS.

Key Changes from the Phase 2 Draft EIS

The results of the pipeline safety risk assessment completed for the Phase 2 Draft EIS apply equally to PSE's Proposed Alignment and all other build alternatives. They likely overstate the potential risks associated with PSE's Proposed Alignment due to the incorporation of recommendations included in the DNV GL report (2016), and additional measures recommended as part of Stantec's independent technical review of the DNV GL report. Therefore, the risk assessment results are not repeated in the Final EIS. This section reflects the changes incorporated in PSE's Proposed Alignment to minimize electrical interference, and further discussion has been included to illustrate the range of possibilities for a pipeline release, including a comparison of potential impacts by segment.

In addition to measures incorporated into alternatives evaluated during the Phase 2 Draft EIS, PSE's Proposed Alignment as analyzed in the Final EIS incorporates the full set of recommendations included in the DNV GL report to reduce and control the risk of electrical interference to the pipelines. These include initially operating both lines at 230 kV rather than 230/115 kV, minimizing points of pipeline and transmission line divergence, using a delta conductor configuration, and locating poles and pole grounds at least 13 feet away from the pipeline(s). In addition to these design features, the Final EIS includes additional measures related to minimizing *arcing* risk. Because these changes would reduce electrical interference risks, no additional risk assessment was conducted for PSE's Proposed Alignment. Therefore, the full risk assessment results presented in the Phase 2 Draft EIS are not repeated in this Final EIS but are incorporated by reference. The pipeline safety analysis presented in this Final EIS describes how PSE's Proposed Alignment relates to the risk assessment conducted for the Phase 2 Draft EIS. In response to comments received on the Phase 2 Draft EIS, additional qualitative discussion of possible release scenarios resulting from a pipeline leak has been included in Section 4.9.6 in the Final EIS. Comments received on the analysis, and responses from the Partner Cites and the EIS Consultant Team, are included in Chapter 6, Appendix K, and Chapter 3 (*Errata*).

The Phase 2 Draft EIS describes long-term impacts to resources in the event of a pipeline incident related to the project, presented as a general overview by element of the environment. In response to comments on the Phase 2 Draft EIS, this Final EIS includes Section 4.9.7, *Impact Comparison by Segment,* describing the general conditions in each segment that could affect the extent of a fire resulting from a large spill as well as the resources that could be affected.

As described in the Phase 2 Draft EIS, one or both of the two petroleum pipelines (part of the Olympic Pipeline system) are generally co-located with PSE's existing corridor within all of the segments; through the Renton Segment, however, it is only co-located in the north part of the segment (see Figure 4.9-1). There are risks associated with pipelines that are independent of the presence of transmission lines, and there are risks related to the presence of transmission lines (electrical interference). The focus of the analysis is the incremental change in risk from the baseline condition (No Action Alternative, or existing 115 kV corridor with the existing pipelines) and PSE's Proposed Alignment, also co-located with the existing pipelines (referred in this section also as the proposed 230 kV corridor).

Although the probability of a leak or fire caused by the project is low, the potential damage from such an incident could be high, given the population density in the study area (as defined in Section 4.9.2, below). The potential magnitude of such an event, if it did occur, would be the same regardless of whether it were the result of construction or operation of the project. For this reason, the analysis of the environmental consequences of such an incident is presented in Section 4.9 along with a description of the operational concerns for the Energize Eastside project that affect pipeline safety. Section 5.9 addresses the construction aspects of the project that affect pipeline safety, and refers back to this section with regard to the consequences of a leak or fire.

4.9.1 Relevant Plans, Policies, and Regulations

As described in both the Phase 1 Draft EIS (Section 8.2) and the Phase 2 Draft EIS (Section 3.9.1), environmental health and safety issues related to pipeline safety are regulated at federal, state, and local levels. Appendix I-6 lists and summarizes the applicable laws and regulations addressing pipeline safety. Federal and state regulations apply to the operation of existing pipelines. Local regulations establish structure setbacks from hazardous liquid pipeline corridors. The regulations identified below apply to the Olympic Pipeline system located in the transmission line corridor.

Under federal and state law, the Olympic Pipe Line Company (Olympic), as the pipeline operator, is responsible for the safety of its pipelines in compliance with these federal and state safety requirements.

For PSE, national and state standards, codes, and regulations and industry guidelines govern the design, installation, and operation of transmission lines and associated equipment (see Section 4.9.8.1). For a detailed summary of the major pipeline safety regulations, see Section 3.9.1 of the Phase 2 Draft EIS.

4.9.2 Pipelines in the Study Area

4.9.2.1 Study Area Characteristics

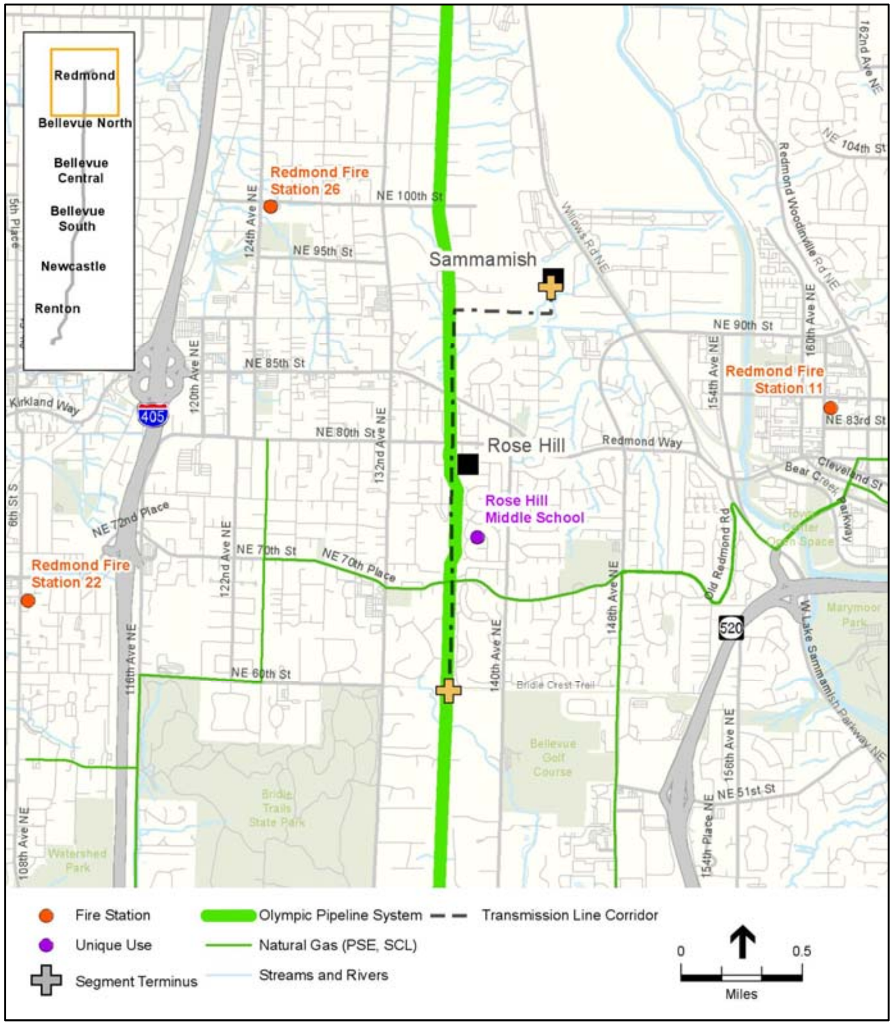
The study area for pipeline safety focuses on the area potentially affected by an Olympic Pipeline system leak or fire caused by the construction or operation of the Energize Eastside project. The study area for this analysis is PSE's existing corridor and the surrounding area including human populations, urban environment, and natural resources that could be affected by an incident.

4.9.2.2 Petroleum Pipelines in the Study Area

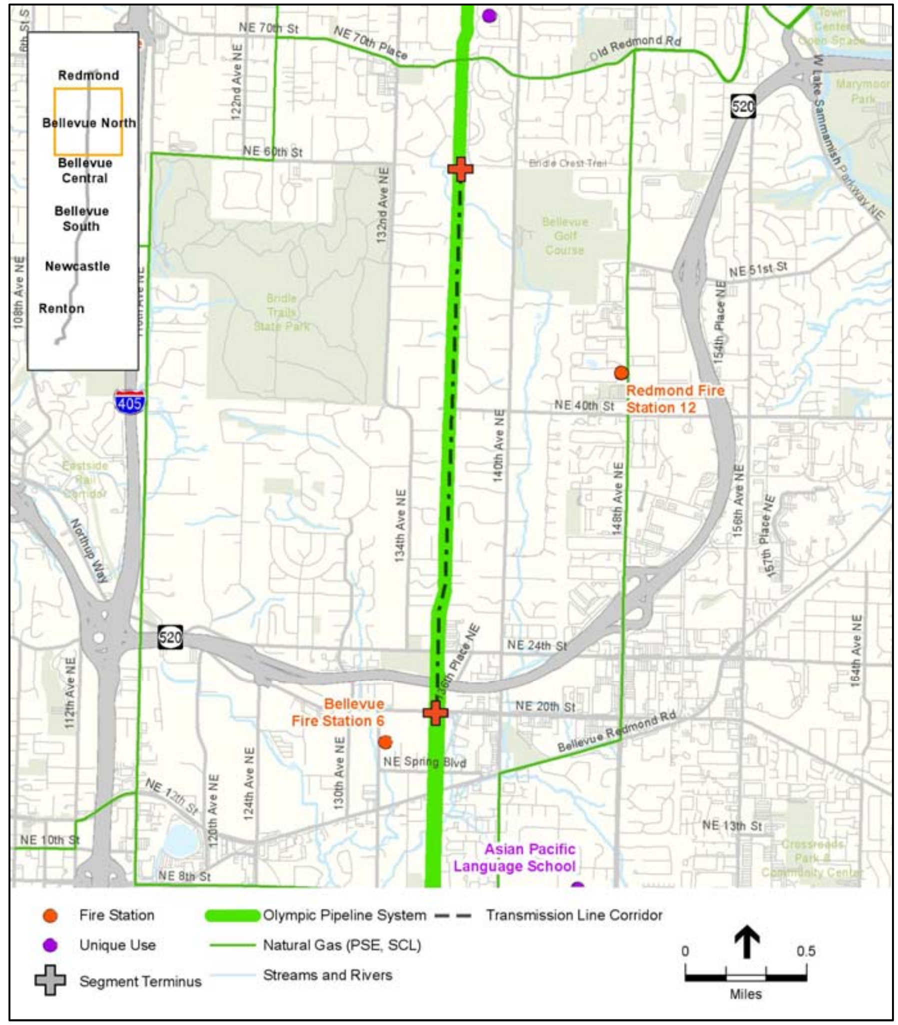
Petroleum pipelines in the study area include the Olympic Pipeline system. The Olympic Pipeline system consists of 400 miles of high-strength carbon steel underground pipeline located within a 299-mile corridor. The Olympic Pipeline system transports refined petroleum products, including diesel, jet fuel, and gasoline. It connects four refineries in northwest Washington near the Canadian border to markets throughout western Washington and Portland, Oregon. Approximately 4.5 billion gallons of refined petroleum products are transported through the pipelines on an annual basis. As described in Chapter 2, BP is the operator of the Olympic Pipeline system, and partial owner of the Olympic Pipe Line Company, with Enbridge, Inc. (Olympic, 2017a). In the EIS, the pipeline ownership and operator are collectively referred to simply as Olympic. Olympic has been working with PSE in connection with PSE's Energize Eastside project, sharing information and supporting requests for information about its facilities and operations. Olympic and PSE meet regularly to discuss, identify, and develop mitigation strategies for potential threats to the pipeline's *integrity*. Olympic has also been communicating with the EIS Consultant Team to provide information necessary in the preparation of the EIS, to the degree it is able to release information.

Buried hazardous liquids pipeline, similar to the Olympic Pipeline system

Pipeline warning sign in the project corridor



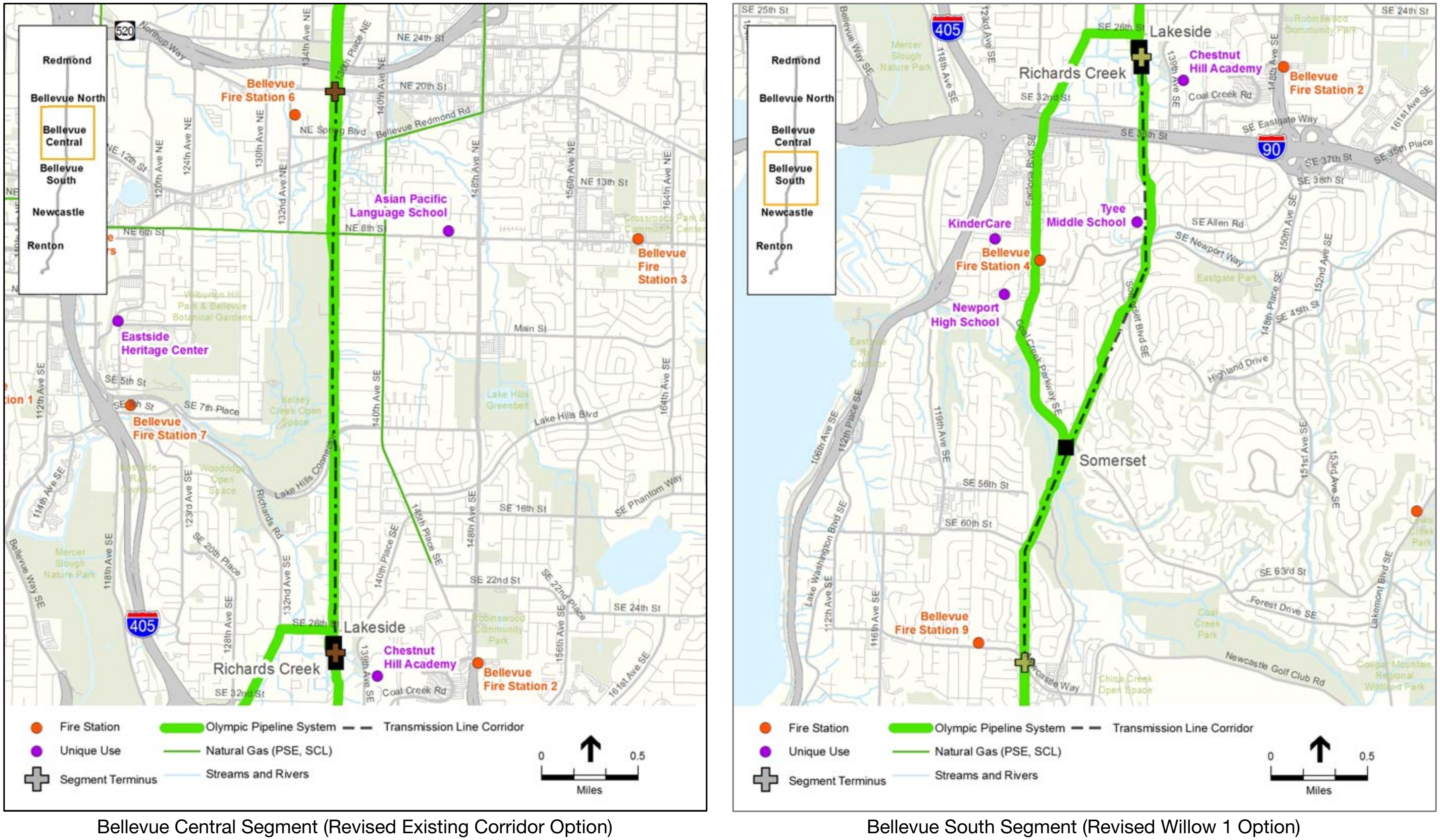
Redmond Segment



Bellevue North Segment

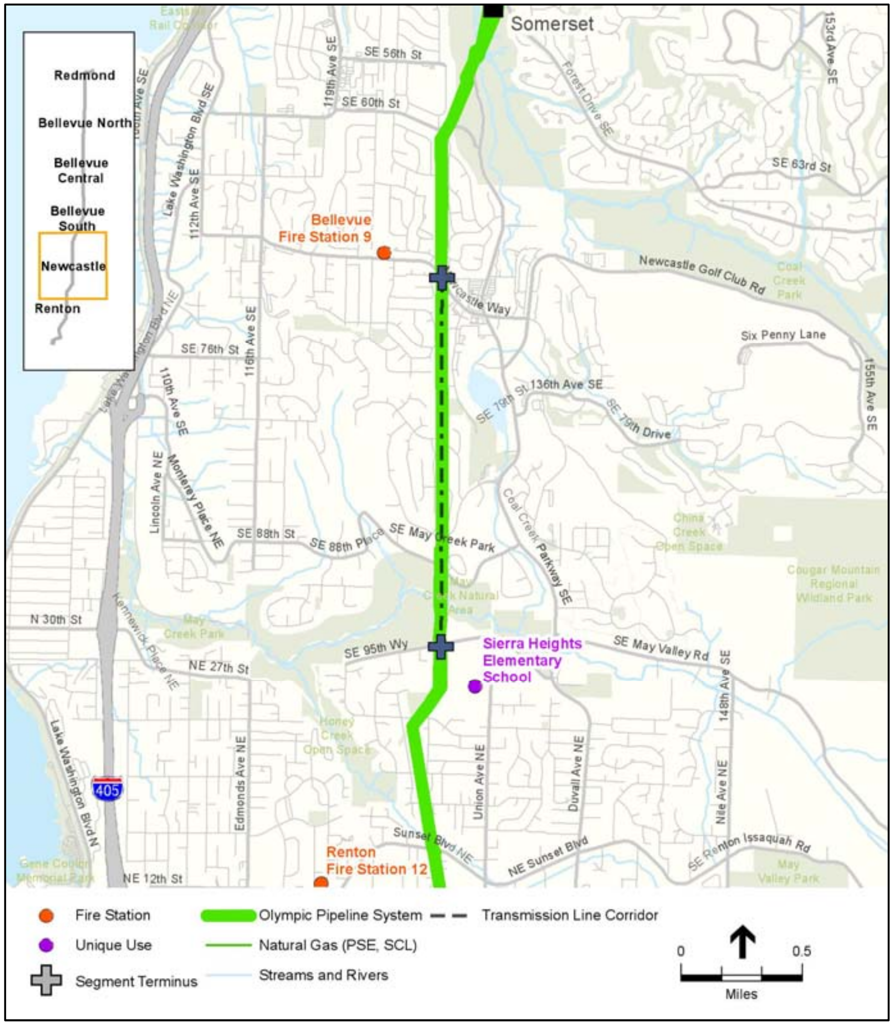
Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; UTC, 2015.

Figure 4.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area



Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; UTC, 2015.

Figure 4.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area (continued)



Newcastle Segment (Both Options)

Renton Segment

Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; UTC, 2015.

Figure 4.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area (continued)

In the Energize Eastside study area, the Olympic Pipeline system includes two pipelines (16-inch and 20-inch diameter). One or both of the pipelines are generally co-located with PSE's transmission line within all of the segments, although in the Renton Segment it is only co-located in the north part of the segment and crosses the pipeline once in south portion of the segment (Figure 4.9-1). The transmission line corridor predates the pipeline by approximately three decades. In most of the segments, the pipelines are along either the east or west side of the right-of-way, crisscrossing the right-of-way from east or west in numerous locations. In parts of the corridor (especially the Newcastle Segment), however, the pipelines are in the center of the right-of-way. In the Bellevue South Segment, only one of the pipelines (16-inch) is along PSE's existing corridor.

Both pipelines are constructed of welded carbon steel and were generally installed at depths of 3 to 4 feet. They carry diesel, jet fuel, and gasoline and operate about 95 percent of the time (West, pers. comm., 2016).

Preventing Unintentional Releases

As the pipeline operator, Olympic is responsible for operating and maintaining its pipelines in accordance with or to exceed U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) Minimum Federal Safety Standards in 49 CFR 195. The regulations are intended to protect the public and prevent pipeline accidents and failures. PHMSA specifies minimum design requirements and protection of the pipeline from *internal and external corrosion*. In addition, 49 CFR 195 established the following broad requirements that apply to Olympic as the pipeline operator:

- 49 CFR 195.577(a) requires, "*For pipelines exposed to stray currents, you must have a program to identify, test for, and minimize the detrimental effects of such currents.*"
- 49 CFR 195.401 (b) (1) requires, "*Non Integrity Management Repairs, whenever an operator discovers any condition that could adversely affect the safe operation of its pipeline system, it must correct the condition within a reasonable time. However, if the condition is of such a nature that it presents an immediate hazard to persons or property, the operator may not operate the affected part of the system until it has corrected the unsafe condition.*"

In response to these federal requirements, Olympic has a number of programs and systems in place to prevent unintentional releases, as summarized below.

Integrity Management Program. Pipelines and high voltage AC transmission lines often share the same corridor. As a result, the pipeline industry implements numerous practices and guidelines to mitigate potential electrical interference-related-corrosion on pipelines. In connection with the governing federal safety requirements, including 49 CFR 195, Olympic has an Integrity Management Program to monitor and, where necessary, mitigate the impact of electrical interference on its pipelines. In accordance with program requirements, Olympic patrols the pipeline corridor on a weekly basis and periodically inspects its pipelines using *in-line inspection*, pressure testing, and other direct inspection methods. The last in-line inspections of the 16-inch and 20-inch pipelines were in April 2014, and the next planned in-line inspections are in early 2019 (West, pers. comm., 2016). In addition to the inspections, Olympic conducts cathodic protection testing, voltage testing, and close interval survey testing at frequencies that meet or exceed regulatory interval requirements (Olympic, 2017b).

Electrical Interference Protection. Federal regulations also require control of *external corrosion* via *cathodic protection*. Electrical interference, external corrosion, and cathodic protection are described below in Section 4.9.4 (and in Section 3.9.3.3 of the Phase 2 Draft EIS). Additional information is provided in Appendix I-5 of the Phase 2 Draft EIS, *Pipeline Safety Technical Report* (EDM Services, 2017).

Pipeline Leak Detection System and Controls. Olympic monitors system pressures, flows, and customer deliveries on its entire system. The 16-inch and 20-inch pipelines in the study area are within the coverage area for Olympic's Pipeline Leak Detection System, which is a real-time pipeline simulation in Olympic's Control Center that detects and locates leaks in accordance with state and federal requirements for pipeline leak detection. If an unexpected loss of pressure is detected, block valves will close off each affected pipeline segment. The control center analyzes pressure differential on either side of a block valve to isolate the location of the leak. Olympic personnel will then be dispatched to the area for visual inspection (Olympic, 2017a)**.**

General Construction Requirements. Olympic has a general list of requirements as part of *BP Pipelines (North America) General Construction Requirements* (BP and Olympic, 2016) for all work proposed near the pipelines (see Appendix I-2). These include specific requirements related to excavation near the pipelines and transport of construction materials or equipment over the pipelines. The requirements also prohibit the placement of foreign (non-Olympic) utility lines underground within the pipeline easement. It also includes specific notification and monitoring requirements, consistent with federal, state, and local requirements.

Protections in Place to Prepare for and Respond to an Incident

Frameworks for preparing for and responding to emergency incidents (including pipeline incidents) are specified in each local jurisdiction's Comprehensive Emergency Management Plan (City of Bellevue, 2013; City of Newcastle, 2008; City of Redmond, 2015; and City of Renton, 2012). As the pipeline operator, Olympic is required to maintain an oil spill contingency plan under state and federal law that provides guidelines to prepare for and respond to a spill from its system. Olympic's *Facility Response Plan,* which received final 5-year approval by Ecology in 2016, serves as Olympic's oil spill contingency plan under WAC 173-182. For security reasons, this document is not publicly available.

Olympic's emergency response plans address a variety of scenarios and involve coordination with federal, state, and local agencies and first responders. Olympic's response plans involve spill isolation, containment, and remediation, with the goals of protecting the environment and the public's health, safety, welfare, and property. The unique circumstances surrounding an event that results in pipeline damage or a leak would dictate the appropriate scale and type of response. Olympic regularly participates in emergency response exercises in coordination with local responders. Olympic conducts annual deployment and worst-case drills for each portion of its pipeline system, and invites members of affected local responders to participate. Olympic also periodically participates in drills conducted by local responders (Olympic, 2017a).

As described in Chapter 15 of the Phase 1 Draft EIS (Section 15.3.1.3), in the event of an incident requiring evacuation along the pipeline right-of-way, local first responders and the Olympic Pipeline response team would set up exclusion zones to evacuate and prevent public access in potentially unsafe areas. Affected homeowners may be notified door-to-door if appropriate staffing levels are available and the area would be safe to access. The City of Bellevue, City of Renton, and King

County recently acquired an emergency notification system (referred to, respectively, as Bellevue Inform, ALERT Renton, and ALERT King County) that permits phone, text, and email alerts to be sent to specific geographical areas very quickly. In most cases, the local first responders would use this tool to contact people should a large-scale event occur. Air monitoring would be conducted and documented throughout the entirety of the incident to ensure that the exclusion zones are properly identified in accordance with the conditions of the day (wind speed, direction, etc.). Olympic maintains a 24-hour Emergency Hotline (1-888-271-8880).

Chapter 15 of the Phase 1 Draft EIS provides additional information on emergency response procedures of local jurisdictions within the corridor.

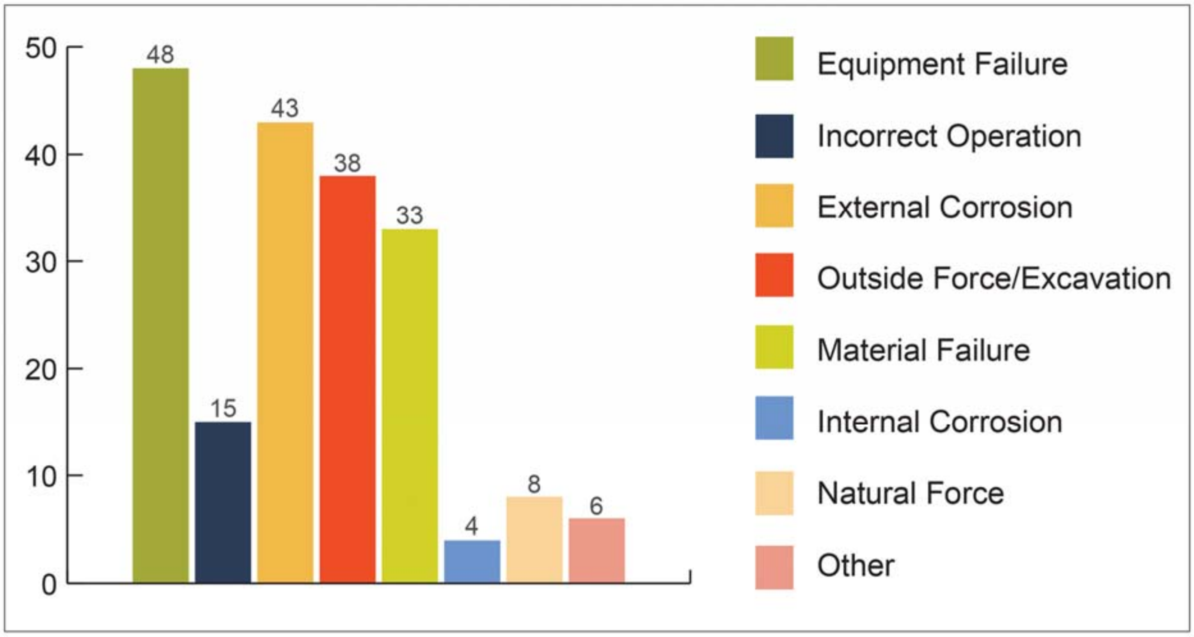
4.9.3 Reported Causes of Unintentional Pipeline Damage

In addition to incident frequency, the risk assessment considered major causes of unintentional pipeline damage as included in the PHMSA incident database for refined petroleum product pipeline releases. The dominant causes of pipeline incidents are equipment failure (25 percent of incidents), *external corrosion* (22 percent), outside force/excavation (20 percent), and *material failure* (17 percent). Figure 4.9-2 shows the distribution of these incidents by cause. Figure 4.9-3 shows the volume (barrels) of reported incidents by cause. This is the same information as presented in the Phase 2 Draft EIS.

Of the causes of unintentional pipeline damage identified, the Energize Eastside project could affect pipeline safety primarily in three ways: outside force/excavation, external corrosion of the pipeline, and natural forces. These causes could result in unintentional releases from the pipeline, placing the public at risk. Natural forces, specifically lightning strikes or wires downed by extreme weather events, present risks of *arcing* from the transmission lines to the pipelines. For the risk assessment, the causes of unintentional pipeline damage associated with external corrosion and natural forces were included under the topic of electrical interference. The ways that the Energize Eastside project could affect pipeline safety are described in more detail below.

Hazardous Liquid Pipeline Incident Data

The baseline data used for the risk assessment are described in Sections 3.9.3 and 3.9.4 of the Phase 2 Draft EIS, and include information on the frequency, major causes, and major risks associated with pipeline releases. The primary source of baseline data used for the risk assessment is reported unintentional release incidents (in the PHMSA database) for hazardous liquid pipelines from the most recent data range under current rules (PHMSA, 2016). Section 3.9.3 of the Phase 2 Draft EIS also includes data on releases from the Olympic Pipeline system provided by the PHMSA incident database for hazardous liquid pipeline releases and Washington Utilities and Transportation Commission (UTC) inspection report data for Olympic's facilities in Washington State for the years 2012 through 2016 (UTC, 2017). Neither the reason for using these data nor the information presented has changed since the publication of the Phase 2 Draft EIS and is incorporated by reference in the Final EIS.



Note: this data set excludes incidents that were limited to pipeline facilities (e.g., tank farm, station equipment, pump station, appurtenance piping, and valve station); the Energize Eastside project would not affect pipeline facility operation.

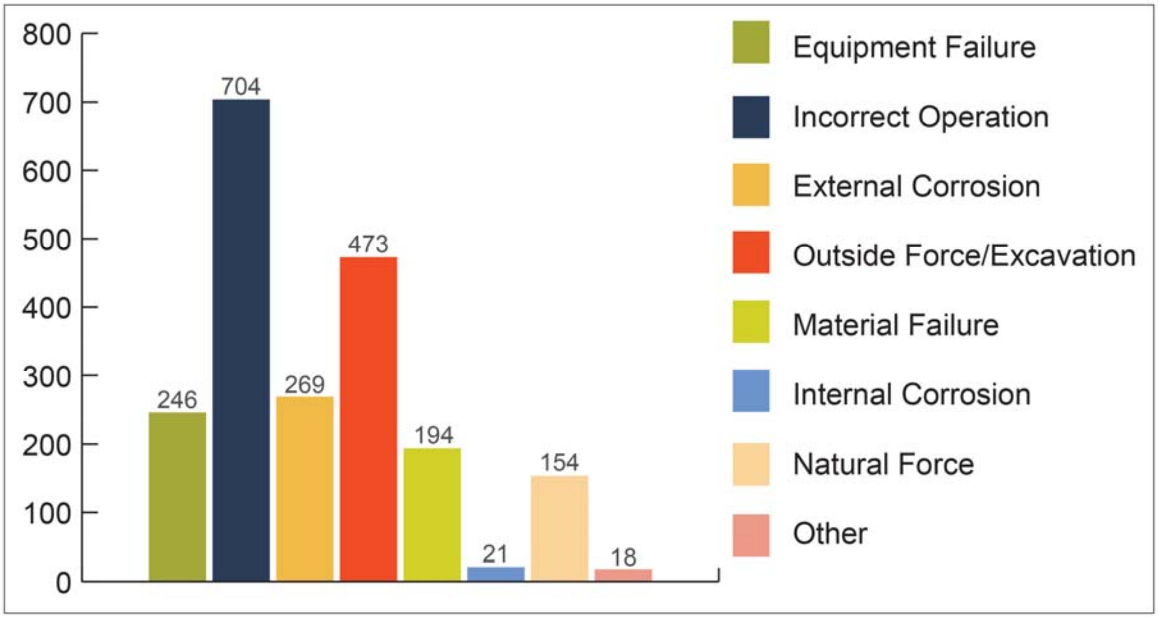
“Equipment failure” can occur on any part of the system, including valve stations, junctions, pump stations, or the pipeline itself. This includes items such as defective or loose components, malfunction of control or relief equipment, and other equipment failures.

“Incorrect operation” includes items such as incorrectly installed equipment, over-pressure, overfill tank or vessel, valve left in wrong position, wrong equipment installed, etc.

“Natural force” includes earthquakes, floods, lightning, extreme temperature, etc.

Source: EDM Services, 2017.

Figure 4.9-2. Number of Reported Pipeline Incidents by Cause, 2010–2015



Note: this data set excludes incidents that were limited to pipeline facilities (e.g., tank farm, station equipment, pump station, appurtenance piping, and valve station); the Energize Eastside project would not affect pipeline facility operations.
Source: EDM Services, 2017.

Figure 4.9-3. Average Volume (Barrels) Per Incident by Cause, 2010–2015

Outside Force/Excavation

Outside force/excavation hazards generally relate to construction activities near pipelines. Commonly referred to as *third-party damage,* pipelines can be damaged by excavation and other heavy equipment operation near pipelines. Excavation or construction near a hazardous liquid pipeline carries a risk that a pipeline could be directly hit or damaged. Also, equipment operating over or near a pipeline can cause pipe stresses due to *surcharge loading.*

Surcharge Loading

Equipment and other loads on the soil surface (surcharge loads) can place stress on the underlying substructures, including pipelines. These stresses can over-stress the pipe, causing damage.

The Energize Eastside project would involve excavation and heavy equipment to construct the project, and occasional truck activity during operation for maintenance and repair (as currently occurs within the corridor). Risks to pipeline safety associated with construction of the project are addressed in Section 5.9 of the Final EIS.

Electrical Interference

In the study area, the existing transmission lines and substations can cause *electrical interference*. This includes areas immediately under and adjacent to PSE's existing 115 kV transmission lines, as well as areas near the Sammamish, Rose Hill, Lakeside, Somerset, and Talbot Hill substations. Electrical interference can occur during normal high voltage AC transmission line (steady-state) operation, which can contribute to accelerated external corrosion damage on the pipeline, or as a result of *fault conditions*. Fault conditions, usually initiated by lightning, result in the transfer of electrical power indirectly from one or more AC powerline conductors (i.e., wire) via the metallic transmission line pole to the ground, or directly to the ground as a result of an overhead conductor falling to the ground. Fault conditions can result in damage to the pipeline coating or directly to the pipeline itself.

Soil Conditions

The moisture, temperature, and chemical content of soil, also referred to as soil resistivity, can have an effect on external corrosion. Typically, the lower the soil resistivity, the higher the potential for corrosion. Soil resistivity generally decreases with increasing water content and the concentration of ionic species (chemically identical ions). For example, sandy soils are high on the resistivity scale and therefore considered the least corrosive, while clay soils, especially those contaminated with saline water, are low on the resistivity scale and considered the most corrosive.

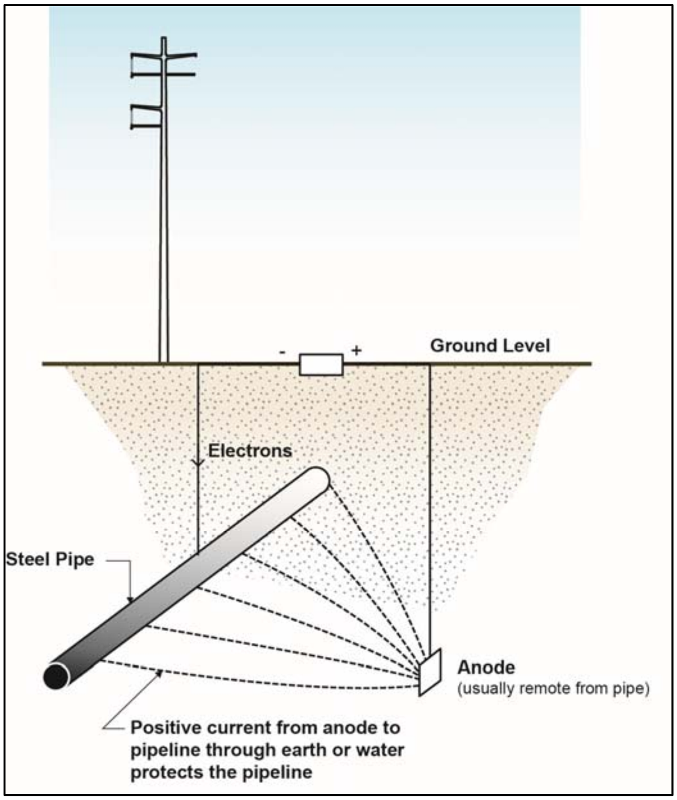
External corrosion occurs when the metal of the pipeline reacts with the environment, causing the pipeline to corrode (or rust) on the outside of the pipe. It can be influenced by a number of conditions, including soil conditions and electrical interference.

AC current density is a measure of electrical interference adjacent to the pipeline. AC current density levels less than 20 amps per square meter do not cause AC-induced corrosion. The AC current density is related to soil conditions, voltage, and the presence and size of any flaws in the pipeline's protective coating (DNV GL, 2016).

Cathodic protection systems are used to reduce the potential for corrosion from occurring on the exterior of pipes, by substituting a new source of electrons, commonly referred to as an anode (Figure 4.9-4). Throughout the study area, the Olympic Pipeline system is externally coated and cathodically protected, primarily with *overlapping impressed current systems* (West, pers. comm., 2016). These systems consist of an array of metallic anodes buried in the ground along the pipelines with a connection to a source of electric direct current (DC) to drive the protective electrochemical reaction.

AC Current Density

AC current densities below 20 amps per square meter do not cause AC corrosion; AC current densities between 20 and 100 amps per square meter may or may not cause AC corrosion.



Representative photograph from PHMSA report showing hole in a pipe wall caused by electrical fault (not Olympic Pipeline system)

Figure 4.9-4. Cathodic Protection System Components

Fault Damage. Faults (or *fault currents*) are an abnormal current flow from the standard intended operating conditions. These faults are typically caused by lightning, insulator failure, mechanical failure, and transformer failure. For example, a lightning strike on a pole can cause current to travel through the pole and into the soil, where it may transfer to an adjacent steel pipeline.

Under fault conditions, elevated electric currents can lead to fault damage (related to *coating stress*) or direct arcing damage (see arc damage below) to the pipeline.

The Olympic Pipeline system has an exterior coating to protect against corrosion. The susceptibility of this coating to breakdown is based on the type and thickness of the coating and the voltage on the pipeline coming from the transmission lines (*coating stress voltage*).

In many cases, a shield wire on transmission poles is used to provide multiple pathways to carry a fault current to the ground, thereby diffusing the strength of the current (Figure 4.9-5). In the absence of a shield wire, the entire fault current returns to ground at a single location where it could arc through the ground to the pipeline, causing damage to the pipeline over time. While other protective measures are in place along the Olympic Pipeline system, such as exterior coating, the existing transmission lines do not have a shield wire.

DSD 005688

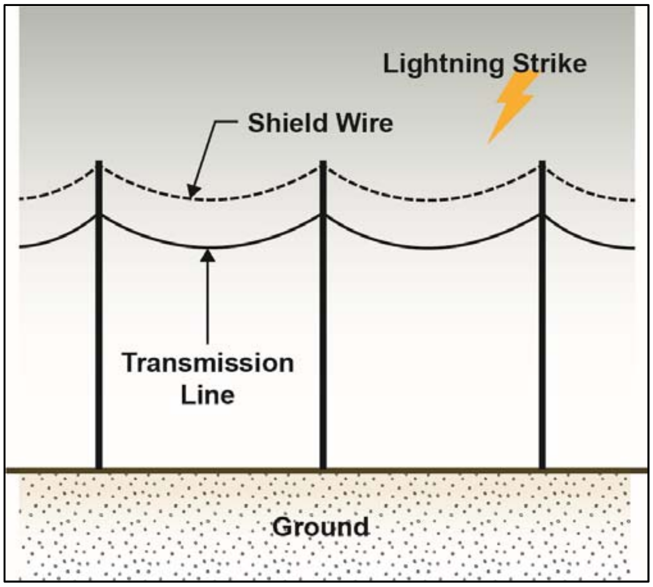


Figure 4.9-5. Shield Wire

Arc Damage. High currents from a fault condition can cause arcing damage to a pipeline. The distance the current can travel to the ground (the *arc distance*) can be calculated based on pole configurations and shield wire characteristics. As noted previously, soil conditions also influence the amount of current that travels through the ground to the pipeline. If a pipeline is within the arc distance of transmission line poles, pole grounds (and sometimes ground wires or other grounding systems) are typically installed to provide adequate separation between the transmission line and the pipelines.

Additional information on external corrosion is provided in Appendix I-5 of the Phase 2 Draft EIS *(AC Interference Study* [DNV GL, 2016]).

4.9.4 Major Risks to Public from Unintentional Pipeline Release

Major risks to the public from unintentional pipeline releases relate to the characteristics of the pipeline product, the presence of ignition sources, and the release setting. For descriptions of the pipeline product characteristics, see Section 3.9.4 of the Phase 2 Draft EIS. Depending on these characteristics and conditions, pipeline releases can result in a *pool fire, flash fire*, or explosion, which are clarified below from the Phase 2 Draft EIS.

Pool Fires

For a buried pipeline transporting refined petroleum product, the greatest risk to the public is posed by *pool fires*. When a release occurs, the pipe contents are released into the soil. Depending on the release rate, soil conditions, groundwater level, and other factors, the released material may come to the surface. Depending on local terrain, it may flow for some distance away from the location of the release. If an ignition source is present, the accumulated pool could catch fire (the pipeline itself would not be expected to catch on fire, just the released material).

Pool Fire

A pool fire occurs when flammable liquid pools on the ground and comes in contact with an outside ignition source.

EDM Services (2017) used a number of reasonable assumptions and data inputs, including the estimated release rate and pipe contents of the Olympic Pipeline system, to model a release and subsequent pool fire as described in Sections 7.1 and 8.3 of their report (see Appendix I-5 of the Phase 2 Draft EIS). Based on these inputs, EDM Services estimated the following maximum release volume: 372,162 gallons.

Spill Release Volume

For reference, the Bellingham incident of June 10, 1999 released about 237,000 gallons of gasoline. Because the release migrated along a water body, pool fire characteristics were different than the depiction in Figure 4.9-6. See the discussion in Section 4.9.7 for characteristics of each segment that could contribute to the spread of a pool fire.

Figure 4.9-6 is a schematic representation of the estimated pool fire size based on the maximum release volume (yellow circle) and the resulting *heat flux* zones. For this conceptual representation, the yellow, orange, blue, and green heat flux zones are where the heat from the fire would cause fatalities. The area outside of these rings would be hot and could result in injury or property damage but typically would not result in fatalities due to the fire.

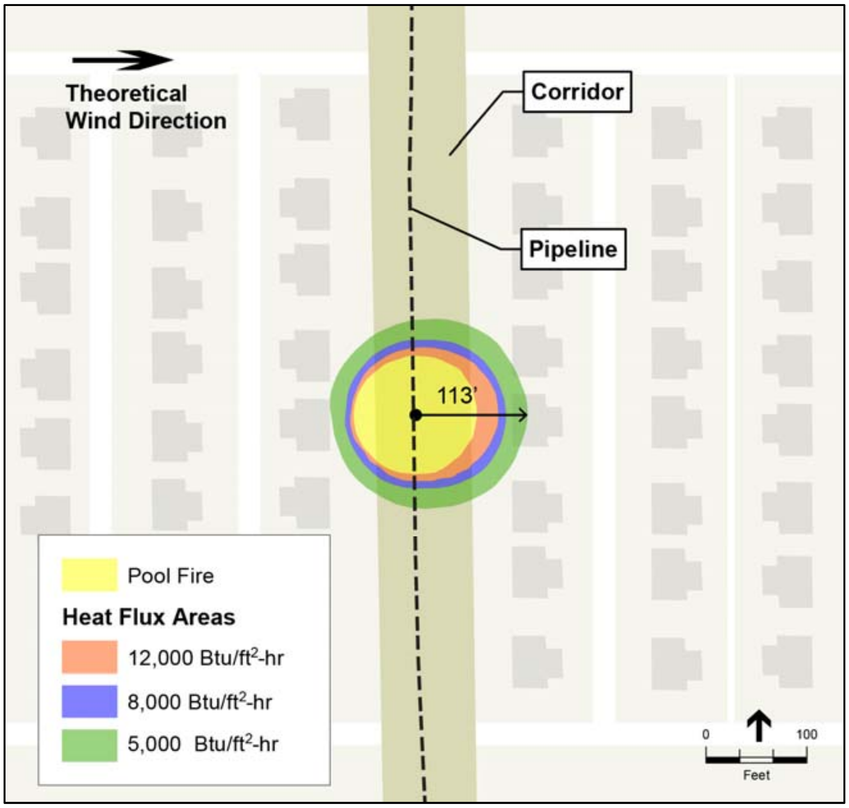
For the modeled release volume, the estimated maximum downward distance to potentially fatal impacts, measured from the center of the pool fire, is 113 feet. This distance represents the area where released pipe contents would spread (or pool) and result in a fire (if an ignition source is present).

This schematic figure is a simplistic representation and does not show site-specific conditions. For example, this figure is presented for flat terrain and illustrates a release where no hills, water bodies, or catch basins are present. If sloping terrain, water bodies, catch basins, or impervious surfaces were present, the pipe contents could flow away from the site of the release and form a pool some distance from the pipeline, or the pool may be elongated instead of round, or the pool area might be smaller or larger. In sloping terrain, a pool may not form at all due to evaporation and percolation as the fluid flows away from the release site. This figure also does not show where the fire could spread to if adjacent vegetation or structures caught on fire. A larger pool fire and heat flux areas could have a higher degree of harm to the environment.

Heat Flux

Humans in the vicinity of a fire receive heat from the fire in the form of thermal radiation. Radiant heat flux decreases with increasing distance from a fire. Those close to the fire would receive thermal radiation at a higher rate than those farther away.

The schematic represents the calculated heat flux endpoints that were used by EDM Services to estimate potential fatalities for the pipeline risk assessment. Although the pool fire and heat flux areas could be larger under variable or site-specific conditions, this diagram provided the basis for calculating the number of potential fatalities assuming a worst-case release volume, and informed the risk assessment results presented in Section 3.9.5 of the Phase 2 Draft EIS. Additional information on how pool fire size was estimated is included in Section 7.1 of Appendix I-5 of the Phase 2 Draft EIS. As acknowledged in Section 7.1, there are literally thousands of possible pool size configuration scenarios based on local conditions. In response to comments received on the Phase 2 Draft EIS, additional qualitative discussion of possible scenarios in the communities along the corridor has been included in Section 4.9.7, *Impact Comparison by Segment*, of the Final EIS. They all result in potential fatalities under a worst-case release.



Note: This diagram is meant to be a conceptual representation of where released pipe contents would spread (or pool) and result in a fire (if an ignition source is present) if the terrain at the spill site is flat and no water bodies or catch basins are present. This diagram does not show site-specific conditions. See Sections 7.1 and 8.3 of the EDM Services report in Appendix I-5 of the Phase 2 Draft EIS for more information on assumptions and data inputs used to develop this diagram.
Source: EDM Services, 2017.

Figure 4.9-6. Typical Pool Fire and Heat Flux Areas Diagram

The effects of radiant heat flux to humans are summarized below. The following three endpoints are commonly used to evaluate the risk of public fatalities (CDE, 2007).

- 12,000 Btu (British thermal unit)/ft^2-hr (combined yellow pool and orange band) – 100% mortality after 30-second exposure.
- 8,000 Btu/ft^2–hr (blue band) – 50% mortality after 30-second exposure.
- 5,000 Btu/ft^2-hr (green band) – 1% mortality after 30-second exposure.

Flash Fires

Flash fires can occur when a vapor cloud is formed, with some portion of the vapor cloud within the combustible range, and the ignition is delayed. To be in the combustible range, the fuel vapor must be sufficiently concentrated; therefore, flash fires only occur when the liquid fuel has a high enough evaporation rate and the vapor cloud is not dispersed by wind. In a flash fire, the portion of the vapor cloud within the combustible range burns very quickly, minimizing the potential impact to humans. For gasoline, diesel fuel, and jet fuel, the potential for extensive vapor migration is limited by their relatively low evaporation rates when in liquid pools.

Explosions

Gasoline, jet fuel, and diesel fuel generally do not explode, unless the vapor cloud is confined in some manner, called a *vapor cloud explosion*. For the most recent PHMSA incident database (2010–2015), there were no reported explosions for refined petroleum product pipelines. Impacts for vapor cloud explosions are expressed in terms of a shock wave measured as overpressure (pounds per square inch) above atmospheric pressure. EDM Services modeled the potential releases from each of the refined petroleum products transported by the Olympic Pipeline system within the project corridor. The resulting peak overpressure level was 0.38 pounds per square inch due to the relatively open environment (medium fuel reactivity and low obstacle density). Although this level is sufficient to result in window breakage, it is not high enough to pose potentially fatal risks to the public. Outdoors, an explosion overpressure level of 2.4 pounds per square inch is necessary to cause mortality for 1 percent of an exposed population. As a result of the low estimated peak overpressure level in the project corridor, explosions are not described further in the EIS. For additional information on explosions, see the *Pipeline Safety Technical Report* (Appendix I-5 of the Phase 2 Draft EIS).

Vapor Cloud Explosion

Occurs when there is a sudden release of flammable vapor, it mixes with air, and then is ignited by an outside source. Note: The Bellingham incident of June 10, 1999 was technically a pool fire, and not an explosion. The pipeline release flowed into a creek and ignited approximately 1.5 hours after the pipeline rupture.

In response to comments received on the Phase 2 Draft EIS, it is acknowledged that specific release scenarios could result in an explosion. EDM modeled release scenarios based on the releases occurring on flat terrain and with no catch basins, storm drain, culverts, or other man-made conveyances present. If refined petroleum product were to flow into a storm drain or other pipe where the atmosphere was confined, then an explosion could result due to the confinement. A deeply incised creek bed might also be sufficient to provide adequate confinement to pose some explosion risk to humans.

4.9.5 Risks During Operation

As described in the Phase 2 Draft EIS, there are risks associated with the Olympic Pipeline system that are independent of the presence of transmission lines within the corridor. If one or both of the pipelines were damaged, refined petroleum product could be released. If the fluid reached a combustible mixture and an ignition source were present, a fire could occur, resulting in possible injuries and/or fatalities. The presence of transmission lines in the corridor could increase the risk of this occurring as a result of electrical interference, which is the focus of this analysis.

To quantify this risk for the Phase 2 Draft EIS, EDM Services conducted a probabilistic pipeline risk assessment for the following conditions:

Methods for Assessing Risks During Operation

To evaluate changes in pipeline safety risk that would occur as a result of the Energize Eastside project, EDM Services was retained to conduct a probabilistic pipeline risk assessment. The *Pipeline Safety Technical Report* (Appendix I-5 of the Phase 2 Draft EIS) describes the current risks of an incident happening along the corridor. It describes these risks with consideration of fuel type, pipe parameters, safety features, and other factors. The primary data source used was the PHMSA Incident Report database and information obtained from Olympic. Modeling was used to show the probability of a potential leak or fire. Estimated existing pipeline safety risk was then compared to estimated pipeline safety risk with the new 230 kV corridor.

- Olympic Pipelines Co-located with Existing Transmission Lines (No Action, *or existing 115 kV corridor*).
- Olympic Pipelines Co-located with Proposed Transmission Lines (Alternative 1 as evaluated in the Phase 2 Draft EIS, *or the proposed 230 kV corridor*).

A probabilistic pipeline risk assessment is a type of risk assessment used to estimate event frequencies or probabilities, for a specified time period, associated with specific, measurable consequences. The pipeline industry commonly uses such assessments to rank and manage risk, and to establish priorities for inspection, testing, and repairs.

Section 3.9.4 of the Phase 2 Draft EIS included detailed descriptions of the pipeline safety risk assessment and methodology, including risk assessment steps, discussion of limitations of the baseline data, and risk terminology definitions. These descriptions have not changed since the publication of the Phase 2 Draft EIS and are incorporated by reference in the Final EIS. Additional information on the risk assessment can be found in Appendix I-5 of the Phase 2 Draft EIS, *Pipeline Safety Technical Report* (EDM Services, 2017).

The risk assessment conducted by EDM estimated the potential risk of human fatalities occurring as a result of a pipeline leak and pool fire. The risk assessment was not a comprehensive assessment of specific risks in specific communities or locations along the corridor. It estimated the probability of a catastrophic release from the pipelines over the length of the co-located pipelines (for estimates of *Individual Risk*) and along a sample 1-mile segment of the pipelines (for estimates of *Societal Risk*). It described this in a manner commonly used for pipeline risk assessments, taking into account the quantity and characteristics of the fuel that could be released in a single event, as well as population density along the corridor. Given the variations in population, land cover, and topography, there are countless variations of circumstances in which releases could occur.

Individual Risk

Annual probability of fatality resulting from a pipeline failure and release for an individual, at a specific location.

Societal Risk

The annual probability that a specified number of people will be affected by a given pipeline release event.

The discussion of impacts presented in the Final EIS provides the same information included in the Phase 2 Draft EIS, but has been revised to focus on PSE's Proposed Alignment. PSE's Proposed Alignment as presented in the Final EIS incorporates the recommendations included in the DNV GL report to reduce and control the risk of electrical interference to the pipelines. These include initially operating both lines at 230 kV rather than 230/115 kV, minimizing points of pipeline and transmission line divergence, using a delta (triangular) conductor configuration, and locating pole grounds away from the pipeline(s). Because electrical interference risks would be reduced, no additional risk assessment was conducted for PSE's Proposed Alignment. The pipeline safety risk under PSE's Proposed Alignment would be expected to be no greater (and likely less) than the estimated pipeline safety risk under Alternative 1 in the Phase 2 Draft EIS.

4.9.5.1 Magnitude of Impact

For this analysis, project-related risks are classified as being significant or less-than-significant as follows:

Less-than-Significant

- With implementation of mandatory safety standards and design measures, there would be no substantial increase in risk of a pipeline release or fire as a result of project operation that could result in public safety impacts or damage to property and environmental resources.

Significant

- Even with the implementation of mandatory safety standards and design measures, there would be a substantial increase in risk of pipeline release or fire as a result of project operation that could result in public safety impacts or damage to property and environmental resources.

4.9.5.2 Risk Assessment Results

The results of the risk assessment conducted for the Phase 2 Draft EIS remain relevant for PSE's Proposed Alignment, and likely overstate the potential risks associated with PSE's Proposed Alignment. This is due to the incorporation of recommendations included in the DNV GL report into the proposed project. Therefore, the risk assessment results presented in the Phase 2 Draft EIS still apply to PSE's Proposed Alignment and are incorporated by reference in the Final EIS.

Key Assumptions

To address the lack of available data related to coating stress and arc distance information for the existing 115 kV corridor, several assumptions were used in the risk assessment. For the pipeline risk assessment, instead of modeling existing conditions to calculate existing risk, worst-case assumptions were used to ensure that project impacts relative to the No Action Alternative were not understated. To estimate the maximum, or worst-case incremental change in risk from the No Action Alternative to the proposed 230 kV corridor, the risk assessment included an assumption that the coating stress voltages and resulting coating stress caused pipeline releases for the existing 115 kV corridor are the same as those for the proposed 230 kV corridor. Similarly, the risk assessment included an assumption that the ground fault arc distances and arc caused frequency of unintentional releases for the existing 115 kV corridor are the same as those for the proposed 230 kV corridor. **Using these assumptions likely understates the existing risk (No Action), thereby possibly overstating the actual difference in risk between the No Action Alternative and PSE's Proposed Alignment.**

4.9.5.3 No Action Alternative

This section describes the potential pipeline safety risks that could occur under the No Action Alternative.

The pipeline safety risks within the existing 115 kV corridor are associated with refined petroleum products that are currently transported in the Olympic Pipeline system. Safety risks to the public from these materials could occur due to incidents caused by pipeline failure from electrical interference (external corrosion, fault damage, and arc damage), outside force/excavation, or other causes either related to (or unrelated to) co-location with the existing 115 kV PSE transmission lines. Depending on the circumstances of an incident and the properties of the pipeline product, incidents could result in the potential for pool fire, flash fire, or explosion. Safety risks related to outside force/excavation are addressed in Section 5.9 of this Final EIS.

As described in Section 3.9.5.1 of the Phase 2 Draft EIS, the risk assessment estimated the likelihood of potential impacts occurring as a result of the operation of the pipelines co-located with the existing 115 kV transmission lines for the three ways a transmission line can interact with a pipeline to cause damage: (1) external corrosion (related to *AC density*), (2) fault damage (related to coating stress), and (3) arcing damage (related to arc distances). These conditions are described above in Section 4.9.4 of this Final EIS. The estimated incident frequencies (or estimated incidents per 1,000 mile years) for individuals (individual risk) and groups of people (societal risk) are presented in Section 3.9.5.2 of the Phase 2 Draft EIS.

External Corrosion. As described in the AC Interference Study (DNV GL, 2016), AC current density levels less than 20 amps per square meter do not cause AC-induced corrosion, and the corrosion impacts arising from AC current density levels above 20 amps per square meter are difficult to accurately predict (i.e., they are unpredictable). There are two short segments in the study area where the estimated AC current density under existing peak winter loads exceeds 20 amps per square meter. These include a location in Somerset where the 16-inch pipeline diverges from the transmission line corridor, and a location near the Lake Hills Connector where the 20-inch pipeline crosses from the east side of the corridor to the west side. Typically, peaks in theoretical AC current density occur at points of divergence between a transmission line and a pipeline. The current densities in these areas are estimated to range from 22 to 35 amps per square meter. The incident frequencies presented in the Phase 2 Draft EIS employ worst-case assumptions about the length of pipeline affected and the duration of peak winter voltages. Winter peak loading scenarios represent the maximum current loading scenarios expected on the transmission lines, scenarios expected to be limited to 1 week or less per year.

Fault Damage. When the risk assessment was completed for the Phase 2 Draft EIS, no data were available from Olympic to estimate the coating stress voltages on the existing Olympic Pipeline system within the existing 115 kV corridor. As a result, the existing pipelines were assumed to have the same coating stress voltages and potential for coating stress-caused pipeline releases as for the proposed 230 kV lines. See Section 4.9.5.4 of this Final EIS (*PSE's Proposed Alignment*) for information on fault damage. Using this assumption in the risk assessment calculation likely overstates the overall change in risk associated with the proposed 230 kV lines because the proposed design would include a shield wire to limit the risk of fault damage, while the existing system does not.

Arcing Damage. Because Olympic did not provide data to estimate the arc distances for the existing Olympic Pipeline system within the existing 115 kV corridor, the existing pipelines were assumed to have the same ground fault arc distances and potential for arc-caused pipeline releases as for the proposed 230 kV transmission lines. See Section 4.9.5.4 of this Final EIS (*PSE's Proposed Alignment*) for information on arcing damage. Using this assumption in the risk assessment calculation could understate the overall risk associated with the existing 115 kV lines relative to the proposed lines, because the proposed lines have features that could provide greater protection from arcing than provided by the existing lines. The existing transmission line does not have a shield wire, and although other protective measures are in place, information provided by Olympic was insufficient to determine potential arcing distances for the existing pipelines.

Total individual risk and total societal risk are not presented for the No Action Alternative due to the lack of available data from Olympic and uncertain assumptions for the current pipelines related to coating stress and arc distances, as described above. Instead of modeling existing conditions to calculate existing risk, worst-case assumptions were used to ensure that project impacts relative to the No Action Alternative were not understated.

For additional details about the analysis of risks under the No Action Alternative, see Appendix I-5 of the Phase 2 Draft EIS (*Pipeline Safety Technical Report* [EDM Services, 2017]).

No Action Alternative Impacts Conclusion

Using low estimates of existing risk (to present a worst-case change in risk associated with the project), the risk of external corrosion is expected to stay the same under the No Action Alternative. Because no data were available to estimate the likelihood of damage as a result of fault conditions on the Olympic Pipeline system within the existing 115 kV corridor, the existing pipelines were assumed to have the same risk as the proposed 230 kV corridor. Under the No Action Alternative, the likelihood of a pipeline rupture and fire is low, due primarily to safety precautions taken by the pipeline operator, as required by federal and state regulations. Under the No Action Alternative, PSE would continue to operate its existing 115 kV transmission lines as described in Chapter 2 of this Final EIS (Section 2.1.1). The arrangement and spacing of lines and voltage would stay the same and there would be no change in risk. Therefore, under the No Action Alternative, impacts would be less-than-significant.

4.9.5.4 PSE's Proposed Alignment

This section describes the potential pipeline safety risks under PSE's Proposed Alignment, focusing on how these risks would change compared to the No Action Alternative. This section provides the same information presented in the Phase 2 Draft EIS (for Alternative 1), but has been revised to focus on PSE's Proposed Alignment. PSE's Proposed Alignment incorporates the recommendations included in the DNV GL report to reduce and control the risk of electrical interference on the pipelines (DNV GL, 2016). These include operating both lines at 230 kV rather than 230/115 kV, minimizing points of divergence between the pipelines and transmission lines, using a delta conductor configuration, and locating poles and pole grounds away from pipelines. In addition to these design features, PSE would verify arc distances once the poles are installed and, where necessary, ground wires or other grounding systems will be installed to ensure that pole grounds are all adequately separated from the pipelines. The effects that these design and operational features have on pipeline safety risk are described further below.

Divergence

Electrical interference commonly occurs where a transmission line and a pipeline diverge. Under PSE's Proposed Alignment, the transmission lines would remain in the same position relative to the pipelines as the existing transmission lines, thereby not increasing the number of points of divergence with the pipelines.

As described in Section 3.9.5 of the Phase 2 Draft EIS, the risk assessment estimated the likelihood of potential impacts from the operation of the pipelines co-located with the proposed 230 kV transmission lines for the three ways the proposed 230 kV transmission lines can interact with a pipeline to cause damage: (1) external corrosion (related to AC density), (2) fault damage (related to coating stress), and (3) arcing damage (related to arc distances). The potential risk and potential impacts were estimated for individuals (individual risk) and groups of people (societal risk) for each of these conditions. In addition, this section describes the design requirements for transmission lines related to extreme weather events and *seismic hazards*. Because ongoing maintenance activities during operation of PSE's Proposed Alignment are expected to be the same as the No Action Alternative, no change in risk related to ongoing maintenance activities is anticipated.

The Phase 2 Draft EIS concluded the following with regard to pipeline safety risk associated with Alternative 1:

- For external corrosion (related to AC density), without consideration of potential mitigation, the project could increase AC-induced corrosion risk in two areas where modeled current densities would be at levels that could cause corrosion.
- For fault damage (related to coating stress), no increase in potential risk of damage was estimated for the proposed 230 kV lines because PSE's plans to use a shield wire on the new transmission lines.
- For arcing damage (related to arc distances), without consideration of potential mitigation measures, there could be an increase in potential risk of damage to the pipelines.

The AC Interference Study was limited by the lack of available data, as described in Section 4.9.5.3 of this Final EIS. The lack of available data for existing conditions required the risk assessment to assume certain conditions in order to provide a worst-case analysis of the proposed 230 kV transmission lines. Using these assumptions likely understates the existing risk (No Action) relative to the project, thereby possibly overstating the actual difference in risk between the No Action Alternative and Alternative 1 in the Phase 2 Draft EIS.

PSE's Proposed Alignment incorporates mitigation for pipeline safety risk; therefore; the expected risks would be even lower than for Alternative 1 as analyzed in the Phase 2 Draft EIS.

AC Interference Study

The *AC Interference Study* (DNV GL, 2016) investigated the possibly for electrical interference effects and recommended design considerations to PSE in order to minimize these effects. Sensitivity studies were conducted related to AC-induced corrosion (AC current density) and fault analysis (coating stress voltage and arc distance) that evaluated varying pole configurations and shield wire types to aid in the design of the transmission line layout.

External Corrosion. For PSE's Proposed Alignment, there are no locations along the corridor where the estimated AC current density would exceed 20 amps per square meter. The estimated current density would be below 20 amps per square meter under peak winter loads. These levels do not cause AC-induced corrosion.

Note that the incident frequencies presented in Section 3.9.5.2 of the Phase 2 Draft EIS were based on Alternative 1, a route with more points of pipeline and transmission line divergence and with the transmission lines initially operating at 230 kV/115 kV. These incident frequencies do not reflect the reduced AC current density levels predicted for PSE's Proposed Alignment.

Fault Damage. PSE plans to use a shield wire on the new transmission lines (see also Section 4.9.8, *Mitigation Measures*). As a result, coating degradation is not anticipated along the corridor (DNV GL, 2016). Given that no shield wire is currently present under the No Action (115 kV) condition, PSE's Proposed Alignment would likely improve conditions related to fault conditions because the shield wire would reduce the risk of fault damage to the pipelines (Fieltsch and Winget, 2014).

Arcing Damage. Based on the DNV GL recommendations, PSE revised the design from that presented in the Phase 2 Draft EIS to ensure that all poles would be at least 13 feet from the pipelines, because this was the maximum calculated arc distance necessary to prevent arcing between the poles and the pipelines, based on soil conditions in the corridor. If the modeled conditions are correct, there would be no risk of arcing damage. However, soil conditions are quite variable; therefore, actual arc distances could vary. Actual arc distances will be measured at each pole once the poles are installed. Where necessary, pole grounds would be installed to provide adequate separation from the pipelines.

Installation of the shield wire on the proposed 230 kV transmission lines would also substantially reduce the fault current flowing into the soil from the faulted structure by distributing the current to multiple structures. This would also reduce the arcing distance; therefore, the arc damage risk from PSE's Proposed Alignment would be reduced compared to the No Action Alternative.

As described in Section 3.9.3.3 of the Phase 2 Draft EIS, the existing transmission lines do not have a shield wire, and although other protective measures are in place, information provided by Olympic was insufficient to determine potential arcing distances for the existing pipelines. Because no data were available to estimate the arc distances for the existing Olympic Pipeline system within the existing 115 kV corridor, for purposes of the risk assessment conducted for the Phase 2 Draft EIS, the existing pipelines were assumed to have the same ground fault arc distances and potential for arc-caused pipeline releases as for the proposed 230 kV transmission lines. Using this assumption in the risk assessment calculation likely overstates the overall change in risk associated with the proposed 230 kV transmission lines because the proposed design incudes a shield wire, pole distance, and commitment to measuring arcing actual distance and adjusting grounding distances, if needed, after installation.

Note that the incident frequencies presented in Section 3.9.5.2 of the Phase 2 Draft EIS were based on worst-case estimates of average pole spacing and pipeline configuration at the grounding rods. For example, EDM Services estimated that 4 percent of the pipelines would be within 13 feet of a grounding rod (see Section 9.3.4 of the *Pipeline Safety Technical Report* [EDM Services, 2017]); under PSE's Proposed Alignment, no portion of the pipelines would be closer than 13 feet to a transmission pole. The risk assessment results presented in the Phase 2 Draft EIS therefore do not reflect the measures to mitigate potential arc damage to the pipelines that are included in the PSE's Proposed Alignment.

Extreme Weather Events and Seismic Hazards. Based on the results of the Phase 1 analysis, the Phase 2 Draft EIS did not include additional analysis on Earth resources (e.g., seismic hazards). In response to comments received on the Phase 2 Draft EIS, the Final EIS includes additional information on Earth resources, and seismic risks specifically (see Section 4.11, *Earth*, of the Final EIS).

Safety measures would be incorporated into the project design to address the extreme weather and seismic conditions that occur in western Washington, to prevent poles from falling and damaging the buried pipelines. Final structural design for electrical utility structures must comply with the National Electrical Safety Code (NESC) 2017 as adopted by the UTC. For transmission lines, NESC 2017 states that the structural requirements necessary for wind/ice loadings are more stringent than seismic requirements and sufficient to resist anticipated earthquake ground motions. In addition, according to the American Society of Civil Engineers (ASCE) Manual No. 74, "*transmission structures need not be designed for ground-induced vibrations caused by earthquake motion because historically, transmission structures have performed well under earthquake events, and transmission structure loadings caused by wind/ice combinations and broken wire forces exceed earthquake loads*" (ASCE, 2009).

In the event of a large seismic event that ruptures the Olympic Pipeline system, there could be immediate life safety concerns along the alignment if the spilled fuel were to ignite. Such a seismic event would likely have widespread, regional impacts with multiple demands on emergency responders and issues related to access because of damaged transportation infrastructure. However, based on the results of the analysis of seismic risks in Section 4.11, these risks exist currently and are not expected to increase with PSE’s Proposed Alignment.

Impact Conclusion for PSE’s Proposed Alignment

Based on the results of the risk assessment, the probability of a pipeline release and fire occurring and resulting in fatalities remains low under PSE’s Proposed Alignment. However, the potential public safety impacts would be significant if this unlikely event were to occur.

Under PSE’s Proposed Alignment, including mitigation for corrosion and arc risk incorporated into the design, the probability of a significant pipeline safety incident would likely be the same or lower than the No Action Alternative. Because of the variability of soils, it is possible that the arcing risk could be slightly higher in some locations when compared with the No Action Alternative. In these areas, testing, monitoring, engineering analysis, and implementation of mitigation measures would lower these risks. See Section 4.9.8, *Mitigation Measures* for measures that would lower the risks.

The individual and societal risks described in Section 3.9.5.2 of the Phase 2 Draft EIS would be similar across all segments of PSE’s Proposed Alignment. The risk would be proportional to the distance that the transmission lines are co-located with the Olympic Pipeline system. For PSE's Proposed Alignment, the Renton Segment has the lowest number of co-located miles. Table 4.9-1 lists the length of the Olympic Pipeline system (both the 20-inch and 16-inch diameter pipelines) co-located with the transmission lines in each segment.

As described above, the lack of available data for existing fault and arc distance conditions required the risk assessment to use certain assumptions for the No Action Alternative condition that would allow for a worst-case analysis of the proposed 230 kV lines. Using these assumptions likely understates the existing risk (No Action), thereby possibly overstating the actual difference in risk between the No Action Alternative and PSE’s Proposed Alignment. The likelihood of a pipeline rupture and fire would remain low, with no substantial change in risk. As a result, the potential impact on environmental health with regard to pipeline safety is not considered significant. With implementation of the mitigation described in Section 4.9.8 of this Final EIS, conditions related to potential for fault damage due to coating stress and arc distances would likely improve under PSE’s Proposed Alignment over the existing operational baseline condition (No Action Alternative) (DNV GL, 2016).

For additional details about the analysis of risks under Alternative 1, see the *Pipeline Safety Technical Report* (EDM Services, 2017).

Table 4.9-1. Miles of Transmission Line and Olympic Pipelines Co-location in Study Area with PSE's Proposed Alignment, by Segment

Segments	Miles of Co-location		Highest and Lowest Number of Co-Located Miles
	20-inch diameter	16-inch diameter	
Redmond	1.6	1.6	
Bellevue North	2.3	2.3	
Bellevue Central, Existing Corridor	2.9	2.9	Highest number of co-located miles
Bellevue South, Existing Corridor	1.2	3.3	
Newcastle	1.5	1.5	
Renton	0.4	0.4	Lowest number of co-located miles

4.9.6 Long-term Impacts on Resources

Implementation of the regulatory requirements identified in Section 4.9.1 of this Final EIS, *Relevant Plans, Policies, and Regulations*, and the mitigation measures described for pipeline safety in Section 4.9.8 of this Final EIS, will reduce the chances of a pipeline incident. However, some level of risk would remain, and it is possible that petroleum products transported through the Olympic Pipeline system could still enter the environment, or a fire could occur, as a result of proximity to the transmission lines under either the No Action Alternative or PSE's Proposed Alignment.

In addition to the public safety risks described above, natural resources and other elements of the environment could be significantly affected if an unintentional release or fire were to occur. This section describes the potential impacts of a spill or a fire on the natural and built environment in the unlikely event that a pipeline release were to occur. It describes the types of impacts on each element of the environment addressed in the Phase 2 Draft EIS.

Methods for Assessing Long-Term Impacts on Resources

To determine long-term impacts on resources in the event of a pipeline spill or fire caused by construction or operation of the proposed project, the EIS Consultant Team considered the types of impact and potential extent of damage. The length (miles) of pipeline co-located with the proposed transmission lines by segment was considered in the assessment, as well as the impact distance identified in the *Pipeline Safety Technical Report* for a fire.

The impacts of a spill depend on the magnitude of the spill (i.e., volume of material released and extent of area affected); the type of material released; and the location (e.g., near a sensitive area). Because the Energize Eastside project would not affect pipeline pressure and flow rates, or other operating parameters of the pipeline system, the potential characteristics of a spill or fire would be the same regardless if it occurred under the No Action Alternative or PSE's Proposed Alignment.

The greatest potential for environmental harm would be if a release enters or directly occurs in a water body as spilled materials can spread more quickly, can be difficult to contain and remove, and can be toxic. A release could enter a water body in a number of ways, such as through surface or subsurface flow, through a catch basin, or across impervious surfaces. The Olympic Pipeline system carries diesel, jet fuel, and gasoline, which are very light or light oils. Gasoline breaks down very quickly, usually lasting only days to weeks in the environment; jet fuel usually lasts days to weeks in the environment; and diesel fuel is somewhat persistent lasting 1 month to a year in the environment (Ecology, 2016; NOAA, 2016).

A pool fire (fire) could result from a spill, but not all spills would result in a fire. For a fire to occur, an ignition source would be needed. The potential risk of a fire from a pipeline rupture is described Section 4.9.4 of this Final EIS, *Major Risks to Public from Unintentional Pipeline Release*, and Section 5.9.1 of this Final EIS, *Risks During Construction*. Potential impacts would depend on how and if the fire spreads, which would depend on vegetation, structures, and other conditions at the site. The nature and extent of the environmental damage from a fire can be quite varied. For example, the pool fire diagram in Figure 4.9-6 shows an area of approximately 1 acre that could have temperature high enough to cause fatalities. A spill of the same volume could spread over a larger area due to topography, especially if the spill reached a water body. Although the spill would not be as concentrated, the extent of damage could extend to several acres. If in a wooded area and during dry season, a pool fire could spread even farther if not contained by firefighters. Because of these variables, the impacts of a fire on resource areas are described here in general terms. Section 4.9.7 describes conditions specific to each segment.

Land Use and Housing

A release of material from the Olympic Pipeline system could foul buildings, contaminate soil, and damage vegetation. If residential buildings are fouled by the spill, structures may need to be demolished, which could temporarily reduce available housing units.

Depending on the location, size, and extent, a fire could destroy or damage houses, commercial buildings, other structures, and vegetation. This would reduce the amount of available housing until structures are rebuilt, displace businesses, and potentially change neighborhood character.

Planned future development consistent with policies adopted by affected cities may not occur if contaminated properties are not promptly remediated. Depending on the time it takes to remediate the soil and rebuild damaged buildings, there may be a long-term displacement of businesses and residents.

Impacts on land use and housing associated with pipeline spills or fires would be highest if they occurred in areas with high population or employment density, areas with unique land uses (such as hospitals or schools), or areas planned for redevelopment or intensification of land uses.

Scenic Views and Aesthetic Environment

A spill has the potential to negatively affect the aesthetic environment, in particular the natural environment (e.g., vegetation). Spilled material can damage vegetation, negatively affecting the visual quality of the area. See the *Plants and Animals* section below for further explanation. The reduction in visual quality would depend on the type of material spilled, location, and size of the release.

A fire from a pipeline release could substantially degrade the visual quality of surrounding landscape. Visual effects of a fire can include areas with extensive burn damage to structures, facilities, and vegetation. This type of physical damage would alter and degrade the visual quality of the affected area until the landscape is restored. The extent of impact would depend on the size and location of the fire. Areas of higher visual quality would be most susceptible to aesthetic impacts from spills or fires, such as undeveloped wooded areas or areas with orderly urban form.

Water Resources

Materials from a spill can directly or indirectly (e.g., through catch basins) enter streams, wetlands, and lakes or could be washed into those water bodies by stormwater. The spills could degrade water quality and contaminate sediments, which can be toxic to aquatic plants and animals. Materials could also move downstream, spreading quickly and contaminating a larger area than if a spill occurred on land. Spills also have the potential to infiltrate and contaminate groundwater. Air quality near a stream affected by a spill could be degraded to an extent that people and animals could be harmed or killed. In Renton, the drinking water supply comes from groundwater, and aquifer contamination would require expensive cleanup or finding an alternate water supply.

Depending on the location, size, and extent, a fire could destroy or damage vegetation in and adjacent to wetlands and streams. This could expose soils and increase erosion of sediments, which could negatively affect water quality. Damage to vegetation could change the function and extent of wetlands. Reduced riparian vegetation could also increase water temperature in streams. Additionally, byproducts from the fire, or chemicals used in firefighting or cleanup efforts, could contaminate water resources. Byproducts or chemicals also have the potential to enter the groundwater and contaminate drinking water.

Impacts on water resources associated with pipeline spills or fires would be highest if they occurred in areas with rivers or streams and associated riparian areas or aquifer recharge areas, or if they occurred in drainage pipes, culverts, or other piped conveyances where the atmosphere was confined. In these situations, an explosion could result due to the confinement. A deeply incised creek bed may also be sufficient to provide adequate confinement to pose some explosion risk. In addition to risks to humans in the explosion area, an explosion could substantially degrade ecological conditions within the water body where the explosion occurred, or nearby water bodies.

Plants and Animals

Vegetation can be damaged by direct physical and chemical interactions associated with a spill. The nature of impacts depends on the duration of exposure, the type and quantity of the material spilled, location of the release, the potential for ignition (described below), and the sensitivity of species. Full restoration to original conditions can take many years. If a spill entered a watercourse, it could damage aquatic vegetation and terrestrial vegetation along the shoreline downstream. If the fuel were to persist in the environment, it can affect the long-term ability of vegetation to recover (Hoffman et al., 2003).

A spill can affect terrestrial and aquatic animals by physical smothering or toxic effects. Animals that contact spilled material could be physically coated by petroleum products, inhale vapors, or ingest oil when foraging or grooming. Aquatic-oriented species (including fish, wading birds, waterfowl, frogs, and salamanders) are more susceptible when oil enters a water body because the spill would spread throughout the water body or downstream. Sensitive areas or species as identified in Section 4.4 of this Final EIS, *Plants and Animals,* are particularly susceptible (Ecology, 2016).

Impacts to plants from a fire would depend on the vegetation species and communities exposed, as well as the duration and temperature that plants are exposed to. Low-lying ground cover and shrubs would recover much quicker than forested areas with mature trees. The longer the exposure and the higher the temperature, the more likely injury or death of plants would occur. The loss of vegetation can also provide an opportunity for invasive non-native species to become established and spread. Also, trees that survive may be more susceptible to disease, fungus, or insects.

Animals can be injured or killed by a fire if they are close enough to the event. Animals that can will move away from a fire; however, some animals with limited mobility, such as newly hatched birds, may not be able to move, and others react to danger by hiding and would be more susceptible to injury or death (USDA, 2000).

Impacts on plants and animals associated with pipeline spills or fires would be highest if they occurred in forested areas with mature trees or aquatic and terrestrial habitats, or during a season critical for the life cycle of a certain species (for example, spawning season for fish).

Greenhouse Gases

Activities that release GHGs contribute to the accumulation of GHGs in the atmosphere, a driving force in global climate change. After a spill, gasoline, diesel, and jet fuel would begin to evaporate, releasing greenhouse gases, primarily CO_2, N_2O, and CH_4. The resulting GHG impacts would depend on the amount of GHGs released into the atmosphere.

A fire would also result in the release of GHGs, primarily from burning structures and trees. The resulting GHG impacts would depend on the amount released and amount ignited. The highest amount of GHGs released would occur if the fire damaged a forested area with mature trees.

Recreation Resources

If a spill occurred near a recreation site, it could affect recreation opportunities, depending on the scale of the spill. Small spills may have a temporary impact on access to a site during clean-up efforts. Larger spills may directly harm or kill vegetation. The loss of or damage to vegetation would negatively impact the recreation user experience. People may avoid a site or be prohibited from entering a contaminated area. Recreation sites downstream of the pipeline could be affected if a large spill entered a watercourse.

If a fire occurred near a recreation site, it could substantially degrade the environment and affect recreation opportunities. Impacts on recreational resources would include the destruction or physical damage by the fire to the resource itself. The loss of or damage to vegetation would detract from the aesthetic quality of a recreation site and negatively impact the recreation user experience, or preclude its use altogether. A recreation site may be temporarily closed during cleanup efforts or if the fire caused the site to be unsafe (e.g., damaged trees).

Impacts on recreation associated with pipeline spills or fires would be highest if they occurred in parks or near recreational facilities that receive the highest number of visitors of the parks along the corridor, or parks with mature vegetation that is part of a recreation user's experience, or occur during a park's peak visiting season.

Historic and Cultural Resources

If material were released in an area where historic or cultural resources are located, these resources could be impacted. Impacts from seepage may damage a resource's integrity of design, setting, materials, workmanship, and feeling, or its depositional context. Impacts on the depositional integrity of a subsurface cultural resource would be a permanent loss, as these resources are non-renewable. Incident response or cleanup activities such as excavation or other ground disturbance may impact historic and cultural resources, but could be mitigated through a state-issued emergency excavation permit. Damage to elements of vegetation or the natural environment that contribute to the historical significance of a resource could negatively affect these resources.

If a fire were to occur near historic and cultural resources, it could destroy or damage historic structures, buildings, or objects and change the historic character of a landscape. Although structures can be rebuilt, destruction of a historic or cultural resource would be a permanent loss, as the original resources are non-renewable. Damage to the surrounding environment and vegetation could impact a resource's integrity of setting, and may minimize the resource's ability to convey its historic significance. Soil disturbance from restoration efforts could also impact the integrity of subsurface cultural resources. Impacts from these efforts may be mitigated through a state-issued emergency excavation permit.

Impacts on historic and cultural resources associated with pipeline spills or fires would be highest if they occurred in areas with a concentration of historic and cultural resources, such as in a historic district.

Transportation

If significant damage to the pipeline system occurred, petroleum products normally transported in the pipelines would be transported by other means, primarily by trucks using interstate highways. This would be expected to generate up to a few thousand truck trips per day, distributed throughout the day and across the interstate highway system. Impacts would be greatest at major distribution points and major end users, and could cause local congestion such as near refineries or at airports. If an accidental shutdown occurred, short-term disruption would occur to airports or other customers of the Olympic Pipeline system until transportation could be arranged. No long-term disruption in petroleum product supply would be anticipated for any planned temporary shutdown or relocation.

Economics (Ecosystem Services)

If a spill or fire damaged a large number of trees, the ecosystem services associated with those trees (stormwater regulation, pollutant removal, and carbon sequestration) would no longer be available. Impacts on ecosystem services would be highest if a spill or fire occurred in a forested area with mature trees.

Conclusion

As stated above, impacts on these sensitive resources described in Section 4.9.6 of this Final EIS could be significant if a pipeline incident occurred. However, the likelihood of a pipeline rupture and release remains low under PSE's Proposed Alignment, and implementation of regulatory requirements (Section 4.9.1 of this Final EIS) and mitigation measures (Sections 4.9.8 and 5.9.4 of this Final EIS) would further reduce the probability of a pipeline incident occurring.

4.9.7 Impact Comparison by Segment

Section 4.9.5.4 of this Final EIS describes the potential for the project to increase pipeline safety risks, and Section 4.9.6 of this Final EIS describes the general consequences in the event of a spill or a fire on the pipeline. As noted, conditions within each segment vary, and these can influence both the possibility of an incident adversely affecting the pipelines and the consequences in that location. This section (which is new for the Final EIS and was not presented in the Phase 2 Draft EIS) provides a segment-level discussion of these two sets of variables. Factors affecting the possibility of an accident include the presence of a co-located pipeline, the segment location relative to the Seattle Fault, landslide hazard areas, and *liquefaction* zones. Factors affecting the potential consequences include the presences of slopes and streams, crossings of impervious areas, the types and density of land uses, and types and sensitivity of vegetation and habitat present. For specific information about the affected environment, other sections of the EIS provide greater detail. For more information regarding co-location of the project with the Olympic Pipeline system, see Section 4.9.2 of this Final EIS (including Figure 4.9-1), as well as Table 4.9-1.

4.9.7.1 Richards Creek Substation

One of the pipelines crosses through the middle of the Richards Creek substation site (see Figure 2-2).

- **Adjacent Land Uses:** The predominate types of structures surrounding the site are the Lakeside substation and Chestnut Hill Academy to the north, industrial warehouses to the west and south, and multi-family residential and commercial buildings to the east. These structures are relatively dispersed and surrounded by parking lots.
- **Land and Vegetation Cover:** The Richards Creek substation site is comprised of 80 percent vegetation cover. However, after development of the site, tree removal would result in less vegetation cover. The site is primarily comprised of, and surrounded by, trees.
- **Seattle Fault, Landslide Hazard Areas, and Liquefaction Hazards:** The Richards Creek substation site is entirely within the Seattle Fault Zone. The site has small pockets of landslide hazard areas, but these would be re-graded during construction of the project.
- **Topography and Nearby Water Bodies:** Topographically, the site generally slopes downhill to the west. One stream is just outside the western property boundary and traverses the southwest portion of the site. Another stream is located in the northeast corner of the property. Wetlands are also located on the property.
- **Road Crossings and Impervious Surfaces:** The site would not cross any roadways, but an existing access road turns into SE 30th Street. A spill on the site could potentially flow down the access road (and into the stormwater system) or into one of the streams on-site.

4.9.7.2 Redmond Segment

- **Adjacent Land Uses:** The predominate types of structures along the segment are detached single-family homes and multi-family buildings. Rose Hill Middle School is adjacent to the segment, and commercial warehouses are adjacent to the Sammamish substation.
- **Seattle Fault, Landslide Hazard Areas, and Liquefaction Hazards:** The segment is entirely outside of the Seattle Fault Zone. The northern 0.85 mile of the corridor is located primarily within landslide hazard areas.
- **Land and Vegetation Cover:** Land cover is forested for the northernmost 0.8 mile. Along the rest of the corridor, the land cover is developed with varying amounts of vegetation (20–80 percent land cover).
- **Topography and Nearby Water Bodies:** The Redmond Segment generally slopes downhill to the east. Swan Lake, a constructed lake associated with the Sixty-01 condominium complex, is approximately 450 feet to the east of the corridor with an 11 percent slope in between. A spill could flow downhill and into Swan Lake. The segment crosses several wetlands and streams.
- **Road Crossings and Impervious Surfaces:** The segment crosses five roadways and a parking lot behind the Sixty-01 condominium complex, where a release from the pipelines could reach an impervious surface and flow into the stormwater system or Swan Lake.

4.9.7.3 Bellevue North Segment

- **Adjacent Land Uses:** Portions of the corridor passing through single-family neighborhoods are generally lined with tall trees. Structure types along the segment are primarily detached single-family residences. Approximately 0.5 mile before the segment terminates, it passes Westminster Chapel, crosses Viewpoint Park and SR 520, and traverses a car dealership.
- **Seattle Fault, Landslide Hazard Areas, and Liquefaction Hazards:** The segment is entirely outside of the Seattle Fault Zone. A small landslide hazard area is located north of NE 24th Street.
- **Land and Vegetation Cover:** Land cover along the segment is a mosaic of forested areas and developed areas, with vegetation coverage ranging from 50 to 80 percent.
- **Topography and Nearby Water Bodies:** The topography along the Bellevue North Segment generally slopes downhill to the south and east. Valley Creek is approximately 0.3 mile to the east of the transmission line corridor with a 9 percent slope in between. A spill could potentially flow downhill and intercept the creek. The segment crosses several wetlands.
- **Road Crossings and Impervious Surfaces:** The segment crosses seven roadways, as well as parking lots associated with commercial properties north of NE 20th Street, where a release from the pipelines could reach an impervious surface and flow into the stormwater system.

4.9.7.4 Bellevue Central Segment

- **Adjacent Land Uses:** Single- and multi-family homes are the predominate structures along the segment. However, there are commercial and industrial structures in the BelRed area and near the Lakeside substation. Chestnut Hill Academy, also near the Lakeside substation, is the only school adjacent to the corridor in this segment. In addition, three major open spaces are adjacent to the segment: Glendale Country Club, Kelsey Creek Park, and a cemetery near the Lakeside substation.
- **Seattle Fault, Landslide Hazard Areas, and Liquefaction Hazards:** The segment is entirely outside of the Seattle Fault Zone. However, the southern terminus of the Bellevue Central Segment borders the northern boundary of the zone. There are pockets of landslide hazard areas between approximately SE 3rd Street and SE 16th Street.
- **Land and Vegetation Cover:** Vegetation coverage ranges from 20 to 80 percent along the corridor in this segment. More heavily vegetated areas include Kelsey Creek Park and the open space in Richards Valley (west of the corridor). Portions of the corridor passing through single-family neighborhoods are generally lined with ornamental trees of varying heights.
- **Topography and Nearby Water Bodies:** The north portion of the segment is on a slight ridge, with the underlying topography sloping downhill slightly to the east and more steeply to the west. South of Bel-Red Road, the topography general slopes downhill to the west. The portion of the corridor along the Glendale Country Club and the Kelsey Creek Park experiences a sharp depression with a 20 percent slope to the west from the easement. Therefore, spills could flow down into Kelsey Creek Park, which includes Kelsey Creek and its tributaries. The segment crosses several wetlands and streams.
- **Road Crossings and Impervious Surfaces:** The northern 0.43 mile of the segment is entirely on impervious surfaces (parking lots and roadways), where a release from the pipelines could reach an impervious surface and flow into the stormwater system. Throughout the corridor, the segment crosses nine roadways.

4.9.7.5 Bellevue South Segment

- **Adjacent Land Uses:** Portions of the corridor passing through single-family neighborhoods are generally lined with ornamental trees of varying heights. Structures along the corridor are primarily single-family homes; however, commercial buildings with large parking lots line I-90, and Tyee Middle School is just north of SE Newport Way.
- **Seattle Fault, Landslide Hazard Areas, and Liquefaction Hazards:** The entire segment is within the Seattle Fault Zone. There are small, scattered areas of landslide hazard between the Richards Creek substation site and I-90, as well as along Somerset Hill. However, the largest landslide area crossed by the corridor is south of the Somerset substation and surrounding the Coal Creek ravine.
- **Land and Vegetation Cover:** Vegetation coverage ranges from 20 to 80 percent. The segment traverses the heavily forested Coal Creek ravine.
- **Topography and Nearby Water Bodies:** The topography generally slopes downhill to the south and west, with the steepest slopes along the Coal Creek ravine. Because there are few flat areas, slopes contribute to the risk of a release from the pipeline spreading. Depending on where it originates, a spill could potentially flow into Coal Creek. The segment crosses several wetlands and streams.
- **Road Crossings and Impervious Surfaces:** There are 19 road crossings, as well as parking lots associated with commercial development south of I-90, where a release from the pipelines could reach an impervious surface and flow into the stormwater system.

4.9.7.6 Newcastle Segment (both Options)

- **Adjacent Land Uses:** Portions of the corridor passing through single-family neighborhoods are generally lined with ornamental trees of varying heights. Typical structures along the segment are predominately single-family homes; however, there are some commercial buildings and townhouses near Coal Creek Parkway, as well as Newcastle City Hall.
- **Seattle Fault, Landslide Hazard Areas, and Liquefaction Hazards:** The entire segment is within the Seattle Fault Zone. The portion of the segment that crosses the May Creek Natural Area is located within a landslide hazard area. There are no liquefaction hazard areas along the segment.
- **Land and Vegetation Cover:** The land cover is developed with varying degrees of vegetation cover (20–80 percent). More heavily vegetated areas exist where the segment traverses the forested area within and around the Newcastle Cemetery and the ravine at May Creek Park.
- **Topography and Nearby Water Bodies:** The transmission line corridor passes through mostly moderately sloping areas with a high point approximately 500 feet south of SE 80th Street. Steep slopes (greater than 40 percent) are concentrated in two areas: near Coal Creek (from Coal Creek Parkway SE to SE 60th Street) and near May Creek (between about SE May Creek Park Drive and SE 95th Way). Because there are few flat areas, slopes contribute to the risk of a release from the pipelines spreading. It is possible that, depending on where a spill originates, it could intersect with one of these two water bodies. Lake Boren is approximately 600 feet east of the transmission line and at a 10 percent slope downhill. A spill could potentially flow into Lake Boren. The segment crosses several small wetlands and streams.
- **Road Crossings and Impervious Surfaces:** There are eight road crossings where a release from the pipelines could reach an impervious surface and flow into the stormwater system.

DSD 005710

4.9.7.7 Renton Segment

- **Adjacent Land Uses:** The predominate types of structures surrounding the co-located utilities are single-family homes and Sierra Heights Elementary School.
- **Seattle Fault, Landslide Hazard Areas, and Liquefaction Hazards:** The entire segment is outside of the Seattle Fault Zone. However, the north portion of the segment borders the southern boundary of the zone. The portion of transmission lines that is co-located with the pipelines does not cross landslide hazard areas or liquefaction hazard areas. There is a landslide hazard area along Honey Dew Creek and a moderate to high liquefaction hazard area located along the Cedar River.
- **Land and Vegetation Cover:** Along the co-located portion of the segment, the land cover is forested.
- **Topography and Nearby Water Bodies:** The topography along the co-located section of the Renton Segment slopes downward to the north into the Honey Dew Creek ravine. Therefore, a spill could travel downhill and reach Honey Dew Creek. The co-located portion of the segment does not cross wetlands or streams.
- **Road Crossings and Impervious Surfaces:** The co-located portion of the segment crosses two roadways, where a release from the pipelines could reach an impervious surface and flow into the stormwater system. From approximately NE 4th Street to NE 7th Street, and from the NE 11th Place to NE Sunset Blvd, the corridor crosses numerous parking lots associated with commercial development and multi-family residences.

4.9.8 Mitigation Measures

This section describes the mitigation measures that would be used during operation of the project, and recommends additional measures to avoid, minimize, and mitigate environmental health and safety impacts related to pipeline safety. See Section 5.9.4 of this Final EIS for mitigation measures applicable during construction. A substantial set of federal, state, and local regulations and practices are in place to minimize the potential for pipeline incidents that could occur as a result of electrical interference from the Energize Eastside project. The design features and BMPs that PSE proposes to use to avoid or minimize impacts during operation have been considered in assessing the environmental impacts to environmental health and safety.

Mitigation measures would be determined during the permitting process, but may be applied prior to construction, at project start-up, or during operation of the project. For instance, PSE has added some mitigation measures, such as pole locations, layout, and configuration as part of the refined design. In addition to these design features, PSE would verify arc distances once the poles are installed and, where necessary, install ground wires or other grounding systems to ensure that pole grounds are all adequately separated from the pipelines. Other mitigation measures would need to be implemented after the project is energized or during peak winter load conditions in order to take into account measured field conditions.

For the Phase 2 Draft EIS, the EIS Consultant Team retained Stantec Consulting Services Inc. (Stantec) to perform an independent, technical review of DNV GL's AC Interference Study. Based on Stantec's experience and industry standards, it was Stantec's opinion that the technical approach used to achieve an optimal transmission line route and powerline conductor configuration to minimize the *AC interference* risks on the Olympic Pipeline system is consistent with industry practice. However, Stantec recommended that additional analysis be performed in the detailed design stage of the project to verify mitigation needs for the project prior to transmission line energization (Stantec, 2017). These measures are listed below.

Olympic, as pipeline operator, is responsible for operating and maintaining its pipelines in accordance with federal standards. PSE, as project applicant, has responsibilities (some of which may be imposed by jurisdictions with permit authority) to coordinate and cooperate with Olympic, but has limited authority to influence specific mitigation measures undertaken by Olympic related to pipeline operation or monitoring. This section first describes the regulatory requirements and responsibilities of PSE for implementing mitigation measures, and of Olympic for operating and maintaining its pipelines in accordance with safety standards and applicable laws. Next, the section identifies additional potential mitigation measures for ensuring that public safety concerns are addressed. As part of ongoing coordination between PSE and Olympic, additional mitigation measures may be identified during final design.

4.9.8.1 Regulatory Requirements

PSE Responsiblities and Requirements

PSE is responsible for the Energize Eastside project's design, construction, and operational parameters within the shared corridor with the Olympic Pipeline system. For PSE, national and state standards, codes, and regulations, and industry guidelines govern the design, installation, and operation of transmission lines and associated equipment. The NESC 2017, as adopted by the UTC, provides the safety guidelines that PSE follows. The NESC contains the basic provisions necessary for worker and public safety under specific conditions, including electrical grounding, protection from lightning strikes, extreme weather, and seismic hazards. PSE would use these in developing final design. The final design of the project has not been completed; therefore, the exact specifications and standards that would be incorporated into the project have not been identified.

To address concerns about potential interaction between the Energize Eastside transmission lines and Olympic Pipeline system, PSE and Olympic have coordinated regarding the project since 2012, and both have indicated they would continue their coordination through final design and construction. PSE and Olympic meet regularly to discuss, identify, and mitigate potential threats to the integrity of the pipelines. Over the course of these ongoing discussions, the project plans have evolved to minimize the potential for impact. PSE's Proposed Alignment presented in the Final EIS now incorporates the recommendations included in the DNV GL report to reduce the risk of electrical interference to the pipelines. These include the following engineering aspects: initially operate both lines at 230 kV rather than 230/115 kV; minimize points of pipeline and transmission line divergence along the corridor; use a delta conductor configuration; and locate poles and pole grounds away from the pipeline(s). PSE also plans to perform an AC interference study prior to construction that incorporates the final powerline route, configuration, and operating parameters to confirm that current densities would remain within acceptable levels, and inform Olympic of any locations where additional measures may be needed to protect the pipelines.

Olympic Responsiblities and Requirements

As the pipeline operator, Olympic is responsible for operating and maintaining its pipelines in accordance with or to exceed PHMSA's Minimum Federal Safety Standards in 49 CFR Part 195 (and Washington State UTC's adopted and enhanced regulations contained in WAC, Title 480). The regulations are intended to ensure adequate protection for the public and to prevent pipeline accidents and failures. PHMSA specifies minimum design requirements and protection of the pipeline from internal, external, and atmospheric corrosion. In addition, 49 CFR 195 established the following broad requirements that are imposed on Olympic as the pipeline operator:

- 49 CFR 195.577(a) requires, "*For pipelines exposed to stray currents, you must have a program to identify, test for, and minimize the detrimental effects of such currents.*"
- 49 CFR 195.401 (b) (1) requires, "*Non Integrity Management Repairs, whenever an operator discovers any condition that could adversely affect the safe operation of its pipeline system, it must correct the condition within a reasonable time. However, if the condition is of such a nature that it presents an immediate hazard to persons or property, the operator may not operate the affected part of the system until it has corrected the unsafe condition.*"

Because Olympic, as the pipeline operator, is responsible for the safety of its pipeline in compliance with federal safety requirements, measures to be used will be determined by Olympic in coordination with PSE and based on a review of final design, site-specific conditions, and field measurements. Certain mitigation measures, such as measures to reduce AC density, necessarily must correspond to specific design and site conditions. Olympic has indicated it will identify specific measures, or a suite of measures, following the detailed engineering analysis of the final design and based on site-specific conditions and field measurements conducted at project start-up and during peak loading scenarios, and in consideration of the AC interference study that incorporates the final powerline route, configuration, and operating parameters. For example, Olympic has informed PSE that after energization, it plans to perform a site survey to ensure that all AC interference risks have been fully mitigated under steady-state operation of the powerline.

DSD 005713

4.9.8.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on results and recommendations of DNV GL's AC Interference Study (2016); Stantec's independent, technical review of DNV GL's AC Interference Study (Stantec, 2017); measures PSE has indicated it will use; and measures the EIS Consultant Team has proposed to provide additional safety assurances. The applicable measures are organized based on the stage at which they would be applied (i.e., before construction, at project start-up, and during operation).

Prior to Construction

- Continue to coordinate with Olympic and include safeguards in the project design to protect nearby pipelines from interaction with the new transmission lines due to AC current density, faults caused by lightning strikes, mechanical/equipment failure, or other causes.
- Perform an AC interference study incorporating the final powerline route, configuration, and operating parameters to confirm that current densities would remain within acceptable levels, and inform Olympic of any locations where additional measures may be needed to protect the pipelines.
- Obtain and incorporate all of the pipeline parameters required for detailed modeling and study (i.e., locations and details of above-grade pipeline appurtenances/stations, bonds, anodes, mitigation, etc.). This should include a review of the annual test post cathodic protection survey data.
- Fully assess the safety and coating stress risks for phase-to-ground faults at powerline structures along the entire area of co-location, including both inductive and resistive coupling.
- Fully assess the safety and AC corrosion risks under steady state operating conditions on the powerline.
- Reassess the safe separation distance at each pole location to minimize arcing risk based on NACE SP0177-2014 and considering the findings in CEA 239T817 (Stantec, 2017).
- Ensure that the separation distance between the pipelines and the powerline structures exceeds the safe distance required to avoid electrical arcing by installing pole grounds at appropriate distance from the pipeline based on engineering analysis.
- File a mitigation and monitoring report with the Partner Cities demonstrating that sufficient safety factors have been incorporated into design, and documenting all consultations with Olympic, including the sharing of modeling and engineering information with Olympic to assist Olympic in its monitoring and mitigation responsibilities. The report should include a plan that identifies the process for conducting additional field surveys and data collection for identifying mitigation measures following project start-up, and proposed monitoring to ensure that mitigation related to operational issues is followed.
- Install Optical Ground Wire (OPGW) shield wire on the transmission line poles.

At Project Start-up

- Work with Olympic to evaluate and implement appropriate mitigation measures to reduce electrical interference on the Olympic Pipeline system to safe levels. (Olympic has informed PSE that, after the system is energized, it plans to collect field data to assess the necessity for the installation of AC grounding or similar systems to address steady-state conditions. Olympic has informed PSE that it plans to implement appropriate mitigation measures to the extent needed based on its analysis of field data collected following system energization. AC grounding systems are commonly installed in connection with power transmission poles to dissipate any energy to ground.)
- Verify arc distances once poles are installed and, where necessary, install ground wires or other grounding systems to ensure that pole grounds are all adequately separated from the pipelines.
- Mitigation that Olympic could provide based on the results of the analysis may include the installation of additional protective measures such as grounding mats, horizontal surface ribbon, and/or deep anode wells based on a detailed mitigation study, as appropriate.

During Operation

- If indicated by the AC interference study conducted for final design, inform Olympic when the electrical system is expected to operate at or near winter peak loading so as to provide Olympic a reasonable opportunity to take appropriate steps to measure actual AC current densities.
- To detect any unexpected changes between the pipeline and transmission line, provide information to Olympic as necessary for Olympic to record AC pipe-to-soil potentials and DC pipe-to-soil potentials during their annual cathodic protection survey.
- Provide Olympic with as much advance notice as practical of when outages are planned on the individual circuits, as the AC induction effects on the pipelines may be magnified when only one circuit (of the double-circuit transmission lines) is energized.
- Provide the Partner Cities with PSE monitoring data on maximum currents under peak winter operating conditions.

4.10 ECONOMICS

This section provides a project-level analysis of potential impacts to economics associated with the Energize Eastside project. The analysis in the Phase 2 Draft EIS addressed the following three topics:

1. Potential loss of property tax revenue, especially to the smallest affected city (Newcastle), due to reduced property values.
2. Potential cost to the community requesting the placement of the 230 kV transmission lines underground as mitigation.
3. Monetary value of lost *ecosystem services* due to reduced tree cover.

The first two components of the analyses (property tax revenue and cost of undergrounding) are not dependent on the segment or route chosen, and the information has not changed since publication of the Phase 2 Draft EIS. Therefore, they are not included in the Final EIS but are incorporated by reference. Comments received on those analyses, and responses from the Partner Cities and the EIS Consultant Team, are included in Chapter 6 and Appendix K. The economic analysis presented in this Final EIS focuses on lost ecosystem services associated with PSE's Proposed Alignment. The assessment of ecosystem services includes the study area used by The Watershed Company (Appendix E-2) to survey existing trees in the existing and new transmission line corridors.

Economic analysis is not a required element for a SEPA EIS; however, SEPA provides discretion to agencies to include economic information in an EIS that could be beneficial to decision makers, such as information related to environmental concerns that may not be readily available elsewhere. The analysis of the value of lost ecosystem services due to reduced tree cover was conducted in response to comments received during the public comment periods for the Phase 1 Draft EIS and the scoping period for the Phase 2 Draft EIS.

Key Changes from the Phase 2 Draft EIS

Impacts associated with property tax revenue in Newcastle and the potential cost to a community requesting placement of a 230 kV transmission line underground have not been revised because the estimates were made using a broad analysis that was not segment-specific. Therefore, the findings still apply to PSE's Proposed Alignment, and this information is not repeated in the Final EIS.

Ecosystem services were analyzed at the segment level; therefore, this Final EIS has been updated to present data related to PSE's Proposed Alignment. Tree removal would be the same as was assessed in the Phase 2 Draft EIS for the Redmond, Bellevue North, and Redmond Segments. However, updated tree removal data were available for a portion of the Bellevue Central Segment, the Bellevue South Segments, and both Newcastle options (see Appendix L). In addition, modifications were made to the model used for the Phase 2 Draft EIS regarding how carbon and structural value are calculated. Therefore, impacts for all segments were reassessed to take into account changes to the model, and the revised tree removal numbers for some segments. The Final EIS presents the potential impacts on ecosystem services that may result from PSE's Proposed Alignment.

4.10.1 Tree Cover Along Transmission Line Corridor

This section has been updated in the Final EIS to present the information related to PSE's Proposed Alignment. No new modeling analysis was conducted for this Final EIS. Individual trees as well as groups of trees provide ecological benefits and environmental values. Trees improve air quality by absorbing CO_2 and potentially harmful gases, such as sulfur dioxide and carbon monoxide, from the air, and releasing oxygen. Trees also store carbon, reduce soil erosion, remove pollutants, and provide food and habitat for birds and other wildlife. The amount of carbon stored in a tree increases as it grows, as does the tree's environmental value. Carbon is stored in the leaves, stems, roots, and other parts of a tree when they absorb CO_2 from the atmosphere and use it to grow. Trees are important for carbon sequestration, because they live a long time and can store their carbon for many years. Each year, an acre of trees absorbs the amount of carbon produced by driving a car for 26,000 miles, and an individual urban tree contains about four times more carbon than individual trees in forests. Some tree species hold higher value than others based on the magnitude of the ecological functions performed; and groups of trees have a higher ecological value than a series of isolated trees, because of the environmental benefits indicated above (ACTrees, 2011).

Methods for Studying the Affected Environment

Ecosystem services are the benefits that the ecosystem provides to humankind. In some cases, these services can be assigned an economic value. For the ecosystem services analysis, trees within each segment of the study area were inventoried by The Watershed Company between March 2015 and July 2016 (The Watershed Company, 2016b). Revised permit-level data were from surveys in 2017, and used for the Bellevue Central Segment, Richards Creek substation, Bellevue South Segment, and Newcastle Options. Data collected during the inventories included the tree species, trunk diameter at breast height, tree height, and health condition. These data were used to model the current ecosystem services value of the trees in each segment using United States Forest Service (USFS) i-Tree Eco software (USFS, 2017), a peer-reviewed software program that provides urban and rural forestry analysis and benefits assessment tools.

To determine the ecosystem services provided by the trees currently in the study area, a statistical model was run for trees surveyed along the existing and new corridors.

In total, approximately 5,500 trees were inventoried along PSE's Proposed Alignment and used in the i-Tree model (The Watershed Company, 2016b, 2017). The model identifies the current amount of carbon stored in the trees (based on tree species, diameter of trunk at breast height, and tree height), and the cost of replacing the tree with a similar tree (called the "structural value"). The total *fixed value* of the "forest" (structural value + carbon storage value) within the study area is $6.7 million. This represents the ecosystem services provided by the "forest" at a fixed point in time. Removing all of the study area trees would incur this one-time cost of $6.7 million. The model also identifies the amount of avoided runoff, pollution removal, and gross carbon sequestration on an annual basis using the following methods (USFS, 2017):

- Annual avoided surface runoff is calculated based on rainfall interception by vegetation, specifically the difference between annual runoff with and without vegetation. The model only accounts for the precipitation intercepted by leaves in this analysis. The value of avoided runoff is based on estimated local values from the U.S. Forest Service Community Tree Guide Series (as cited in i-Tree, 2016).

- Pollution removal is calculated for ozone, sulfur dioxide, carbon monoxide, and particulate matter less than 2.5 microns in diameter. Air pollution removal estimates are derived from calculated hourly tree-canopy resistances for ozone, and sulfur and nitrogen dioxides based on a hybrid of big-leaf and multi-layer canopy deposition models. The air pollution removal value is calculated based on local incidence of adverse health effects and national median externality costs.
- Annual carbon sequestration is estimated using the current tree condition and the average diameter growth added to the existing tree diameter to predict the tree diameter and amount of carbon that will be sequestered in the next year. The value is based on estimated carbon values from the U.S. Environmental Protection Agency (2015) and the Interagency Working Group on Social Cost of Carbon (2015).

The total *services value* provided by the "forest" per year (gross carbon sequestration value + avoided runoff value + pollution removal value) is $14,200. The total services value represents ecosystem services calculated on an annual basis and would fluctuate over time, based on tree health, tree mortality, and the planting of replacement trees.

The fixed values and services value/year is the highest for the Redmond Segment. The Bellevue South Segment has 28 percent of all of the trees surveyed, but due to the make-up of tree species, it has 19 percent of the carbon storage value and 21 percent of the structural value. A summary of the current ecological value of the trees within each segment is provided in Table 4.10-1.

4.10.2 Long-term Impacts from Operation of the Project

The methods for analyzing impacts of the project on ecosystem services are the same as what was used for the Phase 2 Draft EIS. They are as follows:

- **Ecosystem Services:** For this analysis, the following ecosystem services associated with tree cover in the project corridor were assigned an economic value (as described below under Ecosystem Services Methods): sequestration (storage) of carbon dioxide, the principal atmospheric greenhouse gas; absorption of air pollutants; and reduction in stormwater runoff and required infrastructure.

No threshold of significance was set for the ecosystem services analysis. The costs of such services are spread widely, including costs for energy, health care, and stormwater management, and not all such costs are borne locally. Cumulative ecosystem service impacts from this and other projects could be significant, but mitigation measures are available to offset or mitigate such impacts.

4.10.2.1 Ecosystem Services Methods

To estimate the loss of ecological services from tree removal proposed by the project, the i-Tree model was run a second time, but with the trees proposed for removal deleted from the data set. The number of trees that could be removed along the corridor is based on a tree database prepared by The Watershed Company for PSE for the Energize Eastside project (The Watershed Company, 2016b) and updated permit-level tree removal data for the Lakeside substation portion of the Bellevue Central Segment, Richards Creek substation, Bellevue South Segment, and Newcastle Segment (both options) (The Watershed Company, 2017). The results include tree removal for the entire corridor including the Richards Creek substation. Tree removal for the Newcastle Segment No Code Variance and Code Variance Options are both shown, although only one of these options would be implemented. Totals are shown for PSE's Preferred Alignment with the No Code Variance and with the Code Variance option.

DSD 005718

Table 4.10-1. Current Ecological Value of Trees in the Entire Alignment and in Each Segment

Segment	Acres	No. of Trees*	Carbon Storage		Structural Value	Total Fixed Value	Gross Carbon Sequestration		Avoided Runoff		Pollution Removal		Total Services Value/ Year
			Ton	$			Ton/yr	$/yr	ft3/yr	$/yr	Ton/yr	$/yr	
Richards Creek Substation	8.4	429	147	19,106	1,070,711	**$1,089,817**	3.2	415	12,720	850	0.08	715	**$1,980**
Redmond	24.2	776	139	18,093	1,523,134	**$1,541,227**	3.8	493	21,721	1,452	0.14	1,382	**$3,327**
Bellevue North	27.2	733	61	7,946	776,477	**$784,423**	2.2	289	10,304	688	0.07	656	**$1,633**
Bellevue Central	33.9	811	90	11,663	901,329	**$912,992**	3.2	424	12,916	863	0.09	726	**$2,013**
Bellevue South	40.0	1,400	126	16,354	1,426,799	**$1,443,153**	4.3	568	20,347	1,360	0.13	1,144	**$3,072**
Newcastle - No Code Variance	18.2	366	27	3,562	298,187	**$301,749**	1.1	151	4,446	297	0.03	250	**$698**
Newcastle – Code Variance	18.2	365	27	3,561	298,143	**$301,704**	1.1	151	4,441	296	0.03	249	**$697**
Renton	48.5	499	67	8,725	692,464	**$701,189**	2.3	297	9,053	605	0.06	576	**$1,478**
Total (No Code Variance)	200.4	5,014	657	85,449	6,689,101	**$6,774,550**	20.1	2,637	91,507	6,115	0.60	5,449	**$14,201**
Total (Code Variance)	200.4	5,013	657	85,448	6,689,057	**$6,774,505**	20.1	2,637	91,502	6,114	0.60	5,448	**$14,199**

*The number of trees varies slightly from those reported in other sections of the EIS because i-Tree only reports trees with recorded dbh values and tree species known by the model. Trees omitted as part of this analysis are considered to have low ecological value and therefore their omission does not impact the findings.

4.10.2.2 Tree Cover Along Transmission Line Corridor

This assessment provides the same information presented in the Phase 2 Draft EIS, but has been revised to focus on PSE's Proposed Alignment. PSE's Proposed Alignment would require tree removal along the existing corridor and at the Richards Creek substation site. The loss of tree cover means the natural environment of the study area would be less able to reduce air pollutants, reduce stormwater runoff, and sequester carbon dioxide. Potential loss of ecosystem value is described in Table 4.10-2. Under PSE's Proposed Alignment, the following would occur:

- The project corridor would lose 410 tons of carbon stored in trees, and a loss of 13.3 tons of carbon sequestered per year.
- The project corridor would lose its ability to remove 0.43 ton of air pollutants annually, valued at $3,967 per year.
- Without tree canopy to reduce stormwater runoff volume, the municipalities within the study area must manage an additional 65,216 cubic feet of stormwater per year, valued at $4,358 per year.

The City of Bellevue conducted an ecosystem services analysis city-wide based on 2007 tree canopy information (American Forests, 2008). In 2007, the City of Bellevue had an overall tree canopy of 36 percent. The ecosystem services provided by Bellevue's tree canopy in 2007 is summarized below to provide context by which to measure the scale of the impact to ecosystem services under PSE's Proposed Alignment:

- Bellevue's tree canopy stored 332,000 tons of carbon in trees, and sequestered 2,582 tons of carbon per year.
- Bellevue's tree canopy removed 344 tons of pollutants annually at a value of $1.55 million per year.
- Bellevue's tree canopy provided 62 million cubic feet in stormwater detention services per year, valued at $123 million.

The total ecosystem services lost as a result of PSE's Proposed Alignment, when compared to Bellevue alone would constitute less than 0.2 percent of the services provided by urban tree cover, which is not considered to be a large amount. Based on this comparison, ecosystem services are not expected to be significantly impacted by the project.

4.10.3 Mitigation Measures

Mitigation for economic impacts from a project is not required under SEPA; however, potential mitigation measures for tree removal are identified in Section 4.4.6, and include the following (among others):

- Replace trees removed for the project based on tree protection ordinances and critical areas regulations in each jurisdiction; some of these trees would likely be planted off-site or, in the case of the City of Newcastle, mitigated by paying into an in-lieu fee program. Replacement may be based on cross-sectional diameter of trees removed, or on habitat functions lost due to tree removal, depending on applicable regulations.

Table 4.10-2. Loss of Ecological Value

Scenario	# of Trees Removed	Loss of Carbon Storage		Loss of Structural Value ($)	Total Loss of Fixed Value ($)	Loss of Gross Carbon Sequestration		Loss of Avoided Runoff		Loss of Pollution Removal		Total Loss of Services Value/ Year ($)
		Ton	$			Ton/ yr	$/yr	ft/yr	$/yr	Ton/yr	$/yr	
Variance	3,554	409	53,166	4,378,400	**$4,431,566**	13.3	1,741	65,216	4,358	0.43	3,967	**$10,066**
No Variance	3,546	410	53,178	4,375,088	**$4,428,266**	13.3	1,739	65,148	4,354	0.43	3,964	**$10,057**

4.11 EARTH RESOURCES

This section provides project-level discussion and analysis of potential risks and impacts related to earth resources, specifically in regard to the potential for seismic activity to affect the project. Soils and geology were analyzed in the Phase 1 Draft EIS because seismic and geotechnical hazards (including ground shaking, liquefaction, landslides, coal mines, and other hazards) are present throughout the area. In the Phase 1 Draft EIS, impacts under all alternatives were determined to be less-than-significant, assuming regulatory compliance and implementation of industry standards, geotechnical recommendations, and BMPs. Therefore, Earth was not further analyzed in the Phase 2 Draft EIS.

In response to comments received during the Phase 2 Draft EIS comment period, the Partner Cities determined that additional discussion of the risk of seismic activity at a project level should be provided. While seismic risks, including both the general seismic risks in the region as well as risks related to liquefaction-prone soils were discussed in the Phase 1 Draft EIS, the project alternatives pass through specific locations with varying types of geotechnical hazards. In addition, information on the regulations that apply to development in areas of seismic and liquefaction risk is further described in this section.

Information on erosion-prone soils, landslide areas, and steep slopes is provided in the Phase 1 Draft EIS, Chapter 3 (Section 3.3). This section describes seismic risks in the study area, which includes all areas within 1 mile of PSE's Proposed Alignment (Figure 4.11-1). Geology and soils information was obtained from U.S. Geological Survey (USGS) data (including GEOMapNW)[1], and *critical areas* mapping was obtained from study area communities. In addition to the USGS data, the following sources were reviewed to obtain the data presented in this chapter:

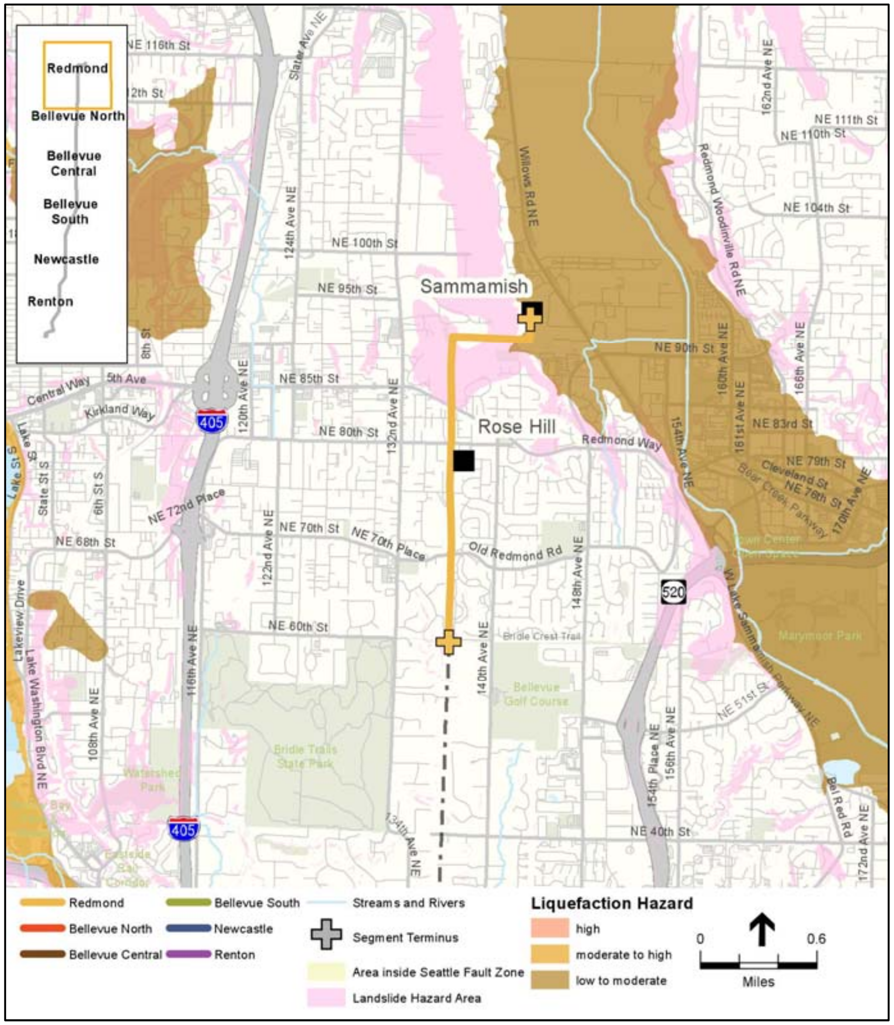
- GeoEngineers, Geotechnical Engineering Services Report for Energize Eastside Project, June 8, 2016.
- Department of Natural Resources, Modeling a Magnitude 7.2 Earthquake on the Seattle Fault Zone in Central Puget Sound, 2012–2013.
- King County geographic information systems (GIS) web portal (King County, 2015).
- Information from the Cascadia Region Earthquake Workgroup (City of Seattle, 2017; CREW, 2013).

Key Changes from the Phase 2 Draft EIS

The Phase 2 Draft EIS did not discuss impacts related to earth resources because the Phase 1 Draft EIS found that significant impacts are not anticipated. In response to the number of comments on the Phase 2 Draft EIS asking for additional information on seismic risks, the Final EIS includes this expanded discussion of the specific seismic risks present in the study area for PSE's Proposed Alignment. While seismic risks are present in the study area and throughout the region, the project would not substantially affect those risks.

Key Findings – Earth Resources

Seismic and geotechnical hazards including fault rupture, ground shaking, liquefaction, landslides, and other hazards are present throughout the area. Impacts would be minor with implementation of NESC standards, geotechnical recommendations, and regulatory requirements.

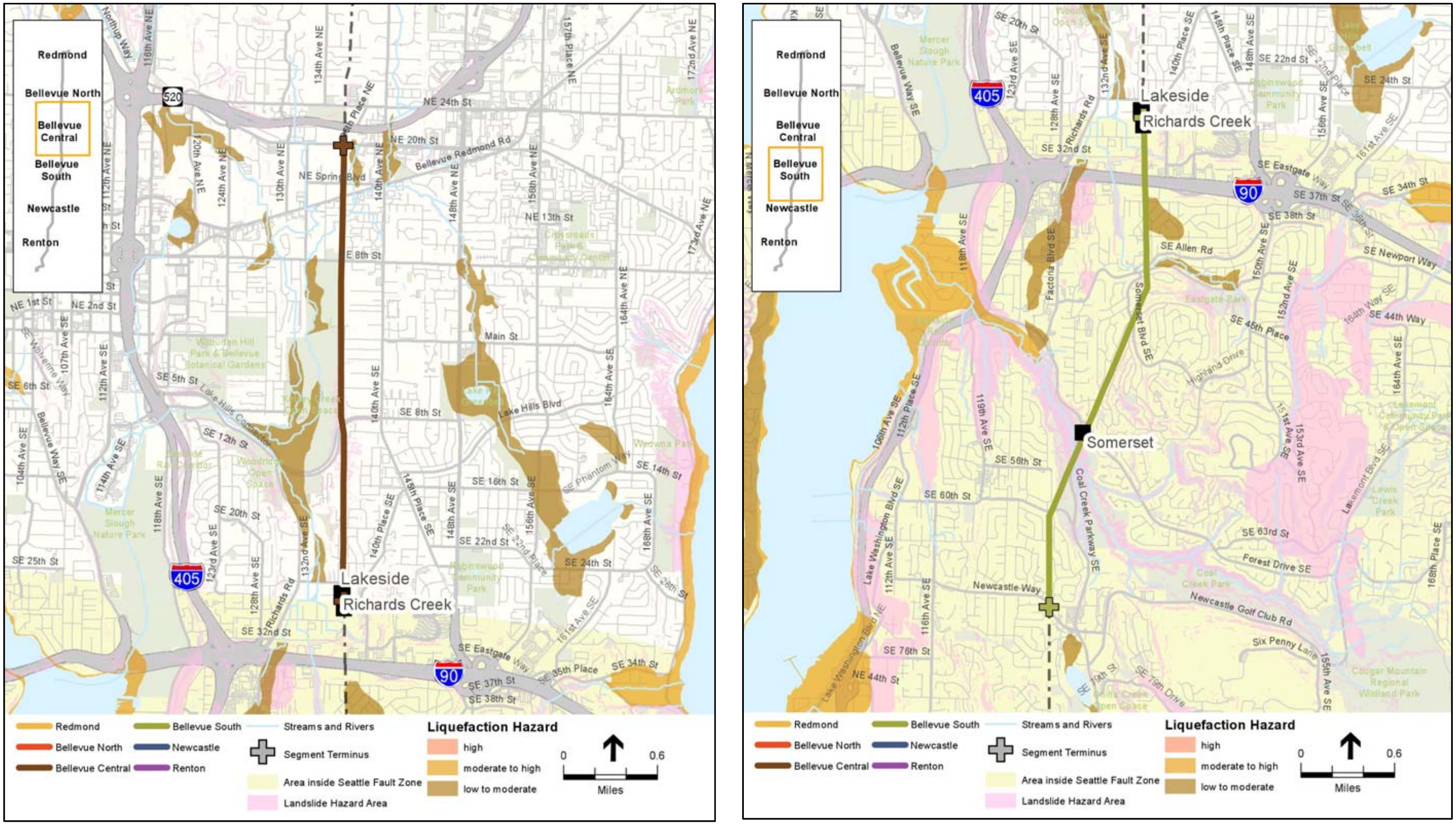


Redmond Segment

Bellevue North Segment

Sources: King County, 2015; Ecology, 2014

Figure 4.11-1. Seismic Hazards in the Earth Resources Study Area

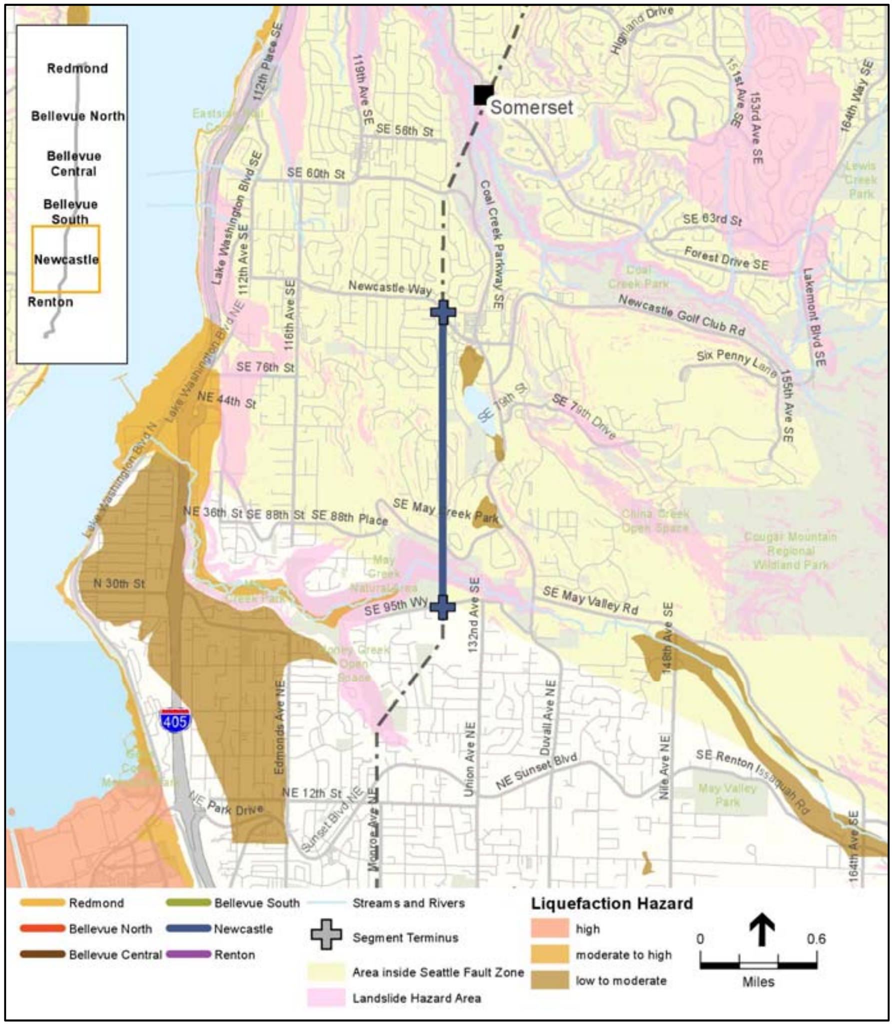


Bellevue Central Segment (Revised Existing Corridor Option)

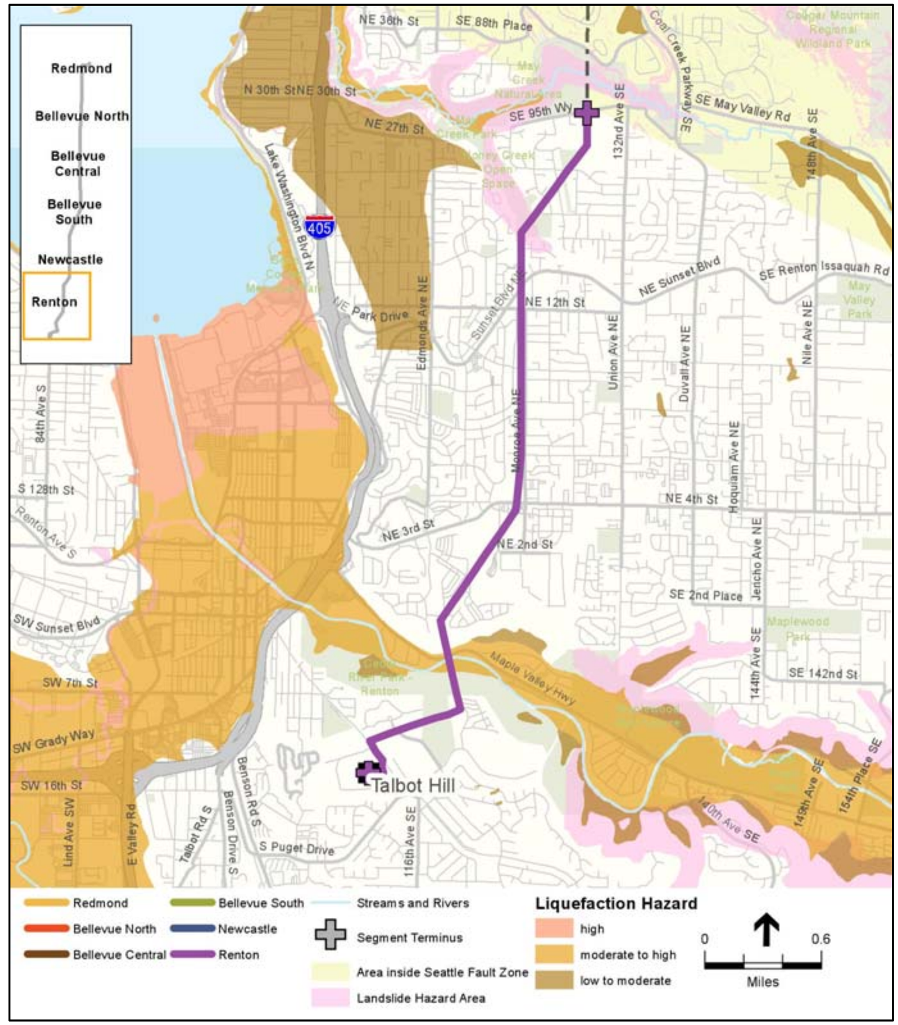
Bellevue South Segment (Revised Willow 1 Option)

Sources: King County, 2015; Ecology, 2014

Figure 4.11-1. Seismic Hazards in the Earth Resources Study Area (continued)



Newcastle Segment, Options 1 and 2



Renton Segment

Sources: King County, 2015; Ecology, 2014

Figure 4.11-1. Seismic Hazards in the Earth Resources Study Area (continued)

4.11.1 Relevant Plans, Policies, and Regulations

This section describes the relevant regulatory framework including plans, policies, and regulations related to geology and soil resources that would apply to the alternatives. The Phase 1 Draft EIS provides a full description of the relevant plans, policies, and regulations that apply to earth resources. Following is a brief listing of those plans, policies, and regulations.

The National Electric Safety Code (NESC) establishes basic provisions for safeguarding of persons from hazards arising from the installation, operation, or maintenance of: (1) conductors and equipment in electric substations, and (2) overhead and underground electric supply and communication lines (IEEE, 2017). The NESC is adopted by the state public utility commission (in Washington, the Utilities and Transportation Commission or UTC) and is updated every 5 years.

Washington State's Growth Management Act (GMA) requires all cities and counties to identify *geologic hazard areas*, which are areas susceptible to erosion, sliding, earthquake, or other geologic events, as part of the designation of critical areas (Chapter 36.70A.060(2) and 36.70A.172 RCW).

As required by the GMA, each jurisdiction in the study area has adopted codes regulating development in or near geologic hazard areas (including building codes). Protecting structures from *liquefaction*[2] and ground shaking are generally addressed through implementation of building code standards that include seismic design measures. Typically, for new construction, an applicant is required to provide a site-specific geotechnical investigation that identifies underlying soil and bedrock properties, and geotechnical hazards, as well as demonstrate that identified hazards can be overcome through the application of geotechnical engineering recommendations. The Washington State Building Code is modeled on the 2015 International Building Code, combined with Washington State amendments. However, the International Building Code, which applies in all jurisdictions, specifically exempts utility structures in a right-of-way controlled by the utility, as is the case with the Energize Eastside project. Therefore, with regard to structural stability, electric utility structures for the project are governed by NESC standards only. Nonetheless, PSE has provided geotechnical studies that incorporate the methodology used in the International Building Code to determine seismic requirements, and provide recommendations in accord with those findings.

Final structural design for electrical utility structures must comply with NESC 2017 as adopted by the UTC. For transmission lines, NESC 2017 states that the structural requirements necessary for wind/ice loadings are more stringent than seismic requirements and sufficient to resist anticipated earthquake ground motions. In addition, according to ASCE Manual No. 74, "transmission structures need not be designed for ground-induced vibrations caused by earthquake motion because historically, transmission structures have performed well under earthquake events, and transmission structure loadings caused by wind/ice combinations and broken wire forces exceed earthquake loads" (ASCE, 2009).

---

[2] Liquefaction occurs where saturated, loose granular soils are subjected to ground shaking such that the soil loses strength and begins to behave more like a liquid than a solid. Saturated loose soils within 50 feet of the ground surface are considered at most risk of liquefaction.

4.11.2 Seismic Hazards in the Study Area

Seismic hazards include the primary effects of earthquakes, such as ground displacement from fault rupture and ground shaking and secondary effects such as liquefaction and landslides. While tsunamis and seiche waves can be also triggered by earthquakes, no portion of the study area is close enough to major water bodies to be affected. *Settlement*[3], fires, and hazardous materials releases are also likely secondary effects from a major earthquake in an urban region such as the study area for the Energize Eastside project.

4.11.2.1 Primary Effects: Earthquake-induced Ground Rupture and Groundshaking

Earthquake-induced ground rupture and groundshaking are defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude, characteristics, and nature of fault rupture can vary for different faults or even along different strands of the same fault.

The Puget Sound basin is a seismically active area dominated by the Cascadia *subduction* zone, which forms the boundary between two tectonic plates: the North American plate and the Juan de Fuca plate. The project vicinity has been subject to earthquakes in the historic past and will undoubtedly undergo shaking again in the future. Damage from earthquakes depends on many factors including distance to epicenter, soil and bedrock properties, and duration of shaking.

Earthquakes in the Puget Sound region result from one of three sources:

1. **Crustal or Shallow Earthquakes** from faults found in the North American tectonic plate that are near the crust's surface. Intense shaking occurs near the epicenter but usually diminishes quickly with distance relative to the other earthquake types. The closest active crustal fault to the study area is the Seattle Fault Zone, which runs roughly east-west in south Bellevue and roughly parallel to I-90 (see Figure 4.11-1). The Seattle Fault Zone is the primary but not only source for shallow earthquakes in Seattle. A Seattle Fault earthquake could be as large as magnitude 7.5, but a magnitude less than 7.0 is more probable (Seattle, 2015). This type of earthquake could have the highest intensity in the study area compared to the other earthquake sources described below, but the degree of accompanying regional damage would likely be smaller than the megathrust earthquakes described below. Geologic evidence suggests displacement on the Seattle fault in West Seattle (Alki Point) from an earthquake about 1,100 years ago. Investigation of an 8,000-year history of activity on the Seattle fault found evidence for possibly one additional earthquake on the Seattle fault about 6,900 years ago, suggesting a recurrence interval of thousands of years for large earthquakes (Seattle, 2015).

2. **Intraplate or Deep Earthquakes** that occur at depths of approximately 20 to 40 miles where dense oceanic crust dives under lighter continental crust. Because of the depth, even buildings right above the epicenter are generally far enough away that ground motions are attenuated and damage is limited. Deep earthquakes are the most common large earthquakes that occur in the Puget Sound region. Deep earthquakes with magnitude greater than 6.0

[3] Ground shaking can cause shifting and rearrangement of unconsolidated materials that result in settlement of the ground surface, both uniformly and differentially (i.e., where adjoining areas settle at differing amounts due to different characteristics).

(Richter scale) have occurred six times between 1909 and 2001 in the Puget Sound region, and the highest recorded event was magnitude 7.3 in 1946. The 2001 Nisqually Earthquake was a deep earthquake with a magnitude of 6.8 (Seattle, 2015).

3. **Subduction Zone or Megathrust Earthquakes** occur on the Cascadia Subduction Zone, Megathrust earthquakes are the largest type of earthquakes in the world, and the greatest risk to the region as a whole. A megathrust earthquake could reach magnitude 9.0+ at its epicenter, and affect an area from Canada to northern California. Shaking in Seattle would be violent and prolonged, but not as intense as a Seattle Fault quake. The last known megathrust earthquake in the northwest was in 1700. Geologic evidence suggests that seven megathrust earthquakes have occurred over the last 3,500 years indicating a return interval of 400 to 600 years (PNSN, 2017).

Strong ground shaking from a major earthquake can produce a range of intensities experienced at any one location. Ground shaking may affect areas hundreds of miles distant from the earthquake's epicenter. The ground shaking can result in slope failure, settlement, soil liquefaction, tsunamis, or seiches, all of which pose a risk to the public. Areas considered to be of high seismic risk are depicted in Figure 4.11-1. These include Seattle Fault Zone, liquefaction prone soils, and landslide prone areas.

4.11.2.2 Secondary Effects

Liquefaction

Liquefaction is often the cause of damage to structures during earthquakes. Liquefaction occurs where soils are primarily loose and granular in consistency and located below the water table. Saturated loose soils within 50 feet of the ground surface are considered at most risk of liquefaction. The consequences of liquefaction include loss in the strength and settlement of the soil. The loss of strength can result in lateral spreading, bearing failures, or flotation of buried utility vaults and pipes.

Liquefaction hazard areas identified in Figure 4.11-1 are those areas where the foundation soils are subject to liquefaction or lateral spreading during an earthquake (but could also be susceptible to seismically induced settlement). Typically, these soils are in low-lying areas near bodies of water, such as along the larger streams and around lakes where there is a high probability of loose, saturated, alluvial soils. In the study area, areas such as lowland lakeside areas within the Redmond Segment north of Lake Sammamish, as well as the floodplains of the Cedar River, contain areas that have low to moderate susceptibility to liquefaction. Other areas are generally not considered susceptible. However, site-specific geotechnical investigation identified two areas with soil conditions considered susceptible to liquefaction (GeoEngineers, 2016), which are described below.

Landslides

Landslides have often occurred during past earthquakes in the Puget Sound region, due to the region's geologic and soil formations. Factors affecting the likelihood of landslides during an earthquake include the types of materials involved (e.g., the geologic composition of materials), precipitation, topography, slope geometry, and human activity that has altered slope support. Earthquake motions can induce significant horizontal and vertical dynamic stresses in slopes that can trigger failure that might otherwise be stable under static conditions.

4.11.3 Long-term (Operation) Impacts Considered

4.11.3.1 Magnitude of Impact

> **Methods and Approach for Studying the Long-term (Operation) Impacts**
>
> Potential impacts were determined by identifying the geologic hazard areas present within the study area and the geotechnical approaches to minimize the hazards.

The magnitude of the potential impacts from the Energize Eastside project due to seismic activity is classified as less-than-significant or significant, defined as follows:

- **Less-than-Significant** – Impacts due to seismic activity would be considered less than significant if, assuming compliance with current practices and regulations pertaining to structural safety, the project would not substantially increase the risk of damage to natural resources or adjacent land uses.
- **Significant** – Impacts due to seismic activity would be considered significant if, even with compliance with current regulations, the project could substantially increase the risk of damage, injury, death, or widespread or long-term interruption of power supply as a result of an expected seismic event. Impacts could be considered significant even if the overall probability is remote.

Geology and soil considerations important to the Energize Eastside project include general topography, underlying geological characteristics and properties, and soil characteristics, as well as seismic and other related geologic hazards. Regional geology and seismicity would not change as a result of the project, but the way the project is designed and constructed will determine its structural stability in the event of a large earthquake. If the poles or other structures in the project were to fail, it would directly affect the electrical supply. Falling poles or failing foundations in the substation could result in secondary damage to people, adjacent structures, and infrastructure.

4.11.4 Long-term Impacts: No Action Alternative

Under the No Action Alternative, PSE would continue to operate the existing 115 kV transmission lines, as described in Chapter 2.

Under the No Action Alternative, existing risks of seismic activity would remain. Seismic activity is likely to occur during the life of the existing transmission lines, and could result in ground rupture, ground shaking, liquefaction, and landslides, any of which could cause the transmission line poles to fall. This in turn could cause substantial power outages, damage to adjacent structures, injuries, or death. However, even in severe earthquakes, it is not common for transmission line poles to fall because the poles are designed to be flexible to resist considerable lateral movement due to wind loads, which create forces that exceed earthquake loads (IEEE, 2017).

Ground rupture from a surface fault rupture on the Seattle Fault zone could cause the Olympic Pipeline system that runs underground through much of the corridor to burst and release flammable petroleum products. In the event of a release from the pipelines, the risk of a fire near the transmission lines would be high, and the wood poles could burn. Because it is unlikely for a pole to fall in an earthquake, it is also unlikely that a falling pole would in some way cause a rupture on the pipeline.

An arc from a broken transmission line could provide an ignition source for a fire in the event of a release from the pipeline. However, the likelihood of an arc starting a fire in this manner is limited by the following factors: (1) if a transmission line breaks or there is some other electrical fault on the transmission line, a circuit breaker would shut down the power to the transmission line in a fraction of a second; (2) because of the slack in transmission lines, it is not common for them to break during an earthquake; and (3) transmission lines are designed so that the individual wires or conductors can swing, either due to wind or earth shaking, without striking each other and causing an arc. While these factors make the likelihood of an arc on the transmission line starting a fire very low, it is not impossible that a severe earthquake could cause a simultaneous release from the pipelines and a break in the transmission lines, resulting in a fire. Section 4.9, *Pipeline Safety*, addresses the potential effects if a transmission line were to ignite fuel that had been released from the Olympic Pipeline system.

Ground shaking could also cause damage at substations from a seismic event on the Seattle Fault Zone or from other sources along the Cascadia Subduction Zone. Equipment such as transformers, switches, and buswork could be damaged structurally. Catastrophic failures of circuit breakers, transformer bushings, and disconnect switches at substations can result in widespread power outages. Due to potential for oil used as insulation in this equipment to be released if the equipment is damaged, fires are also possible.

These existing risks of adverse impacts to the environment would not change under the No Action Alternative because the transmission lines and substations would remain in place, as would existing infrastructure surrounding the transmission lines, including the Olympic Pipeline system.

4.11.5 Long-term Impacts: PSE's Proposed Alignment

4.11.5.1 Impacts Common to all Components

The Energize Eastside project under any alternative or option would cross the same seismic and other geologic hazard areas as crossed by the existing transmission lines. As such, the project would be subject to the probability of future seismic activity. Seismic activity will likely occur during the life of the proposed transmission lines, and could result in ground rupture, ground shaking, liquefaction, and landslides, any of which could cause transmission line poles to fall or other equipment to fail as described in the No Action Alternative, if not designed appropriately. However, according to the geotechnical investigation conducted by a Washington State licensed geotechnical engineer during the design stage of the project, the recurrence interval of the Seattle Fault is on the order of 1,000 years and considered to have a low risk of causing fault rupture over the design life of the project (GeoEngineers, 2016). This is not to suggest that ground shaking is not a hazard present throughout the alignment, as discussed below.

There would be no wood poles, so fires resulting from a seismic event would not cause the poles to burn, although other damage to wires and connectors could be similar, and fires could weaken steel poles if they are hot enough. Pole heights would be substantially taller than the existing poles in most segments of the project and could reduce the possibility of fire damage to the lines in those areas. If a pole were to fall, the taller poles would be both heavier and have greater force should one strike a person, property, or structure.

The final structural design for poles and other electrical equipment at the substations would comply with NESC 2017 as adopted by the UTC (IEEE, 2017). In addition, PSE provided calculations showing that the design of the project facilities could withstand probable seismically induced ground shaking as would be required if the project were subject to the International Building Code. Modeled potential seismic impacts were determined for the area to determine what the peak ground acceleration (PGA) value, a measure of maximum groundshaking, would be for the study area. Using the estimated PGA value of 0.606 according to methods consistent with the International Building Code, the loadings or forces that would be produced would be 82 to 87 percent of the NESC requirements for wind and ice load on transmission poles. Therefore, as noted above, designing for weather is sufficient to ensure that the appropriate structural design would be able to withstand both of these conditions. Therefore, the NESC requirements for transmission poles are more stringent that the current International Building Code. Wind load is not as great a factor for substation facilities, however.

The liquefaction potential of the study area corridor was reviewed by a Washington State licensed geotechnical engineer during the design stage as part of the geotechnical review for seismic stability. Areas of potential liquefaction were identified and the amount of ground settlement that could occur as a result of liquefaction was estimated to range up to a maximum of 4 to 8 inches. Design of structures to resist seismic forces and secondary effects such as liquefaction was informed by geotechnical engineering methods by a Washington-licensed geotechnical engineer that was consistent with current regulatory standards.

Under the Energize Eastside project, a minimum of 16 miles of new overhead transmission lines would be constructed. As noted above, the transmission lines would be constructed in accordance with the standards outlined by NESC, FERC, NERC, and ASCE Manual No. 74 (ASCE, 2009). In areas of common utility corridors, coordination with other utility providers would be conducted as appropriate. Site-specific geotechnical investigations have been used to define the underlying engineering properties and identify geotechnical hazards that may be present. Geotechnical engineering methods, such as the use of engineered fill or foundation design, would be used to ensure that the effects of any identified hazards are minimized and impacts during operation would be minor.

4.11.5.2 Richards Creek Substation

The Richards Creek substation site is on the edge of the Seattle Fault Zone. Areas within the fault zone are at a potential risk of ground surface displacement and groundshaking hazards. As noted above, improvements would be designed in accordance with NESC standards, which may or may not meet the same standard as the International Building Code. Because earthquakes in other regions have resulted in damage to substations, it is reasonable to assume that substation equipment could be damaged unless designed to withstand earthquakes typical of the region.

Seismic hazards at the site, including fault rupture and liquefaction, were considered in development of seismic design recommendations presented in the project geotechnical report (GeoEngineers, 2016). PSE has indicated that recommendations included in the geotechnical report are consistent with the International Building Code (IBC) requirements for designing structures to resist seismic hazards known to be present on a site, and that the Richards Creek substation will be designed in accordance with the design recommendations presented in the project geotechnical report.

- **Seattle Fault Zone/Fault Rupture Hazards:** The substation site is on the fault zone. As noted above, the recurrence interval of the Seattle Fault Zone represents a low risk of fault rupture.
- **Liquefaction Hazard Areas:** The substation site does not intersect a mapped liquefaction hazard area with a moderate or high hazard rating. However, a geotechnical evaluation conducted by a Washington State licensed geotechnical engineer provided an analysis of the

liquefaction potential and estimated the potential for ground settlement due to liquefaction in the small area between the Lakeside substation and the south side of the existing pole yard, which was not shown on the general area map cited above. Consideration of this area was incorporated into the design criteria (GeoEngineers, 2016).

- **Landslide Hazard Areas:** The substation site does not intersect an identified landslide hazard area.

4.11.5.3 Redmond Segment

Relative to the No Action Alternative, this segment would include new, taller poles that intersect landslide and seismic hazard areas. However, impacts would be less-than-significant with implementation of NESC standards and geotechnical recommendations based on the geotechnical evaluations that have been conducted by a Washington-licensed geotechnical engineer.

- **Seattle Fault Zone/Fault Rupture Hazards:** This segment is outside of the fault zone.
- **Liquefaction Hazard Areas:** The north portion of this segment (in the vicinity of the Sammamish substation) intersects the edge of an identified liquefaction hazard area with a moderate or high hazard rating. A geotechnical evaluation conducted by a Washington State licensed geotechnical engineer provided an analysis of the liquefaction potential and estimated the potential for ground settlement due to liquefaction in the wetland area near the Sammamish substation, which was more specific than the general area maps. Consideration of this area was incorporated into the design criteria (GeoEngineers, 2016).
- **Landslide Hazard Areas:** The north portion of the segment intersects an identified landslide hazard area that has received geotechnical evaluation and appropriate design measures by a Washington State licensed geotechnical engineer.

4.11.5.4 Bellevue North Segment

Relative to the No Action Alternative, this segment would include new, taller poles that would not intersect any identified landslide and seismic hazard areas. Implementation of NESC standards overseen by a Washington-licensed geotechnical engineer would ensure that the new poles would have less-than-significant impacts related to seismic (primarily groundshaking) hazards.

- **Seattle Fault Zone/Fault Rupture Hazards:** This segment is outside the fault zone.

  Liquefaction Hazard Areas: This segment does not intersect any identified liquefaction hazard areas.
- **Landslide Hazard Areas:** The segment is outside of any identified landslide hazard areas.

4.11.5.5 Bellevue Central Segment (Revised Existing Corridor Option)

PSE’s Proposed Alignment for the Bellevue Central Segment follows the route of the Existing Corridor Option as described in the Phase 2 Draft EIS (see Section 2.1.2.3), with refined design details for pole types and placement. Relative to the No Action Alternative, potential impacts would be similar as the new poles, even though taller, would be better designed to withstand seismic hazards; therefore, impacts would be less-than-significant.

- **Seattle Fault Zone/Fault Rupture Hazards:** This segment is largely outside of the fault hazard zone. However, the south end of the segment abuts the north edge of the fault zone area, as described above for the Richards Creek substation site. As noted above, the recurrence interval of the Seattle Fault Zone represents a low risk of fault rupture (GeoEngineers, 2016).
- **Liquefaction Hazard Areas:** This segment does not intersect any identified liquefaction hazard areas.
- **Landslide Hazard Areas:** The segment is outside of any identified landslide hazard areas.

4.11.5.6 Bellevue South Segment (Revised Willow 1 Option)

PSE's Proposed Alignment for the Bellevue South Segment follows the route of the Willow 1 Option as described in the Phase 2 Draft EIS, with refined design details for pole types and placement. In this segment, poles would be placed within the Seattle Fault Zone where potential ground surface displacement could occur along any of the fault strands within this zone. The thrust fault strands within this zone are complex, not well defined because of surface concealment, but thought to include three main strands. Incorporating seismic design measures as guided by geotechnical evaluations from a Washington State licensed geotechnical engineer would make the potential for catastrophic failure unlikely. As a result, the potential impacts would be less-than-significant. Making this more closely reflect the conclusion of the geotech report.

- **Seattle Fault Zone/Fault Rupture Hazards:** This segment is located entirely in the fault hazard zone. Final design was reviewed by a geotechnical evaluation by a Washington State licensed geotechnical engineer, which provided appropriate design criteria. As noted above, the recurrence interval of the Seattle Fault Zone represents a low risk of fault rupture.
- **Liquefaction Hazard Area:** This segment does not intersect any identified liquefaction hazard areas.
- **Landslide Hazard Area:** The segment is outside of any identified landslide hazard areas.

4.11.5.7 Newcastle Segment – Option 1 and 2

This segment includes two options that represent different approaches in pole design and placement but would follow the same route; thus, both would be exposed to similar hazards. Relative to the No Action Alternative, this segment would place poles of either design within the Seattle Fault Zone where potential ground surface displacement could occur along any of the fault strands. The thrust fault strands within this zone are complex and not well defined because of surface concealment, but thought to include three main strands. Incorporating seismic design measures as guided by geotechnical evaluations from a Washington State licensed geotechnical engineer would make the potential for catastrophic failure unlikely. As a result, the potential impacts would be less-than-significant.

- **Seattle Fault Zone/Fault Rupture Hazards:** This segment is largely located within the fault zone. However, as noted above, the recurrence interval of the fault represents a low risk of fault rupture.
- **Liquefaction Hazard Areas:** This segment does not intersect any identified liquefaction hazard areas.

- **Landslide Hazard Areas:** The segment is outside of any identified landslide hazard areas.

4.11.5.8 Renton Segment

This segment is outside of the Seattle Fault zone but still at risk of groundshaking hazards. In addition, the alignment intersects a landslide hazard area (near the Honey Creek Open Space) that could be triggered by a seismic event. Implementation of NESC standards overseen by a Washington-licensed geotechnical engineer would ensure that the geotechnical design of the new poles minimizes the seismic and landslide hazards present; therefore, impacts would be less-than-significant.

- **Seattle Fault Zone/Fault Rupture Hazards:** This segment is outside the fault hazard zone. However, the north end of the segment abuts the south edge of the fault zone. However, as noted above, the recurrence interval of the fault represents a low risk of fault rupture.
- **Liquefaction Hazard Areas:** This segment would intersect an identified liquefaction hazard area with a moderate to high rating (see Figure 4.11-1). However, no poles or other structures would be constructed in the liquefaction hazard area; therefore, the project would not be affected by this hazard.
- **Landslide Hazard Areas:** The segment intersects an identified landslide hazard area that has received geotechnical evaluation and appropriate design measures by a Washington State licensed geotechnical engineer.

4.11.6 Mitigation Measures

This section describes mitigation measures that would be used during operation of the project and recommends additional measures to avoid, minimize, and mitigate impacts related to seismic risks. Federal, state, and local regulations would minimize the potential for impacts dues to seismic activity resulting from the Energize Eastside project. The design features and BMPs that PSE proposes to use to avoid or minimize impacts during design and operation and those required by agency standards are assumed to be part of the project and have been considered in assessing the environmental impacts that could result from seismic activity.

All mitigation measures would be determined during the permitting process. Measures may be required prior to construction, at project start-up, or during operation of the project. For instance, mitigation measures related to the design of poles and substation equipment would be incorporated into the project design prior to construction. Other mitigation measures, such as monitoring foundations, would need to be implemented after the project is constructed.

4.11.6.1 Regulatory Requirements

PSE Responsibilities and Requirements

PSE is responsible for the Energize Eastside project's design, construction, and operational parameters within the shared corridor with the Olympic Pipeline systems. For general responsibilities of the Olympic Pipe Line Company regarding pipeline safety, see Section 4.9. For geotechnical recommendations for construction activities near the Olympic Pipeline system, see Section 5.9.

For PSE, national and state standards, codes, and regulations, and industry guidelines govern the design, installation, and operation of transmission lines and associated equipment. The National

Electrical Safety Code (NESC) 2017, as adopted by the UTC, provides the safety guidelines that PSE follows. The NESC contains the basic provisions necessary for worker and public safety under specific conditions, including electrical grounding, protection from lightning strikes, extreme weather, and seismic hazards. PSE would use these in developing final design.

The final design of the project has not been completed; therefore, the final specifications and standards that would be incorporated into the project have not been identified.

4.11.6.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on results and recommendations of the GeoEngineers, Geotechnical Engineering Services Report for Energize Eastside Project, June 8, 2016, measures PSE has indicated they will use, and measures the EIS Consultant Team has proposed to provide additional safety assurances. The applicable measures are organized based on the stage at which they would be applied (i.e., before construction, at project start-up, and during operation).

Prior to Construction

- Confirm that a Washington State licensed geotechnical engineer has conducted geotechnical hazard evaluations for all proposed elements addressing groundshaking, fault rupture, liquefaction, and landslides, and that all geotechnical recommendations have be incorporated into project design.
- Design the Richards Creek substation in accordance with the design recommendations presented in the project geotechnical report (GeoEngineers, 2016). This will ensure that substation structures are designed to IBC seismic standards even though the IBC exempts this project from its requirements.
- Use the 2012 IBC parameters for short-period spectral response acceleration (S_S), 1-second period spectral response acceleration (S_1), and Seismic Coefficients F_A and F_V presented in Table 2 of the geotechnical report (GeoEngineers, 2016).
- Use site-specific soil input parameters for lateral load design that consider the effects of liquefaction through the application of p-multipliers for LPILE parameters.
- For the area north of the proposed Richards Creek substation, reevaluate the lateral spreading risk to the proposed poles in this area once their final locations have been determined, to determine appropriate foundation dimensions.
- Where liquefiable deposits are present, extend foundations below the loose to medium density liquefiable deposits into underlying dense, non-liquefiable soils.
- Reevaluate the axial capacity of the pole foundations and potential downdrag loads for poles in liquefiable deposits once final locations are selected, and consider these in the structural design.
- For the one location where soil test results indicated a moderate to high potential for corrosion, consider involving a corrosion engineer.

- Where bedrock is near the surface, additional options such as rock anchors or micropiles might be appropriate as an alternative to drilled shafts. If micropiles are used, the contractor should submit a detailed micropile plan describing methods and demonstrating consistency with specifications.
- The contractor should submit a detailed drilled shaft installation plan describing casing and drilled shaft construction methods for review and comment by the engineer before construction. The submittal should include a narrative describing the contractor's understanding of the anticipated subsurface conditions, the overall construction sequence, access to the pole locations, and the proposed pole foundation installation equipment.
- The contractor should submit a detailed direct embedment pole installation plan describing both uncased and temporary casing methods.

During Constrution

Implementation of the following measures during construction would ensure proper installation and prevent damage to adjacent structures for all of the proposed segments:

- If drilled shafts are used where groundwater is present, the concrete for drilled shafts should be placed using the "tremie" method (as described in the geotechnical report).
- Monitor the installation of the drilled shafts to confirm that soil conditions are as anticipated and that the shafts are installed in accordance with project plans and specifications, document variations in the field if necessary, and provide consultation as required should conditions vary from those anticipated.
- Where sensitive structures may be present within about 100 feet of the work area, vibration should be monitored.

During Operation

Implementation of the following measures during operation would reduce or minimize the potential for damage due to seismic activity for all of the proposed segments:

- Develop a monitoring and maintenance program that includes inspection and reporting on structural stability.
- As part of PSE's regular inspection of the transmission line, monitor all improvements for changes in conditions such as cracking foundations or slumping slopes that could reduce the ability of structures to resist seismic disturbances. This could include regular reporting to permitting agencies to ensure compliance.
- If changes are identified during inspection and monitoring of conditions, implement additional measures to reduce or minimize those impacts.

5

Short-Term (Construction) Impacts and Potential Mitigation

energize EASTSIDE EIS

CHAPTER 5. SHORT-TERM (CONSTRUCTION) IMPACTS AND POTENTIAL MITIGATION

This chapter describes short-term (construction) impacts that could result from construction of PSE's Proposed Alignment. Under the No Action Alternative, no construction would occur; therefore, the No Action Alternative is not evaluated below. For the purposes of this Final EIS, impacts associated with routine maintenance of the existing transmission lines (e.g., occasional replacement or repair of poles, wires, and related equipment, and associated access disturbance) are assessed as part of Chapter 4, *Long-Term (Operation) Impacts and Potential Mitigation*.

5.1 LAND USE AND HOUSING

5.1.1 Short-term (Construction) Impacts Considered

The magnitude of short-term project-related impacts to land use and housing is classified as being less-than-significant, or significant as follows:

- **Less-than-Significant** – Construction activities are disruptive (e.g., noise and dust are generated) but not to the extent that current use of the property is altered and is for a duration that would not infringe on the use or access of the parcel or housing structures thereupon.
- **Significant** – Construction activities are disruptive and/or continue for an interval long enough to infringe on the current use of the parcels in the study area by causing a nuisance (e.g., noise, dust, etc.) that changes the use of the land or by impeding access to the parcels or housing structures thereupon.

5.1.2 Short-term (Construction) Impacts: PSE's Proposed Alignment

Construction of the project would entail the installation of poles and stringing of conductor wires. According to PSE, pole installation requires 3–14 days each (within a 2-month work window), no significant excavation is required, access to adjacent land uses would be maintained, and installation would not create significant noise, provided that the project complies with local noise regulations. Any nuisance caused by the construction activities of PSE's Proposed Alignment would be less than significant due to the relatively short duration of the impacts in any one location.

In general, PSE does not anticipate the need to evacuate homeowners during construction. At some locations, however, access may be more difficult due to terrain, vegetation, topography, or existing structures, and cranes or helicopters could facilitate construction by lifting pole sections over buildings. This type of construction could reduce the duration and extent of impacts on adjacent uses and is described under mitigation below.

PSE and the construction contractor would coordinate directly with affected land owners regarding replacing fences and ancillary structures that are either removed or disturbed, tree removal and/or pruning, temporary evacuation, and other construction-related access issues consistent with conditions established by permitting requirements.

5.1.3 Mitigation Measures

Short-term (construction) land use impacts would be less-than-significant. However, the following measure could be implemented to reduce construction-related site disturbance, construction duration, or inconvenience for adjacent land uses.

During Construction

- In locations where access is difficult, a helicopter or large crane could be used to lift foundation rebar and/or poles over adjacent properties and into place. Helicopters could also be used to facilitate stringing the new transmission line into place, reducing the need to enter property to feed the initial lead line (called a "sock line") that is used to pull the actual conductors into place.

  The decision to use a large crane or helicopter is usually determined by the construction contractor to address access concerns and minimize site disturbance. Use of a helicopter for this purpose is regulated by the Federal Aviation Administration (FAA). A "congested air" permit and advance notification are required. Because of the potential impacts of this type of construction, local regulators may also want to limit where this type of construction would be allowed. Appendix A-3 includes a series of questions and answers about helicopter use. Following is a brief summary of considerations regarding this type of construction.

  - Helicopter use for stringing the sock line takes only a few minutes per pole, for each conductor. It involves flying directly over the poles and would not likely involve suspending anything over occupied buildings or homes.
  - If a crane or helicopter were used to install poles, it would require occupants of buildings or homes in the path of the poles being transported to vacate the premises for up to 2 hours at a time during daylight working hours.
  - Helicopters generate substantial noise that is not regulated by local codes. Appendix A-4 includes a table that shows expected noise levels.
  - Helicopter use would not eliminate the need for construction access by vehicles for excavation and pouring concrete.

5.2 SCENIC VIEWS AND THE AESTHETIC ENVIRONMENT

5.2.1 Short-term (Construction) Impacts Considered

The Phase 1 Draft EIS described the types of project-related construction impacts that could affect the visual environment of the study area. Common construction-related impacts include clearing and grading or general construction activities (e.g., the presence of construction workers, vehicles, or equipment). Impacts would likely result from the creation of short-term, construction access roads; temporary vegetation clearing to facilitate construction; or the increased presence of construction vehicles, equipment, materials, and personnel, as well as the potential for increased light and glare associated with construction site lighting.

Short-term project-related impacts to scenic views and the aesthetic environment are classified as being less-than-significant or significant as follows:

Less-than-Significant:

- **Aesthetic environment –** The degree of contrast created by construction activities (e.g., temporary access roads, temporary vegetation clearing, construction equipment, light and glare) would not be more intense in scale and duration than typical construction activities associated with linear corridor projects, or viewer sensitivity would be low.
- **Scenic views –** The area with impacted scenic views would not include a substantial number of sensitive viewers; the degree of additional obstruction of views compared to existing conditions would be minimal; or the degree of scenic view blockage would be of short duration (1–3 years).

Significant:

- **Aesthetic environment –** The degree of contrast created by construction activities (e.g., temporary access roads, temporary vegetation clearing, construction equipment, light and glare) would be substantially more intense in scale and duration than typical construction activities associated with linear corridor projects, and viewer sensitivity would be high.
- **Scenic views –** The area with scenic views impacted includes a substantial number of sensitive viewers, defined as residential viewers, viewers from parks and trails, or viewers from outdoor recreation facilities; the degree of additional obstruction of views compared to existing conditions would be substantial; and the degree of scenic view blockage would be of long duration (more than 3 years).

5.2.2 Short-term (Construction) Impacts: PSE's Proposed Alignment

During the Phase 1 Draft EIS evaluation, the EIS Consultant Team determined that construction impacts to the aesthetic environment and scenic views, due to their temporary nature, would be less-than-significant. Areas cleared for temporary construction activities (including construction access roads) would be replanted post construction; the presence of construction vehicles, equipment, materials, and personnel would end; and increased light and glare would terminate after construction. No further evaluation of construction (short-term) impacts to scenic views and the aesthetic environment was conducted for the Phase 2 Draft EIS or this Final EIS.

5.3 WATER RESOURCES

5.3.1 Short-term (Construction) Impacts Considered

The project has the potential to cause minor short-term impacts to water resources, in particular water quality, due to construction site runoff, dewatering discharge, accidental spills, temporary vegetation clearing, and operation of heavy equipment. The scale and proximity of construction activities to water resources determine the intensity of potential impacts. The analysis considered the cumulative impacts and potential mitigation measures to minimize or eliminate project impacts to water resources. For this analysis, the magnitude of short-term project-related impacts is classified as being less-than-significant, or significant as follows:

- **Less-than-Significant** – Impacts to water resources would be considered less-than-significant if project activities would cause temporary or minor permanent alterations to or disturbance of water resources; impacts can be fully mitigated according to permit requirements; or impacts are largely avoided by the implementation of BMPs.
- **Significant** – Impacts to water resources would be considered significant if project activities would cause the permanent or net loss of wetland or buffer acreage or impairment of functions that cannot be fully mitigated; would be in noncompliance with applicable water quality standards; or would cause groundwater contamination that cannot be avoided by construction BMPs.

Methods for Analyzing Short-term Impacts

The EIS Consultant Team used the same mapping methods as for long-term (operation) impacts to determine the short-term (construction) impacts. Impacts were assessed based on project construction methods, the scale of construction activities, and proximity of these activities to water resources. The impact analysis considered the extent of vegetation clearing, construction grading, and other project actions.

5.3.2 Short-term (Construction) Impacts: PSE's Proposed Alignment

5.3.2.1 Richards Creek Substation

Construction of the Richard Creek substation facilities would require clearing and grading of approximately 2 acres. Temporary access roads would be constructed in Wetlands A and H. Clearing would expose bare soils, and stormwater runoff from these areas could cause increased sedimentation and turbidity to wetlands and streams on and near the site if erosion from cleared areas is not controlled. Compliance with applicable permits and implementation of BMPs would control surface water runoff and erosion. Therefore, impacts would be less-than-significant.

The access road would cross Stream C, the existing culvert under the access road would be replaced, and Stream C would be realigned to increase streamflow conveyance. Construction would include in-water work and work in wetlands and buffers that could temporarily increase erosion and sedimentation to the stream. Construction would occur in the summer low flow period and would be done in compliance with City of Bellevue performance standards (LUC 20.25H.100) and implementation of BMPs. This would minimize impacts and make them less-than-significant.

To minimize impacts to wetlands, the site would be excavated into the slope on the east side. This would require approximately 26,500 cubic yards of cut and 8,000 cubic yards of fill. A soldier pile retaining wall would be installed. Excavation could encounter shallow groundwater and require dewatering as described in Section 5.3.2.2, below. Pump tests would be conducted prior to construction to determine potential drawdown and appropriate mitigation. Most of the other substation facilities would be placed on concrete pads, requiring limited excavation. Therefore, no impacts to groundwater are anticipated.

Table 5.3-1 describes construction impacts to water resources in the study area by segment. Because the impacts are similar for all segments, the table refers to Section 5.3.2.2.

5.3.2.2 Short-term (Construction) Impacts Common to All Segments

Construction impacts to water resources would primarily be associated with installing transmission poles, access roads, and staging areas. Construction of the new transmission lines and poles would have similar impacts for all segments and could potentially cause temporary water quality impacts to nearby water bodies. Impacts would be temporary and minor with the implementation of BMPs and temporary and therefore less-than-significant. Impacts to the acreage and function of wetlands and buffers are described as long-term impacts in Section 4.3.

Installation of the transmission poles would require excavation for pole foundations. Excavations would be 4 to 8 feet in diameter and could extend 25 to 50 feet deep. Poles in the existing corridor would be replaced in approximately the same location as existing poles, minimizing the amount of additional clearing and disturbance required. Existing poles would be removed and disposed of at an approved landfill. PSE's Proposed Alignment is entirely within the existing corridor. PSE would utilize existing roads for access and existing developed areas for staging to the extent possible, but some new staging areas and short segments of access roads would be required.

Construction would require clearing of trees and vegetation within the managed right-of-way, which could expose bare soil and potentially increase erosion and sedimentation during construction. Implementation of BMPs and sediment and erosion control plans would reduce potential impacts. Disturbed areas would be replanted and stabilized following construction to prevent future erosion. (See Section 4.4 regarding replacement vegetation.) Therefore, these impacts would be temporary and less-than-significant.

Installation of poles in wetlands or buffers would require the clearing of vegetation and excavation, which would disturb soils and could cause minor, temporary increases of erosion and sedimentation. Construction vehicles could compact soils and damage wetlands or buffers. PSE would implement BMPs and provide mitigation in compliance with applicable critical areas regulations, including mitigation requirements described in Appendix D. Timber mats and specialized equipment, such as tracked vehicles, would be used to minimize the extent of wetland disturbance. Implementation of BMPs and compliance with these requirements would result in less-than-significant impacts to wetlands and buffers.

No poles would be placed in stream beds, but the transmission line would cross streams in several locations, as described in Table 5.3-1. These crossings would consist of overhead transmission wires, which would not impact the stream directly. Restringing the wires would not require construction equipment or activities in the stream, so no impacts would occur. Stringing sites would be located outside of wetlands and streams. For these reasons, impacts to streams would be less-than-significant.

The presence of construction vehicles and equipment in the vicinity of streams and wetlands could result in accidental spills of fuel, oil, hydraulic fluid, and other chemicals. These fluids could reach wetlands, streams, or groundwater if spills are not controlled. Construction contractors would be required to develop spill prevention plans prior to issuance of the clearing and grading permit, that would be implemented to minimize impacts, so these impacts would be less-than-significant.

Construction for the installation of some poles would also require excavation up to 50 feet, which could encounter shallow groundwater. This could require dewatering to remove groundwater that seeps into excavation areas. The uncontrolled release of dewatering water could contaminate surface waters. Use of sediment tanks to settle soil particles and potentially filter or treat water pumped from the excavations would prevent contamination. Because the area of excavation for each pole would be limited to approximately 8 feet in diameter, any dewatering would be minimal and impacts would be less-than-significant.

Excavation also has the potential to change or interfere with the flow patterns of shallow groundwater, and dewatering could cause drawdown of groundwater levels. However, the limited extent of the excavations would not impact groundwater flows or levels. Pump tests would be conducted prior to construction to determine the potential for drawdown and settlement, and appropriate mitigation measures would be developed to minimize impacts.

PSE will establish staging sites to store equipment and materials, as well as stringing sites to stage operations to restring (install) the new wires. Generally, PSE will use already developed areas for staging and stringing, minimizing the need to clear new areas, but some new areas would be required. Clearing of these areas could increase erosion and sedimentation to adjacent water resources, but implementation of BMPs would minimize impacts. New staging areas would be restored following construction, so impacts would be temporary and less-than-significant.

5.3.2.3 Short-term (Construction) Impacts by Segment

Table 5.3-1 summarizes the short-term (construction) impacts for the Richards Creek substation and transmission line segments and options, taking into account code-required mitigation. Information in this section is based on the 2016 and 2017 wetland delineation reports for Redmond, Bellevue North, Bellevue Central, and Renton (The Watershed Company, 2016, 1017) and the critical areas permit applications for Richards Creek Substation, Bellevue South, and Newcastle (PSE, 2017b, 2017c). Additional wetland and stream impacts may be identified during the permitting process. PSE would comply with all mitigation requirements, so impacts are expected to be less-than-significant.

Table 5.3-1. Short-term Impacts to Water Resources in the Study Area by Segment

Location/Segment	Short-term Effect	Impact
Richards Creek Substation		
Sedimentation and turbidity	Increased sedimentation and turbidity could occur in the wetlands and stream reaches on and near the site if erosion from cleared areas is not controlled. Implementation of BMPs and compliance with City of Bellevue stormwater and clearing and grading regulations (LUC 24.06 and LUC 23.76) would minimize potential impacts.	Less-than-Significant
Impacts to wetlands and streams	Construction of substation facilities could temporarily increase erosion and sedimentation in wetlands on and near the site. Construction of the access road crossing of Stream C, including culvert replacement and stream realignment, could increase erosion and sedimentation to the stream. Compliance with City of Bellevue performance standards (LUC 20.25H.100) and implementation of BMPs would minimize impacts.	Less-than-Significant
Contamination from accidental spills or leaks	Oil, fuel, and other chemicals could inadvertently spill or leak from construction equipment and contaminate surface and groundwater. Implementation of spill prevention plans would minimize impacts.	Less-than-Significant
Contamination from dewatering	Excavation to install most substation facilities would be shallow and would not encounter groundwater. Installation of poles could encounter groundwater and require dewatering. No contamination from dewatering is anticipated because the dewatering would be minimal.	Less-than-Significant
Impacts to groundwater flow or water levels	Excavation to construct the substation would be shallow and would not impact groundwater flows or levels. Installation of poles could encounter groundwater, but the limited extent of excavation would not impact groundwater flows or levels.	Less-than-Significant
Reduced groundwater infiltration	Heavy construction equipment could compact soils and reduce the rate of surface water infiltration and groundwater recharge. Limiting the area of construction impact would minimize compaction.	Less-than-Significant

Location/Segment	Short-term Effect	Impact
Redmond Segment		
Sediment and turbidity Contamination from accidental spills and leaks Contamination from dewatering Impacts to groundwater flows or water levels Reduced groundwater infiltration	See Section 5.3.2.2, *Impacts Common to All Segments*	Less-than-Significant
Impacts to streams and wetlands	Replacement poles would be located in approximately the same location as they are currently. Approximately 4 poles would be located in wetlands, but no poles would be located in buffers. Existing access roads would be used. Staging and stringing sites would be located outside of critical areas, to the extent feasible. Impacts from installing new poles or wires, or removing old poles from stream and wetland buffers would be less-than-significant.	Less-than-Significant
Number of stream crossings	The transmission line would cross two streams and the buffer of one other. Stringing the wires across the stream would not cause impacts because no construction activities would occur in the stream.	Less-than-Significant
Bellevue North Segment		
Sediment and turbidity Contamination from accidental spills and leaks Contamination from dewatering Impacts to groundwater flows or water levels Reduced groundwater infiltration	See Section 5.3.2.2, *Impacts Common to All Segments.*	Less-than-Significant
Impacts to streams and wetlands	No transmission poles, staging areas, or stringing sites would be located in streams, wetlands, or buffers, so no impacts would occur.	No Impact
Number of stream crossings	The transmission line would not cross any streams in the existing corridor, so no impacts would occur.	No Impact

Location/Segment	Short-term Effect	Impact
Bellevue Central Segment (Revised Existing Corridor Option)		
Sediment and turbidity Contamination from accidental spills and leaks Contamination from dewatering Impacts to groundwater flows or water levels Reduced groundwater infiltration	See Section 5.3.2.2, *Impacts Common to All Segments*	Less-than-Significant
Impacts to streams and wetlands	No transmission poles would be located in streams. Two poles are proposed in wetlands and nine poles would be located in buffers (these would replace existing poles). Staging and stringing sites would be located outside of critical areas, to the extent feasible. Impacts from installing new poles and removing old poles from stream and wetland buffers would be less-than-significant.	Less-than-Significant
Number of stream crossings	The transmission line would cross 13 streams or surface water drainage features in this segment in the existing corridor. No new clearing would be required. Stringing the wires across these features would not cause impacts because no construction activities would occur in these water courses.	Less-than-Significant
Bellevue South Segment (Revised Willow 1 Option)		
Sediment and turbidity Contamination from accidental spills and leaks Contamination from dewatering Impacts to groundwater flows or water levels Reduced groundwater infiltration	See Section 5.3.2.2, *Impacts Common to All Segments.*	Less-than-Significant

DSD 005746

Location/Segment	Short-term Effect	Impact
Impacts to streams and wetlands	Two poles are proposed in wetlands (these would replace two existing poles) and one is proposed in a stream buffer. Staging and stringing sites would be located outside of critical areas, to the extent feasible. Impacts from installing new poles and removing old poles from stream and wetland buffers would be less-than-significant.	Less-than-Significant
Number of stream crossings	The corridor would cross seven streams, which is the same as existing conditions. No new clearing would be required. Restringing the wires across the stream would not cause impacts because no construction activities would occur in the stream. No new impacts would occur from stream crossings.	Less-than-Significant
Newcastle Segment (Both Option 1 and Option 2)		
Sediment and turbidity Contamination from accidental spills and leaks Contamination from dewatering Impacts to groundwater flows or water levels Reduced groundwater infiltration	See Section 5.3.2.2, *Impacts Common to All Components.*	Less-than-Significant
Impacts to streams and wetlands	Poles would be replaced in wetland buffer, resulting in minor impacts. Under Option 1, slightly more temporary impacts would occur in stream and wetland buffers because additional pole work areas and access routes would be required.	Less-than-Significant
Number of stream crossings	The corridor would cross three streams, which is the same as existing conditions. No new clearing would be required. Stringing the wires across the streams would not cause impacts because no construction activities would occur in the streams.	Less-than-Significant

DSD 005747

Location/Segment	Short-term Effect	Impact
Renton Segment		
Sediment and turbidity Contamination from accidental spills and leaks Contamination from dewatering Impacts to groundwater flows or water levels Reduced groundwater infiltration	See Section 5.3.2.2, *Impacts Common to All Components.*	Less-than-Significant
Impacts to groundwater	Portions of the segment are within Zone 2 of Renton's Wellhead Protection Area. Compliance with the City's construction standards would minimize impacts to groundwater.	Less-than-Significant
Impacts to streams and wetlands	No poles, staging areas, or stringing sites would be placed in wetlands, streams, or their buffers, so there would be no impacts.	No Impacts
Number of stream crossings	The corridor would cross four streams, which is the same as existing conditions. No new clearing would be required. Stringing the wires across the streams would not cause impacts because no construction activities would occur in the streams. No poles would be placed in the shoreline jurisdiction of the Cedar River.	None

5.3.3 Mitigation Measures

The following construction-specific mitigation measures would be required or could be imposed to reduce construction impacts to water resources. Construction-specific mitigation measures were identified based on a review of regulations and standard construction BMPs, both of which would be required. Therefore, no potential mitigation measures are proposed because required regulatory mitigation measures would adequately alleviate any potential impacts to water resources. Some of the required and potential mitigation measures identified in Section 4.3.6, such as compliance with critical areas ordinances, also have the potential to mitigate construction-related impacts.

5.3.3.1 Regulatory Requirements

PSE would need to comply with applicable federal, state, and local permit requirements for stormwater, streams, wetlands, and critical areas, and Shorelines of the State. Compliance with these requirements would mitigate the potential for short-term adverse impacts to water resources. Mitigation measures required to comply with such regulations are not discretionary.

Prior to Construction

- Apply for all necessary permits (BMPs specific to the site and project would be specified in the construction contract documents that the construction contractor would be required to implement).

During Construction

- Comply with code provisions for the protection of water resources from clearing and grading activities.
- Comply with all necessary permits:
  - *National Pollutant Discharge Elimination System* general permit for construction (issued by Ecology).
  - Hydraulic Project Approval (issued by WDFW).
  - Construction Stormwater General Permit.
- Implement the *Stormwater Pollution Prevention Plan* and Temporary Erosion and Sediment Control Plan to mitigate potential increased sedimentation and turbidity from stormwater runoff. These plans will include BMPs to ensure that sediment originating from disturbed soils would be retained, with the limits of disturbance such as the following:
  - Temporary covering of exposed soils and stockpiled materials.
  - Silt fencing, catch basin filters, interceptor swales, or hay bales.
  - Temporary sedimentation ponds or sediment traps.
  - Installation of a rock construction entrance and street sweeping.
- Implement a Spill Prevention, Control, and Countermeasures Plan to minimize the potential for spills or leaks of hazardous materials. BMPs in the Spill Prevention, Control, and Countermeasures Plan would include the following:
  - Operating procedures to prevent spills.

- Control measures such as secondary containment to prevent spills from entering nearby surface waters.
  - Countermeasures to contain, clean up, and mitigate the effects of a spill.
  - Construction vehicle storage and maintenance and fueling of construction equipment will be located away from streams and wetlands.

- Comply with a dewatering plan to monitor groundwater withdrawal during excavations and to avoid groundwater contamination. This would likely include collecting dewatering water from excavations and treating it before discharge to surface water or stormwater systems.
- Comply with construction standards applicable to Wellhead Protection Zone 4 (RZC 21.64.050D.4.b) in the City of Redmond.
- Comply with construction standards applicable to Wellhead Protection Area Zone 2 (RMC 4-4-030.C8) in the City of Renton. These standards include requirements for the following:
  - Secondary containment for hazardous materials.
  - Securing hazardous materials.
  - Removal of leaking vehicles and equipment.
  - Cleanup equipment and supplies.
- Monitor soils from construction-related excavation/grading for contamination; if contaminated soils are encountered, mitigate in accordance with federal, state, and local regulations.

5.4 PLANTS AND ANIMALS

The potential effects of short-term (project construction) activities on plant and animal resources in the study area were assessed on the basis of project construction methods, the scale of the construction activities, and the quality and proximity of typical species and habitat resources. The analysis considered the scale of PSE's Proposed Alignment in determining potential impacts to species or their habitats, including noise disturbance, the disturbance or short-term alteration of available habitat, and construction area stormwater runoff.

Impacts were assessed based on the number and type of power transmission facilities installed, amount of ground disturbance during construction, the presence of natural or critical areas, and the proximity of construction areas to known or potential species habitats. These include known or potential nesting, migration, and rearing habitats within the study area.

5.4.1 Short-term (Construction) Impacts Considered

The project is expected to cause temporary (short-term) modifications of available fish and wildlife habitat, as well as potential direct impacts to fish and wildlife species. The scale and proximity of construction activities to these resources determined the intensity of potential impacts. The analysis considered the cumulative impacts and potential mitigation measures to minimize or eliminate project impacts to plant and animal resources. For this analysis, the magnitude of short-term impacts is classified as being less-than-significant or significant, as follows:

- **Less-than-Significant**–Impacts to fish and wildlife are considered less-than-significant if project activities would cause temporary, or minor permanent, alterations or disturbances to study area habitats, including impacts that could be minimized but not fully mitigated; occur in developed areas with minimal or poor quality habitat; or when impacts are mitigated through compliance with tree protection or critical areas ordinances. This would include limited interference with the breeding, feeding, or movement of resident or migratory fish, bird, amphibian, or mammal species. This would also include activities that could cause harassment, injury, or death to common species, whose populations would not be substantially altered by such impacts.
- **Significant**–Impacts are considered significant where construction activities would cause the following: injury, death, or harassment of federal and state listed endangered or threatened species, or bald eagle and peregrine falcon (state sensitive and federal species of concern); a reduction of habitat quality or quantity that can substantially affect the critical survival activities (breeding, rearing, and foraging) of listed species; substantial interference with the breeding, feeding, or movement of native resident or migratory fish, bird, amphibian, or mammal species; or noncompliance with tree protection ordinances or critical areas ordinances.

Methods for Analyzing Short-term Impacts

The EIS Consultant Team used the same methods as for long-term (operation) impacts to determine the short-term (construction) impacts to plants and animals in the study area. Impacts were assessed based on the type and scale of construction activities and potential habitat modifications, and the likely presence of protected fish and wildlife species.

DSD 005751

5.4.2 Short-term (Construction) Impacts: PSE's Proposed Alignment

5.4.2.1 Short-term (Construction) Impacts Common to All Components

A range of potential direct and indirect impacts to plants and animals could occur during construction, including the following: noise disturbance, habitat alteration or loss (vegetation clearing), degradation of aquatic habitat, and introduction of invasive plant species.

Disturbance from Construction Noise and Human Activity

Increased construction noise and human activity could cause some animal species to temporarily relocate to surrounding habitats, or in some instances to be displaced. This would be a significant adverse impact if listed species are harassed, lost, or permanently displaced. However, the typical construction activities would not cause excessive noise disturbances, and protected wildlife species are not known to occupy habitat within the study area. In addition, construction BMPs would be implemented for PSE's Proposed Alignment to eliminate or substantially reduce impacts.

Most of the construction activities would occur in discrete locations (i.e., individual pole locations) dispersed along the existing corridor. The work areas would typically be limited to the immediate area around the pole locations, where vegetation could be removed to allow a safe working space for equipment, vehicles, and materials. The amount of ground disturbance would be limited. Disturbing these small, isolated areas would require wildlife to move only short distances to avoid direct effects, and limit indirect effects to surrounding habitat. The pole locations would also be chosen to minimize the disturbance of sensitive or critical areas, by typically allowing placement within approximately 25 feet of the existing poles.

Loss of Habitat

Construction activities that disturb the vegetation and soil would result in the short-term loss or alteration of habitat for ground-oriented species, thereby decreasing the value of the habitat for wildlife. The primary factor resulting in habitat loss would be the amount of area needed to install the poles and wires along the corridor. The construction activities typically consist of excavating a hole using a Vactor truck or auger, to minimize ground disturbance. The poles would either be placed directly in the hole and backfilled, or reinforced-steel anchor bolt cages would be installed and filled with concrete to secure the pole. After the poles are erected, the new power lines would be strung between the poles. Stringing new wires would require additional staging areas to pull the wires and achieve the correct wire tension. Some additional vegetation clearing, grading or other ground disturbance activities would sometimes be necessary at these sites, depending on site conditions. Overall, the amount of ground-disturbing activities associated with installing the poles and stringing the new conductors would be limited, and disturbed areas would be replanted to the extent practicable. As a result, these activities would have less-than-significant impacts to fish and wildlife habitat.

Sedimentation of Aquatic Habitats

Construction activities adjacent to streams or within wetlands have the potential to increase sedimentation of aquatic habitats, due to runoff from disturbed areas. While most segments avoid critical areas and their buffers, there are a few instances where pole placements could result in potential impacts as described in Table 5.3-1. Such impacts would be significant if protected fish or other aquatic species are present. However, complying with state and local stormwater permit BMPs, including installing temporary erosion control measures prior to ground-disturbing activities, would minimize or eliminate potential impacts. In addition, the limited amount of disturbed area, and the flexibility of locating poles up or down the existing corridor, would minimize the potential for turbid runoff from reaching sensitive habitats. As a result, expected impacts would be less-than-significant.

Contamination of Aquatic Habitats

Construction activities adjacent to critical areas or their buffers have the potential to result in accidental spills of oils, fuels, solvents, and other chemicals from construction equipment. If not controlled, such spills could enter nearby surface waters and adversely affect aquatic species. However, such impacts would be minimized or eliminated by fulfilling permit requirements and implementing Spill Prevention and Control Plans. As a result, expected impacts would be less-than-significant.

Invasive Plant Control

PSE would replant disturbed areas after construction to reduce the space and opportunity for invasive species to become established. PSE would also continue to selectively use herbicides for vegetation management, in accordance existing permits and associated BMPs. Therefore, less-than-significant impacts are expected.

5.4.2.2 Short-term (Construction) Impacts by Component and Segment

While the extent and duration of construction activities would vary among segments, the types of construction impacts would be similar for each. The primary difference between segments would be the number of construction sites (pole locations) within the segment, ranging from 21 to 59 poles per segment, and the availability and condition of access routes. For example, access to the north portion of the Redmond Segment could require access through a vegetated greenbelt with wetland habitat features, but existing access roads would be used. Along most of the existing corridor, the new poles would be placed in the same general area as the existing poles, using existing access routes, also limiting potential impacts. The analysis of potential construction impacts considered both existing access routes as well as proposed temporary access routes for the project.

In addition to access-related impacts, project construction activities have the potential for direct and indirect impacts to fish and wildlife and their habitat. The installation of new poles would disturb or replace small areas of existing habitat, although these impacts would generally be offset by the removal of a similar, or slightly greater, number of existing poles. As described above, the potential short-term impacts of construction activities on fish, wildlife, and plant species are expected to be limited due to the low-impact construction methods needed to install the poles and string the conductors.

Impacts by segment (and the Richards Creek substation) are summarized in Table 5.4-1.

DSD 005753

Table 5.4-1. Impacts to Plants and Animals by Segment and Option

Location/Segment	Short-term Effect	Impact
Richards Creek Substation		
Noise disturbance activities	Increased noise levels could disturb or displace species on or near the site, particularly during pile driving activities to protect the hillside to the east of the site. However, pile driving activities would occur for a relatively short period of time (several weeks). Other construction noise would likely be similar to background levels in surrounding areas, protected species use of the habitat in the vicinity is limited, and seasonal restrictions would be implemented to limit construction during sensitive periods (breeding and nesting seasons).	Less-than-Significant
Habitat loss (temporary)	Much of the existing site is already disturbed and used as a storage area. As a result, potential impacts of construction access and construction staging during installation of the substation would be limited.	Less-than-Significant
Impacts to aquatic species	With the potential exception of lamprey, no protected aquatic species are expected to occur in the small streams adjacent to the substation site. Construction of the access road crossing of Stream C, including culvert replacement and stream realignment, would require in-water work and could increase erosion and sedimentation to the stream. Compliance with City of Bellevue performance standards (LUC 20.25H.100) and state and federal permit requirements including implementation of BMPs would minimize impacts would minimize the potential to affect aquatic species.	Less-than-Significant
Invasive plant control	Discriminating use of growth regulators and herbicides for vegetation management will be used in accordance with existing permits and associated BMPs.	Less-than-Significant
Redmond Segment		
Noise disturbance from ground-clearing activities	See Section 5.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant

Location/Segment	Short-term Effect	Impact
Habitat loss (temporary)	Impacts to available habitat from installing new poles and stringing new wires would be less-than-significant because the segment is in the existing corridor, existing access roads would be used, and timber mats would be used to access the pole locations to minimize ground disturbance.	Less-than-Significant
Impacts to aquatic species	With the potential exception of lamprey, no protected aquatic species are expected to occur in the small streams in this segment. Direct impacts to aquatic habitat would be avoided, and compliance with appropriate construction BMPs would minimize the potential to affect aquatic habitat.	Less-than-Significant
Invasive plant control	As with the Richards Creek substation site, this would include discriminating use of growth regulators and herbicides in accordance with existing management plans and permits.	Less-than-Significant
Bellevue North Segment		
Noise disturbance from ground-clearing activities	See Section 5.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Loss of habitat (temporary)	Impacts from installing new poles and stringing new wires on available habitat would be less-than-significant because the segment is in the existing corridor with available access to minimize ground disturbance.	Less-than-Significant
Impacts to aquatic species	Several protected fish species could occur in Valley Creek in this segment. However, no poles would be located in the stream or buffers, and available access to the pole sites would minimize or eliminate potential short-term impacts to aquatic habitat or species.	Less-than-Significant
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant

Location/Segment	Short-term Effect	Impact
Bellevue Central Segment (Revised Existing Corridor Option)		
Noise disturbance from ground-clearing activities	See Section 5.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	Impacts from installing new poles on available habitat would be less-than-significant because the segment is in the existing corridor with available access to minimize ground disturbance.	Less-than-Significant
Impacts to aquatic species	Several protected fish species occur in the streams in this segment. However, no poles would be located in streams or stream buffers, and available access to the pole sites would minimize or eliminate potential short-term impacts to aquatic habitat or species.	Less-than-Significant
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant
Bellevue South Segment, Revised Willow 1 Option		
Noise disturbance from ground-clearing activities	See Section 5.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	Impacts from installing new poles and restringing wires would be less-than-significant because the segment is in the existing corridor, and mitigation would minimize short-term impacts to available habitat.	Less-than-Significant
Impacts to aquatic species	Seven streams are located in this segment, including Coal Creek, which supports several protected fish species. However, no new impacts would occur near these streams.	Less-than-Significant
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant
Newcastle Segment		
Noise disturbance from ground-clearing activities	See Section 5.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	Impacts on available habitat from installing new poles and restringing wires would be less-than significant because the segment is in the existing corridor and mitigation would minimize short-term impacts to available habitat.	Less-than-Significant

Location/Segment	Short-term Effect	Impact
Impacts to aquatic species	May Creek occurs in this segment and supports several protected fish species, the same as existing conditions. No new impacts would occur at these stream crossings.	Less-than-Significant
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant
Renton Segment		
Noise disturbance from ground-clearing activities	See Section 5.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	Impacts on available habitat from installing new poles and restringing wires would be less-than-significant because the segment is in the existing corridor, and mitigation would minimize short-term impacts to available habitat.	Less-than-Significant
Impacts to aquatic species	Five streams occur in this segment, including Honey Creek and the Cedar River, which support several protected fish species. No new impacts would occur at these stream crossings. No poles would be placed in the shoreline jurisdiction of the Cedar River.	Less-than-Significant
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant

5.4.3 Mitigation Measures

As described above for long-term impacts, PSE would provide mitigation for potential long-term impacts to fish, wildlife, and plant resources caused by construction, using on- and off-site habitat enhancements, which would be developed in coordination with local, state, and federal agencies (Section 4.4.6). In addition, to mitigate for the short-term impacts described in this chapter, the following mitigation measures would be used during construction to reduce construction-related impacts.

5.4.3.1 Regulatory Requirements

The following measures are required to comply with regulations and are not discretionary.

During Construction

Implementation of the mitigation measures described in Section 5.3.3 to minimize impacts on water resources would also minimize impacts on plants and animals. In addition, PSE would comply with applicable construction windows for in-water work.

PSE would also comply with all requirements of their Joint Aquatic Resources Permit Application (JARPA) imposed by natural resource agencies to protect fish and wildlife species and their habitat, such as:

- Limit work to allowable "fish window" time periods.
- Limit work during sensitive nesting and breeding seasons for protected wildlife species occurring in the area.
- Implement PSE's established bird protection programs and procedures.
- Provide fish exclusion if required to prevent harm to protected species.
- Replant and stabilize disturbed construction and staging areas with native trees, shrubs, and grasses.
- Implementation of temporary erosion control measures.
- Utilize a Spill Prevention and Control Plan.

5.4.3.2 Potential Mitigation

During Construction

- PSE would continue to implement an ecologically based, integrated weed management program to control the spread of invasive and noxious weeds at disturbed areas by planting native plants.
- Flag the limits of construction, trees to be retained, and critical habitat areas and associated buffers to be avoided.
- At sites where access is difficult, a helicopter or large crane may be used to limit the extent of disturbance necessary for construction access. See the discussion of helicopter use in Section 5.1.3.

5.5 GREENHOUSE GASES

5.5.1 Short-term (Construction) Impacts Considered

The following specifically defines project-level short-term (construction) impacts to GHGs:

Less-than-Significant – The project would result in construction-related GHG emissions over a limited period not exceeding 2 years.

Significant – The project would result in construction-related GHG emissions over an extensive construction period exceeding 2 years and not implementing BMPs.

Methods for Analyzing Short-term Impacts

Short-term construction emissions of GHGs were qualitatively assessed with a construction phase duration of 2 years as the criteria for requiring BMPs as mitigation.

5.5.2 Short-term (Construction) Impacts: PSE's Proposed Alignment

Construction truck trips, off-road equipment, and worker trips would generate GHG emissions. Construction equipment would include specialized oversize trucks and trailers, backhoes or excavators, concrete trucks, and cranes or other specialty equipment to place transformers. Most of this equipment would operate on diesel fuel, which has an emission factor of 10.15 kilograms of CO_2 per gallon.

As described in the Phase 1 Draft EIS, the Energize Eastside project would have a relatively short construction period (approximately 12 to 18 months). Installing transformers would be performed concurrently with the transmission line and poles. Consequently, although the project would involve a relatively large amount of construction equipment, its relatively short duration would result in temporary construction GHG emissions.

The Phase 1 Draft EIS addressed the potential for lifecycle emissions from manufacturing and transport of material resources required for the Energize Eastside project. The primary material resources would be concrete for pier and transformer foundations, steel or laminated wood poles for towers, and conductors. Of these materials, concrete is likely the most GHG-intensive to produce. Production of 1 cubic meter of concrete generates approximately 101 kilograms (222 pounds) of CO_2 (Kjellsen et al., 2005), which accounts for cement production, aggregate production, water, and transport. The most recent estimate of installation requirements for the proposed project indicates that there would be 221 pole foundations required and that of those approximately 40 percent (89) would require concrete foundations. Assuming caisson foundations 35 feet deep and 6 feet in diameter, each foundation would require approximately 6 cubic meters of concrete, yielding a minimum GHG estimate for all towers of 54 metric tons of CO_2.

Project-related GHG emissions from construction would be temporary, would not represent a continuing burden on the statewide inventory, and would likely be below state reporting thresholds; in addition, in practice, the reporting threshold applies to emissions from a facility and not to temporary construction activities. Consequently, construction-related GHG emissions would be less-than-significant.

5.5.3 Mitigation Measures

Short-term (construction) GHG impacts would be less-than-significant, and no mitigation measures are required. However, the following BMPs could be implemented to reduce construction-related GHG contributions.

5.5.3.1 Potential Mitigation Measures

During Construction

- Use renewable diesel for diesel-powered construction equipment. The fuel can achieve a 40–80 percent reduction in GHG emissions compared to fossil diesel and is a recommended component of GHG reduction efforts in other jurisdictions such as the Drive Clean Seattle program (Seattle OSE, 2012).
- Use non-petroleum lubricants for construction equipment.
- Replant disturbed construction and staging areas with native trees, shrubs, and grasses.

5.6 RECREATION

5.6.1 Short-term (Construction) Impacts Considered

Potential short-term impacts to recreation include the loss of use of a recreation site during construction activities. The following specifically defines short-term impacts to recreation.

Less-than-Significant – Impacts would be less-than-significant if a recreation site were not usable for a short duration or if construction activities are noticeable (e.g., decreased visual enjoyment) and cause irritation to users but do not preclude recreation use (e.g., if a trail is closed for 3 to 14 days over a 2-month period while a pole is replaced and the lines are restrung). Impacts would also be less-than-significant if a recreation site were unusable or access completely blocked outside of peak use or in a recreation site or area of a recreation site that is not frequently used (e.g., if construction site access blocks a trail that is located in a park for a 2-month period while all poles in that park are replaced and the lines are restrung). Construction on school property would be less-than-significant if it occurred when school is not in session (e.g., weekends, summertime).

Significant – Impacts are considered significant if a recreation site were unusable or access is completely blocked during peak use for an extended period of time (e.g., a park is inaccessible during the summer months and many users are affected). Construction through easements on school property during the school year would be significant if sports and play fields are not available to the students (e.g., a soccer field is inaccessible during a tournament).

Methods for Studying Short-term Impacts

The EIS Consultant Team used the same mapping methods used for long-term (operation) impacts to determine the short-term (construction) impacts. They then considered the type and scale of construction activities, the time of year of construction (e.g., during peak summer use), duration of construction, number of users affected, and type and number of recreation sites affected.

5.6.2 PSE's Proposed Alignment: New Substation and 230 kV Transmission Lines

5.6.2.1 New Richards Creek Substation

Short-term impacts to recreation from the construction of the substation would be less-than-significant. Students at the Chestnut Hill Academy may hear construction noise in outside play areas or sports fields, but this is not expected to disrupt their activities.

5.6.2.2 Impacts Common to All Segments

Activities within a recreation site in the vicinity of construction may be limited for the duration of active construction (see Section 2.1.3, *Construction*, for details). For example, where a pole site is located within a park, the portion of the park nearby could be inaccessible for 3 to 14 days while work is being done. If poles and access routes are not located in areas used by recreationists, recreation would not likely be affected. Where a trail is located along PSE's existing corridor and access to a number of poles would be along the corridor, the trail could be temporarily closed or rerouted during active work (i.e., while workers are on-site) until all poles are replaced. For example, if a trail is used to access four pole sites, that trail could be affected for up to 20 days within a 2-month period. The trail could remain open provided it was safe, but users would see construction activities and vehicles on the trail, which may affect user enjoyment. Bicycle and pedestrian use of roads or sidewalks may be restricted while poles are replaced or constructed along roads. In between active work (i.e., between work stages, including evenings and weekends), areas may have indications of construction (e.g., disturbed soil or a small area cordoned off), but access would be maintained. PSE would work to maintain access to recreation sites while providing a safe working area for crews and the public. Recreation users may relocate to nearby parks during construction, making those parks busier than usual. PSE will try to keep recreation areas open to the extent possible; however, during certain construction activities (e.g., movement of construction equipment), safety is paramount and may require temporary closure of some areas.

Trees and vegetation may be removed within the managed right-of-way within or adjacent to recreation sites to facilitate project construction and access. Grasses, shrubs, and saplings would be disturbed or cleared in areas subject to ground-disturbing activities. Temporary vegetation cleared to facilitate construction will be restored, but areas may be fenced off to allow vegetation to reestablish. Impacts to recreation from permeant changes to vegetation are described in Section 4.6, Recreation.

Construction vehicles may use parking spaces or adjacent street parking. In addition, it is possible that recreation sites or facilities may be used for temporary construction staging. PSE would work with the appropriate cities to identify suitable locations for staging that would result in minimal impacts to recreation. Such suitable locations may include overflow parking areas or parts of the site that are underutilized.

After poles are replaced, the site (including any staging areas) would be restored and available for recreation. Recreation users would be inconvenienced by construction activities; however, impacts would be short in duration at each recreation site and less-than-significant.

Short-term (construction) impacts at specific recreation sites are summarized by segment in Table 5.6-1. As shown, there would be no impacts or less-than-significant impacts at all recreation sites in the study area.

Table 5.6-1. Short-term Impacts to Recreation Sites in the Study Area by Segment

Recreation Sites	Short-term Effect	Impact
Richards Creek Substation		
Chestnut Hill Academy	Students may hear some construction noise from outside play areas or sports fields; however, there would be no change to recreation during construction.	Less-than-Significant
Redmond Segment		
Willows Crest Park	The parcel adjacent to Willows Crest Park would be used to access 11 pole sites (2 poles per site) on the easement. There would no construction in the park, but users would be disturbed by vehicles driving past the park intermittently for up to 3 months.	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
Willows Creek Neighborhood Park	Construction would not be visible from the park, and there would be no disturbance to the park itself.	No Impact
Trails (unnamed on corridor, between the Sammamish substation and where the corridor turns south)	The trail would be temporarily closed while adjacent poles are replaced. Vegetation may be cleared to facilitate construction. Ten new poles are proposed in the vicinity of the trail. This trail may be closed until all poles are replaced, or users may avoid the area. Given the number of poles, work in this area would likely be continuous for approximately 2 months. As this is not a high use area, impacts would be limited.	Less-than-Significant
Unnamed Trails (on the north-south portion of the corridor)	Trails along the north-south portion of the Redmond Segment may be temporarily closed while adjacent poles are replaced. How long a trail would be affected would depend on proximity to roads and if the trail is needed to access other poles. Vegetation may also be cleared to facilitate construction.	Less-than-Significant
Rose Hill Middle School	Access to playfields would be restricted during active construction while poles and wires are replaced. Two H-frames (four poles) would be removed and replaced with one pole on the school property. Work would take 6 to 14 days. Vegetation clearing during construction would be limited because the area is already cleared. The existing 115 kV lines (part of a different transmission line) and monopoles on the east side of the property would remain.	Less-than-Significant
Bellevue North Segment		
Bridle Crest Trail	No poles are located on this trail. The trail would be intermittently closed (less than 1 week at a time) while poles on the adjacent parcel are replaced. Work would take 3 to 14 days.	Less-than-Significant
Unnamed Trail along NE 52nd Ln right-of-way and SR 520 Trail	No poles are located on either of these trails. These trails may be temporarily closed for 1 day during restringing of lines across the trails. Restringing of lines across SR 520 would likely take place at night.	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
Viewpoint Park	The portion of the park within the existing corridor, including the trail, may be closed while the poles (one set of poles within the park) and wires are replaced. Vegetation clearing during construction would be limited because the area is already cleared. Work would take 3 to 14 days.	Less-than-Significant
Bellevue Central Segment (Revised Existing Corridor Option)		
Unnamed Trail (on corridor at Bel-Red Rd and NE Spring Blvd)	There would be no changes to this section of trail and therefore no associated construction.	No Impact
Highland-Glendale Property	No poles are in this park, and it would not be used to access other poles. Wires would be restrung over the park, but ground disturbance is unlikely and the area is already cleared. The park may be closed for up to 1 day during restringing of lines.	Less-than-Significant
Glendale Country Club (private)	There are six pairs of poles along the east edge of the golf course that would need to be replaced, which would result in disturbance at each pole site. Access for construction is not limited; thus; work in one area would not likely restrict access somewhere else. Users of the clubhouse and golf course would see construction activities, including vegetation clearing, and holes or trails under the lines may be closed during active construction. Construction on the club property would be completed in less than 2 months.	Less-than-Significant
Unnamed Trails along the Existing Corridor (between SE 10th St and SE 20th St), 10th Ave Trail, and SE 3rd Trail	Portions of trails would be closed during active construction while the poles and wires are replaced, and vegetation cleared. PSE would drive along the easement to access poles farther from the road, and trail users would need to be aware of construction traffic on the trail and possible restrictions. Between SE 10th St and SE 20th St, there are six pole sites, five of which PSE would access from the south, and the trail could be affected for up to 25 days within 2 months in addition to site preparation.	Less-than-Significant
Kelsey Creek Park	In Kelsey Creek Park, trails in PSE's easement would be closed during active construction while the poles and wires are replaced, and vegetation cleared. PSE would need to drive along the easement to access poles farther from the road, and trail users would need to be aware of construction traffic on the trail and possible	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
	restrictions. Between SE 1th St and the Lake Hills Connector, there are four pole sites, which PSE would access from the north, and the trail could be affected for up to 20 days within 2 months in addition to site preparation.	
Skyridge Park	One pole site is located on the east edge of the park. Park users would see construction activities, such as vegetation clearing. As the pole site is near the entrance to the park, access to the park may be closed for 3 to 14 days within 2 months.	Less-than-Significant
Richards Valley Greenway (Trail)	This portion of the greenway may be temporarily closed for 1 day during restringing of lines across the greenway.	Less-than-Significant
Bel-Red Mini Park, McDowell House, Wilburton Hill Park and Bellevue Botanical Gardens, Eastside Rail Corridor (ERC), West Kelsey Open Space, Woodridge Open Space, Richards Creek Open Space, Bannerwood Ballfield Park, and Richards Valley Open Space	The Revised Existing Corridor Option is not near these parks.	No Impact
Bellevue South Segment (Revised Willow 1 Option)		
Mountains to Sound Greenway I-90 Trail	No poles are located on the trail. Although unlikely, it is possible that the trail may be temporarily closed for up to 1 day during restringing of wires across the trail.	Less-than-Significant
Tyee Middle School	Access to the playfields would be restricted during active construction while poles are replaced. Vegetation disturbance would be minimal as existing vegetation is primarily lawn grass. Construction on school property would take 6 to 14 days.	Less-than-Significant
Somerset North Slope Open Space	This open space is not open to the public.	No Impact

Recreation Sites	Short-term Effect	Impact
Somerset Recreation Club	PSE would access the poles from Somerset Pl SE. Construction would be visible, and access to the area near the poles may be limited. Although unlikely, it is possible that the club may be temporarily closed for up to 1 day during restringing of wires. PSE would work with the club to avoid disturbance to recreation activities.	Less-than-Significant
Forest Hill Neighborhood Park & Open Space	The portion of the park within the existing corridor would have limited access during active construction. Users of the greenspace to the east of the corridor would see construction activities, but access would not be limited.	Less-than-Significant
Forest Drive Open Space	The north end of the open space would be used to access the pole site on the easement. Use of the access road as a trail would be limited during active construction, approximately 3 to 14 days.	Less-than-Significant
Coal Creek Natural Area	The Bellevue South Segment does not follow Coal Creek Parkway but follows the existing easement south of Forest Dr SE. The Lower Coal Creek Trailhead near Forest Dr SE, the trailheads near the parking lot north of Coal Creek, and the parking lot itself are not expected to be affected by construction. Where the corridor crosses through the natural area, access would be limited while the poles at three pole sites are replaced, as access for construction vehicles would be along the corridor and trail. Construction through the natural area could take up to 3 weeks.	Less-than-Significant
Newport Hills Mini Park	Access to the park would be limited during active construction, which would take 3 to 14 days. Vegetation disturbance would be minimal; existing vegetation is primarily lawn grass.	Less-than-Significant
Waterline Trail (SE 60th St to Newcastle Way)	Access to the trail would be limited during active construction. Vegetation disturbance would be minimal as existing vegetation is primarily lawn grass. There are two pole sites north of SE 63rd St and three to the south; access may be limited to portions of the trail up to 2 and 3 weeks, respectively.	Less-than-Significant
Newport High School and ERC	The Revised Willow 1 Option is not near these sites.	No Impact

Recreation Sites	Short-term Effect	Impact
Newcastle Segment (Both Option 1 and Option 2)		
Waterline Trail, China Creek (proposed) Cross Town Trail, and Olympus Trail	Trail access would be limited in the vicinity of each pole site. Because there are many road crossings, work at one pole site would unlikely affect access to an adjacent pole site. Vegetation may be temporarily cleared to facilitate construction. There are six pairs of poles along the corridor between the Cross Town Trail and SE May Creek Park Dr where the Olympus Trail is located. Each set of poles would take 3 to 14 days to be replaced within a 2-month period.	Less-than-Significant
May Creek Natural Area	There are two pole sites within the natural area; however, they are not near areas used for recreation, and recreation would not be affected. Access to the May Creek Trail where it crosses the corridor may be restricted while the wires are strung. Vegetation may be temporarily cleared to facilitate construction.	Less-than-Significant
Lake Boren Park	There would be no construction work in or adjacent to Lake Boren Park.	No Impact
Renton Segment		
Sierra Heights Park	Access to the portion of the park along the existing corridor would be restricted during active construction. Each set of poles (3 pairs) would take 3 to 14 days to be replaced within a 2-month period. The trail is not on the corridor, and access to the trail would not be affected.	Less-than-Significant
Sierra Heights Elementary School	The easement crosses the northwest corner of the school. The school sports fields are separated from the easement by a forested area. Construction activities are unlikely to be visible from the sports fields and would not affect recreation opportunities and uses.	No Impact
May Creek Greenway	There would be no construction work in or adjacent to the May Creek Greenway.	No Impact

Recreation Sites	Short-term Effect	Impact
Honey Creek Open Space	There is one pole site (two H-frame structures would be replaced with two poles) within the park, on the south side of Honey Creek. Access to the Honey Creek Trail, which crosses the corridor, may be closed during active construction. The poles would take 3 to 14 days to be replaced within a 2-month period. Vegetation may be temporarily cleared to facilitate construction.	Less-than-Significant
Cedar River Greenway System: Riverview Park, Cedar River Natural Zone, Cedar River Trail	During active construction, access would be limited in the portion of the system within the existing corridor. It would take 3 to 14 days to replace the poles within a 2-month period. The Cedar River Trail, south of the Cedar River, crosses the existing corridor near a pole site, and the trail may be closed while poles are replaced at that site. Vegetation may also be temporarily cleared to facilitate construction. Riverview Park and the Cedar River Trail are in the valley bottom would not be affected by construction activities.	Less-than-Significant

5.6.3 Mitigation Measures

Required and potential mitigation measures described in Section 4.6.6 have the potential to mitigate construction-related impacts. However, the following construction-specific mitigation measures would also be required or could be imposed to reduce construction impacts to recreational resources. Construction-specific mitigation measures were identified based on discussion with the Partner Cities. Mitigation measures specified during the permitting process, such as use of construction BMPs, would be required, whereas measures suggested by the City of Bellevue or based on comprehensive plan policies would be at the discretion of the applicant to adopt or the local jurisdictions to impose as a condition of project approval.

5.6.3.1 Regulatory Requirements

The following measure is required.

During Construction

- Use BMPs to minimize noise, dust, and other disturbances to visitors to recreation sites during construction, as well as in areas used for informal recreation (e.g., along roads).

5.6.3.2 Potential Mitigation Measures

Prior to Construction

- Coordinate with potentially affected park districts/departments.
- Provide alternative access points to recreation sites and trail detours.
- Avoid construction during months when recreation sites are busier, when possible.
- Avoid vegetation clearing for construction activities where possible.
- Avoid replacing poles at Rose Hill Middle School and Tyee Middle School while school is in session.

DSD 005768

- Notify local jurisdictions, schools, or private owners (including the Somerset Recreation Club), 60 days in advance of work within recreation sites.
- Notify the public of any temporary closure of trails or recreations sites 2 weeks in advance.
- Provide signage along trails or park entrances at least 1 week prior to closures.

Post Construction

- Restore recreation sites or trails after construction.

5.7 HISTORIC AND CULTURAL RESOURCES

5.7.1 PSE's Proposed Alignment: New Substation and 230 kV Transmission Lines

5.7.1.1 Archaeological Resources (belowground)

Construction impacts to archaeological resources would be an irreversible and permanent impact as these resources are non-renewable, and any impact to the depositional integrity (i.e., context) of a protected archaeological resource would be significant. Therefore, analysis of impacts to protected archaeological resources is addressed as a permanent impact in Section 4.7.

5.7.1.2 Historic Resources (aboveground)

Construction impacts to historic resources would be temporary and could reduce a resource's historic register eligibility or reduce the ability of the resource to convey its historic significance. These impacts could be reversible or irreversible. Reversible impacts would be less-than-significant.

Irreversible impacts would be permanent. As such, these impacts are addressed in Section 4.7. Permanent impacts could occur during construction if increased vibration levels result in structural damage to a significant historic resource. The necessary level of vibration to result in structural damage would be above the standard threshold limits defined in the Federal Transit Administration's Noise and Vibration Impact Assessment (FTA, 2006). The project does not propose work that would result in this level of vibration. Permanent impacts could result from the placement of a new pole within the viewshed of a significant historic resource, demolition of a significant historic resource, or irreversible alterations to contributing resources within a historic district. It is probable that these impacts could be mitigated and therefore are not considered significant.

- **Less-than-Significant**–Less-than-significant construction impacts are defined in this analysis as those that are temporary, reversible, and that do not impact the significant historic resource's historic register eligibility or ability to convey its historic significance. Less-than-significant impacts could temporarily alter a resource's integrity of setting, feeling, or place, but it is probable that these impacts could be mitigated through BMPs that would reduce levels of dust, vibration, and noise.
- **Significant**–Significant construction impacts are defined in this analysis as those that are irreversible and permanent. Because these would result in permanent impacts, analysis is addressed in Section 4.7.

5.8 ENVIRONMENTAL HEALTH - ELECTRIC AND MAGNETIC FIELDS

Electric and magnetic fields (EMF) associated with construction are described in more detail in Chapter 8 of the Phase 1 Draft EIS. As described in that document, although small motors in construction equipment generate some level of magnetic fields, these fields are very small and would be indistinguishable from background levels for the public outside of the construction site. Workers within the construction site would experience magnetic fields from this equipment as they would from working on any similar construction site (these fields would be at lower levels than those investigated as potentially causing health impacts). Therefore, any increase in magnetic fields during construction would be minor and are not described in further detail in this chapter.

5.9 ENVIRONMENTAL HEALTH – PIPELINE SAFETY

5.9.1 Risks During Construction

During construction, the Olympic Pipelines would be exposed to an increased risk of damage by construction activities (e.g., outside force/excavation), which includes both excavation activities and potential for pipelines to be overstressed by *surcharge loading* from construction equipment. This section addresses the potential pipeline safety risks associated with construction within PSE's Proposed Alignment. Risks during construction were assessed in the Phase 2 Draft EIS by EDM Services using the risk assessment methodology described in Section 3.9.5.1 (and described further in Appendix I-5 of the Phase 2 Draft EIS) to assess the temporary increase in potential risks of pipeline damage and pool or flash fires associated with project construction activities.

Methods for Assessing Risks During Construction

The *Pipeline Safety Technical Report* (EDM Services, 2017) estimated the increase in existing pipeline safety risk that would be present during construction. The analysis considers the following activities: excavation and surcharge loading. The report estimated the likelihood of unintentional pipeline releases or fires from these construction activities and identified actions that can mitigate the potential impacts and risks.

5.9.1.1 Significance Thresholds

As described in Chapter 4, thresholds for significance were established based on Partner Cities workshop discussions. For this analysis, project-related risks associated with construction are classified as being significant or less-than-significant as follows:

Less-than-Significant

- With implementation of mandatory safety standards, including Olympic general construction procedures, there would be no substantial increase in risk of a pipeline release or fire during construction that could result in public safety impacts or damage to property and environmental resources.

Significant

- Even with the implementation of mandatory safety standards, including Olympic general construction procedures, there would be a substantial increase in risk of a pipeline release or fire during construction that could result in public safety impacts or damage to property and environmental resources.

5.9.1.2 Risk Assessment Results

Because construction disturbance would be similar to that evaluated for the Phase 2 Draft EIS, the results of the risk assessment developed by EDM Services for the Phase 2 Draft EIS (as described in Section 3.9.5.1, *Methodology*) remain relevant for PSE's Proposed Alignment. Therefore, the detailed presentation of the risk assessment results is not included in the Final EIS but is incorporated by reference. No further evaluation of construction (short-term) impacts to pipeline safety was conducted for this Final EIS.

5.9.2 Risks During Construction: No Action Alternative

No risk assessment was conducted for existing risks during construction since there would be no construction activity under the No Action Alternative. Any change in risks related to ongoing pole replacement activities (an operational activity) is expected to be minimal. Therefore, the construction risks for the No Action Alternative would be the same as the operational risks for the No Action Alternative. See Section 4.9.5.3.

5.9.3 Risks During Construction: PSE's Proposed Alignment

This section summarizes the potential pipeline safety risks during construction. During construction, the possibility of pipeline damage could occur from excavation activities and/or *surcharge loading* from construction equipment. The consequences of those impacts on resources, in the unlikely event an incident occurs, are provided in Section 4.9.6. The *Pipeline Safety Technical Report* was used as a resource in this evaluation. See Appendix I-5 of the Phase 2 Draft EIS for additional detailed information included in this analysis. In the EIS, the pipeline owner and operator are collectively referred to simply as Olympic.

If a pipeline is encountered during excavation, the pipeline could be damaged and could result in an immediate or subsequent release that could place the public and/or workers at risk. PSE or the construction contractor would be required under state law to notify Olympic at least 48 hours prior to the start of any work to comply with the state's "one-call" locater service law. After Olympic is notified, PSE or the construction contractor would mark the ground where the facilities exist. As company practice, if a project is within 100 feet of the pipelines, Olympic's Damage Prevention Team will meet the construction crew on-site at the beginning of the project and weekly thereafter. If excavation has the potential to be within 10 feet of the pipelines, the Damage Prevention Team would be on-site at all times to monitor excavation. These procedures are designed to ensure that excavation would not damage any underground utilities and to decrease potential safety hazards (see Section 5.9.4, *Mitigation*). Therefore, unintentional damage to the pipelines from project-related construction would be unlikely.

Surcharge Loading

The presence of equipment and other loads on the soil surface (surcharge loads) can place stress on the underlying substructures, including pipelines. These stresses can over-stress the pipe, causing damage.

Vibrations from the operation of equipment to excavate for the poles could also be a potential construction impact. PSE would work with Olympic to confirm that potential vibration associated with proposed excavation methods for pole installation, which include the use of vacuum trucks and auger drills, would avoid damaging the pipelines.

The presence of equipment and other loads on the soil surface (surcharge loads) can place stress on the underlying substructures, including pipelines. These stresses can over-stress the pipe, causing damage. During construction, surcharge loads would be imposed over the existing Olympic Pipeline system from heavy equipment, crane mats, and other loads that could be placed on the ground above the pipelines. PSE would coordinate with Olympic during project design to identify site-specific surcharge load requirements and needed mitigation measures to reduce or distribute the loads (see Section 5.9.4, *Mitigation*). Therefore, when measures are implemented, pipeline damage caused by surcharge loads would be unlikely. Site-specific coordination will also address construction at the Richards Creek substation site, where the existing pipeline is near or crosses the planned locations of an underground vault, the realigned access road, and the footprint of the substation facility, where site grading will occur (see Figure 2-2).

Construction of the pole foundations has the potential to encounter underground boulders that could place additional stress on an adjacent pipeline. Section 5.9.4, *Mitigation Measures*, includes excavation techniques that PSE would use to address this potential. Using the excavation techniques specified, lateral forces on the pipelines from a "rolled" boulder are not anticipated.

As described in Section 4.9.3, "outside force/excavation" caused 20 percent of the refined petroleum product releases (nationally) from January 2010 through December 2015. In many cases, damage from outside/force excavation occurs because a contractor or other third-party fails to notify the *utility locator service*, or the utility improperly locates the buried pipeline. With PSE's awareness of the pipelines within the corridor, Washington State's Damage Prevention Law and "one-call" locator service, and Olympic's procedures to prevent third-party damage described in Section 5.9.4, the increased risk posed to the pipelines during construction of the Energize Eastside project is relatively low.

Despite procedures in place to prevent third-party damage, the estimates for individual and societal risk incident frequencies were developed using worst-case assumptions about the potential increase in risk during construction. The assessment assumed that the potential for third-party damage during construction would increase by 50 percent (EDM Services, 2017), a conservatively high assumption. Because the probability of damage to the pipelines during construction is so low to begin with, even with these assumptions, the results indicate that there would still be a very small increase in total risk. With the implementation of measures to mitigate potential excavation and surcharge loading risks described in Section 5.9.4, these risks would likely be even lower.

Based on the results of the risk assessment presented in Section 3.9.5.2 of the Phase 2 Draft EIS, there could be an increased risk of a pipeline release and fire during construction when compared with the No Action Alternative (see Section 5.9.1.2). Based on the results, and in consideration of project safeguards, the probability of a pipeline release and fire remains low under PSE's Proposed Alignment. However, the potential environmental health and safety impacts are significant if this unlikely event were to occur.

The individual and societal risks described in Section 3.9.5.2 of the Phase 2 Draft EIS would be similar across all segments of PSE's Proposed Alignment. There would be reduced risk in segments where fewer miles of the transmission line are co-located with the Olympic Pipeline system. The Renton Segment has the lowest number of co-located miles. See Table 4.9-2 for the length of the Olympic Pipeline system (both the 20-inch and 16-inch diameter pipelines) co-located with the PSE transmission lines by segment.

With the implementation of additional measures to mitigate potential excavation and surcharge loading risks, the construction risks could be even lower (see Section 5.9.4, *Mitigation Measures*). Even with worst-case assumptions related to the increased risk during construction, the likelihood of a pipeline release and fire would remain low, and no substantial change in risk compared to the existing condition (No Action Alternative) has been identified. As a result, the potential risk is not considered significant.

For additional details about the analysis of construction risks under PSE's Proposed Alignment, see the *Pipeline Safety Technical Report* (Appendix I-5 of the Phase 2 Draft EIS).

5.9.4 Mitigation Measures

The following construction-specific mitigation measures would be required or could be imposed to reduce the potential for environmental health and safety impacts related to pipeline safety. Construction-specific mitigation measures were identified based on a review of regulations, construction BMPs, and construction requirements for work in the corridor, all of which would be required. Additional mitigation measures are proposed to further reduce the potential for construction-related environmental health and safety impacts related to pipeline safety. Some of the required and potential mitigation measures listed in Section 4.9.8 (such as integrating the results and recommendations of the *AC Interference Study* [DNV GL, 2016] where applicable to the design of pole locations and layout) also have the potential to mitigate construction-related impacts.

As the pipeline operator, Olympic is responsible for operating and maintaining its pipelines in accordance with or to exceed PHMSA's Minimum Federal Safety Standards in 49 CFR 195. The regulations are intended to adequately protect the public and to prevent pipeline accidents and failures. As a result of potential hazards and in compliance with these federal requirements, Olympic has a general list of requirements as part of *BP Pipelines (North America) General Construction Requirements* for all work proposed near the pipeline (see Appendix I-2). These requirements have been shared with PSE.

> **PSE/Olympic Coordination**
>
> PSE is responsible for the Energize Eastside project's design, construction, and operational parameters within the shared corridor with Olympic. Olympic and PSE have worked together in the corridor for 40 years, and communicate regularly to coordinate activities related to standard pole replacement and other maintenance work. As part of the project development process for the Energize Eastside project, PSE has and will continue to coordinate with Olympic on specific issues/actions, including construction.

As part of ongoing coordination between PSE and Olympic, additional mitigation measures may be identified during final design. Appendix I-4 includes a "frequently asked questions" sheet, summarizing steps that PSE and Olympic will take during construction for corridor safety.

5.9.4.1 Regulatory Requirements

PSE construction activities within all segments would need to comply with applicable federal, state, and local damage prevention laws, regulations, and requirements, and Olympic's general construction requirements for work near its pipelines, including the following measures:

- Develop construction and access plans in coordination with Olympic's Damage Prevention Team and mutually agreed upon by both parties. These plans will outline the specific actions that PSE will take to protect the pipelines from vehicle and equipment surcharge loads, excavation, and other activities in consideration of Olympic's general construction requirements and in consultation with Olympic on the Energize Eastside project design specifically. The following general measures, at a minimum, would be included in the construction and access plans:
    - Notify "one-call" 811 utility locater service at least 48 hours prior to PSE or PSE designated contractors conducting excavation work. (Olympic's line marking personnel would then mark the location of the pipelines near the construction areas. These procedures are designed to ensure that excavation would not damage any underground utilities and to decrease potential safety hazards.)

- Field verify the distance between the pipelines and transmission line pole grounds.
- Add the pipeline location and depth to project plans and drawings and submit to Olympic for evaluation.
- Arrange for Olympic representatives to be on-site to monitor construction activities near the pipelines.
- Install temporary fencing or other markers around the pipeline area.
- Provide all necessary information for Olympic to perform pipe stress calculations for equipment crossings and surface loads (surcharge loads). Based on pipe stress calculations, and in coordination with Olympic, provide additional cover that may include installing timber mats, steel plating, or temporary air bridging; utilize a combination of these; or avoid crossing in certain identified areas in order to avoid impacts on Olympic pipelines. Ensure that mitigation to address potential surcharge load impacts is implemented in accordance with applicable requirements and recommended practices, including the following:
  - 49 CFR 195, Transportation of Hazardous Liquid by Pipeline.
  - American Petroleum Institute Recommended Practice 1102, Steel Pipelines Crossing Railroads and Highways.
  - American Lifelines Alliance, Guidelines for the Design of Buried Steel Pipe.
- Comply with additional measures related to minimizing surcharge loads included in Olympic's general construction requirements (Appendix I-2).

- As part of Olympic's general construction requirements for all work proposed near the pipelines (see Appendix I-2), comply with other applicable requirements, including the following:
  - No excavation or construction activity will be permitted in the vicinity of a pipeline until appropriate communications have been made with Olympic's field operations and its Right-of-Way Department. A formal engineering assessment (conducted by Olympic) may be required.
  - No excavation or backfilling within the pipeline right-of-way will be permitted for any reason without a representative of Olympic on-site giving permission.
  - In some instances, excavation and other construction activities around certain pipelines can be conducted safely only when the pipeline operating pressure has been reduced. PSE must inform its designated contractors that excavation that exposes or significantly reduces the cover over a pipeline may have to be delayed until the reduced operating pressures are achieved.
  - For a project within 100 feet of the pipelines, Olympic's Damage Prevention Team will meet the construction crew on-site at the beginning of the project and weekly thereafter. If excavation has the potential to be within 10 feet of the pipelines, the Damage Prevention Team would be on-site at all times to monitor excavation.

5.9.4.2 Proposed Mitigation Measures

Potential mitigation measures are summarized below based on recommendations of EDM Services (2017), measures PSE has indicated it will use, and measures the EIS Consultant Team has proposed to provide additional safety assurances.

Prior to Construction

- Prior to permit issuance of the Energize Eastside project, prepare a preliminary plan detailing measures PSE will require of its contractor to protect the pipeline during construction.
- Prior to construction of the Energize Eastside project, file a mitigation and monitoring report with the Partner Cities documenting consultations with Olympic and mitigation measures to address safety-related issues. The report should include a monitoring plan that identifies how mitigation measures will be monitored to ensure that mitigation related to construction activities is followed.
- Require that a geotechnical engineer review final plans and indicate in their report measures necessary to ensure that construction activity will not increase the risk of landslides that could damage the Olympic Pipeline system.
- Coordinate with Olympic and include safeguards in the project construction and access plans to protect nearby pipelines from excavation activities and surcharge loads.
- Develop an adjacent use protection plan near sensitive land uses to identify appropriately sized construction zones to protect the general public, construction timing limits, and other mitigation measures that would effectively limit the exposure of the general public to potential pipeline incidents.
- Coordinate with school districts to identify the most appropriate time for construction to occur near schools that would minimize exposure to students or others in the school facility.

Pipeline Location

To identify appropriate measures to mitigate potential surcharge load impacts on the existing pipelines to safe limits, Olympic would locate the existing pipeline using a variety of methods, which may include electronic pipe locators, probing, and soft digging methods. Once the pipeline is located and identified, Olympic would perform pipe stress calculations for equipment crossings and surface loads, in coordination with PSE.

During Construction

- To address the potential to encounter boulders, use vacuum truck/equipment (or hand digging in difficult to access areas) to dig past the depth of the pipelines before auguring type equipment is utilized.
- Coordinate with Olympic to ensure that line marking personnel mark the entire length of any pipeline within 50 feet of any excavation or ground disturbance below original grade, and not only the location of angle points (points of intersection).
- Use soft dig methods (e.g., hand excavation, vacuum excavation, etc.) whenever the pipeline(s) are within 25 feet of any proposed excavation or ground disturbance below original grade.
- Coordinate with Olympic to ensure that an Olympic employee, trained in the observation of excavations and pipeline locating, is on-site at all times during excavation and other ground-

disturbing activities that occur within 100 feet of the pipelines where the pipelines are co-located with the proposed transmission lines.

- Arrange for a special monitor (third-party monitor) on-site at all times during excavation and other ground-disturbing activities that occur within 100 feet of the pipelines where the pipelines are co-located with the proposed transmission lines.
- Where excavations will be within 10 to 20 feet of the Olympic Pipeline system, temporary casing in the upper 10 to 15 feet should be considered to reduce the risk of sloughing under the pipeline.
- Steel plates or mats should be placed over the pipelines to distribute vehicle loads where construction equipment needs to cross over the pipelines.
- Utility settlement monitoring points, similar to those described below and recommended by PSE's geotechnical engineer, should be established on the Olympic Pipeline system where drilled shafts will be within 15 feet, if requested by Olympic, to monitor settlement during installation of the drilled shafts. Settlement monitoring points should be installed so that base-line readings of the settlement monitoring points may be completed prior to the contractor mobilizing to the site. Monitoring should continue during construction on a daily basis and twice a week in the 3 weeks following construction. The monitoring readings should be reviewed by the Engineer on a daily basis. If measured settlement exceeds 1 inch, or the amount specified by the utility owner, the integrity of the utility should be tested and the contractor should be required to repair any damage to the utilities as a result of construction.

5.10 ECONOMICS

The economic aspects of the project that are evaluated in this Final EIS do not relate to construction impacts; no further detail is provided in this chapter.

5.11 EARTH

Construction impacts on earth resources are addressed in the Phase 1 Draft EIS (see Section 3.6), which included analysis of erosion hazards, slope instability and landslide hazards, seismic hazards, construction-induced vibrations, and hazards associated with the Olympic Pipeline system. As documented in the Phase 1 Draft EIS (see Section 3.6), implementation of construction BMPs as required by local codes would ensure that impacts are minor and not significant. This includes having a geotechnical engineer review plans and make recommendations to avoid increasing the risk of destabilizing landslide-prone slopes or increasing soil erosion, and implementing those recommendations during construction.

Although the Phase 2 Draft EIS did not include an analysis of earth resources, comments received on the Draft EIS led to the inclusion of additional information on seismic and associated landslide hazards in the Final EIS. Those risks are primarily associated with operation of the project, and are therefore addressed in Section 4.11. Construction is not expected to increase any seismic-related risks associated with the project.

For detailed information on construction hazards associated with the Olympic Pipeline system, see Section 4.9 and 5.9 (*Pipeline Safety*) of the Final EIS.

Construction (short-term) effects on earth resources are not addressed further in this Final EIS subsection. Appendix M compiles all mitigation measures as identified in the Phase 1 Draft EIS, Phase 2 Draft EIS, and Final EIS.

6

Summary of Comments and Responses

energize EASTSIDE EIS

CHAPTER 6. SUMMARY OF COMMENTS AND RESPONSES

This chapter summarizes comments and responses provided on both the Phase 1 Draft EIS and the Phase 2 Draft EIS for the Energize Eastside project. Appendix J provides a complete set of responses to comments on the Phase 1 Draft EIS, and Appendix K provides a complete set of responses to comments on the Phase 2 Draft EIS.

The Phase 1 Draft EIS was programmatic in nature and not required under SEPA (see Section 1.4 and Chapter 2, page 2-2, of this Final EIS for more detail). Therefore, responses to comments during Phase 1 were prepared as the comment-response narrative summary in Appendix J-1. Although a separate response was not prepared for each individual comment, the EIS Consultant Team made a significant effort to capture all substantive issues raised in the comments, and prepared the summary responses in the narrative to address those concerns. The Phase 1 Draft EIS comment response narrative is intended to provide a logical flow and understanding of the issues associated with this project. Comments were grouped into major topics and identified “key themes.” Following the narrative summary in Appendix J-1, all comment letters received on the Phase 1 Draft EIS are reproduced in full in Appendix J-2, with cross-references provided to the corresponding key theme that summarizes the associated response in the summary narrative.

Because the Phase 2 Draft EIS focused on a specific project proposed by PSE, responses to Phase 2 comments are presented in Appendix K for each individual comment received, rather than using a narrative summary. The comment letters are reproduced in full in Appendix K, with the responses presented next to the identified comments.

Source of Comments Received on the Phase 1 Draft EIS

Comments on the Phase 1 Draft EIS were received in the form of website forms, emails, oral testimony, and letters, many of which included attachments. Most of these comments were provided by email and oral testimony (Figure 6-1).

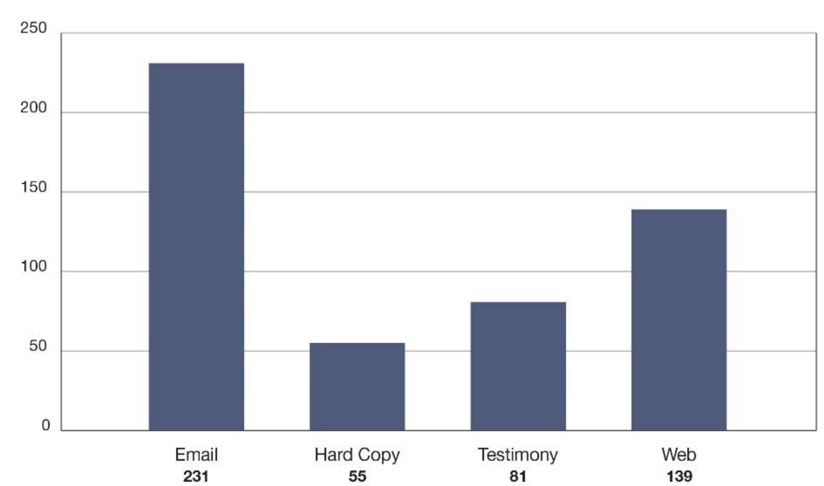


Figure 6-1. Comment by Type, Phase 1

Comments were submitted by 1,068 individuals. Individuals who provided their names on a petition that was submitted as a single attachment to one comment letter are included in this count. Of these, 456 signatories added individual comments to the petition. Of the 1,068 individual

DSD 005782

commenters, some submitted multiple website forms and/or spoke at more than one meeting, and are only counted once in this total. Some individuals submitted duplicate forms, emails, and letters.

Comments were received from 26 different organizations (e.g., homeowner associations), six public agencies, and the Muckleshoot Tribe. A comment received from an organization, the Coalition of Eastside Neighborhoods for Sensible Energy (CENSE), referenced 50 comment letters included as an attachment.

Source of Comments Received on the Phase 2 Draft EIS

Comments on the Phase 2 Draft EIS were received in the form of website forms, emails, oral testimony, and letters, many of which included attachments. Most of these comments were provided by email and oral testimony (Figure 6-2).

Comments were submitted by 173 individuals. Some of these individuals submitted multiple website forms and/or spoke at more than one meeting, and are only counted once in this total. Some individuals submitted duplicate forms, emails, and letters.

Comments were received from 21 different organizations (e.g., homeowner associations), two public agencies, and one Tribe.

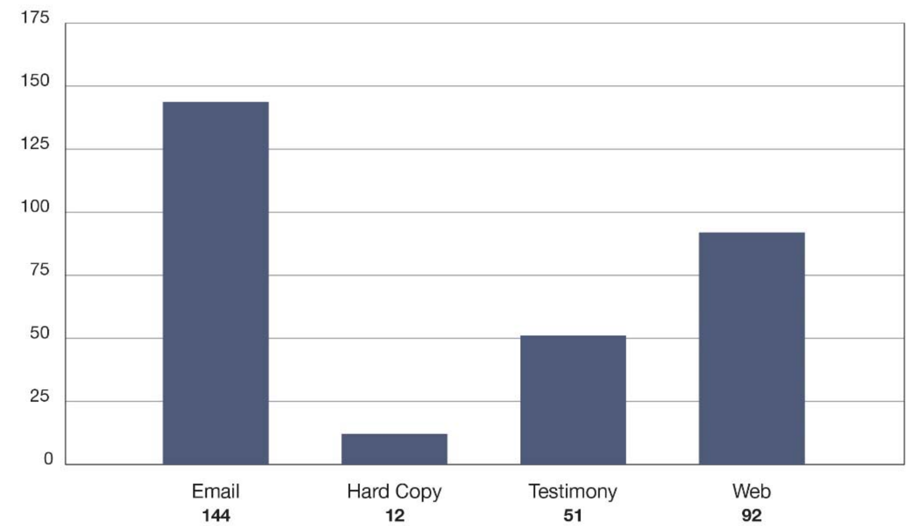


Figure 6-2. Comment by Type, Phase 2

Topics, Issues, and Themes Raised in Comments during Phase 1 and Phase 2

Comments received at both stages followed similar topics and themes. The following summary in Chapter 6 lists those topics and the general themes raised within them. It also summarizes how the comments received were taken into account in preparing the Final EIS. Any errors in the analysis identified in either Draft EIS are corrected in the Final EIS; see Chapter 3, *Errata*, in this Final EIS. The intent of this summary is to provide the reader a "road map" for how the comments were responded to and addressed; the more detailed responses are captured in Appendix J, Appendix K, the Errata, and revisions to the Final EIS, based on comments received.

6.1 SEPA AND EIS PROCESS

Comment Theme	Response
Objectivity and overall adequacy of the Phase 1 Draft EIS	The Partner Cities have taken steps to ensure the EIS analysis is independent and objective. The EIS includes an appropriate level of analysis of all potentially significant impacts identified during scoping. See Key Theme EIS-1 in Appendix J-1.
SEPA process, including phased EIS and opportunities for meaningful public input	The Partner Cities acknowledge the document is long, and the public process has also been long. However, SEPA provides flexibility by allowing a phased EIS process and other provisions, to address complex issues such as those posed by the Energize Eastside project. See Key Theme EIS-2 in Appendix J-1. No change in Final EIS.
Completeness of the Phase 1 Draft EIS scope	Concerns about the level of detail provided in the Phase 1 Draft EIS are addressed through the project-level analyses in both the Phase 2 Draft EIS and the Final EIS. The scope of the economics analysis is at the discretion of the Lead Agency under SEPA; in this case, the Partner Cities elected not to include all of the economic information requested in the scoping process and public comment periods. See Key Theme EIS-3 in Appendix J-1.

6.2 PROJECT OBJECTIVES

Comment Theme	Response
Objectives of proposal (to address reliability issues or to increase capacity for other purposes)	The Phase 1 and Phase 2 Draft EISs evaluated PSE's proposal to construct 230 kV overhead transmission lines; the Lead Agency has limited authority under SEPA to question an applicant's motives and cannot use SEPA to alter the applicant's objectives. The EIS Consultant Team reviewed the planning model and found that PSE had used standard planning practices. The project is intended to address an anticipated future transmission capacity issue in the study area that could affect PSE's broader transmission system reliability. No change in Final EIS. See Key Theme OBJ-1 in Appendix J-1.
Disagreement with PSE's planning data and assumptions, and how they define project need	The EIS Consultant Team confirmed that the needs assessment was conducted in accordance with industry standards for utility planning. No change in Final EIS. See Key Theme OBJ-2 in Appendix J-1.
The Lauckhart/Schiffman Load Flow Study suggests that the project is not needed	PSE indicates that it has a responsibility for planning its system according to NERC, WECC, and ColumbiaGrid requirements. The Lauckhart/Schiffman Load Flow Study makes a number of assumptions that are not consistent with WECC and ColumbiaGrid model assumptions. Even using their assumptions, the City of Bellevue's independent analysis found that at least one transformer would exceed capacity. No change in Final EIS. See Key Theme OBJ-3 in Appendix J-1.
ColumbiaGrid	PSE alone is responsible for delivering power within PSE's service area and cannot depend on ColumbiaGrid to make up for the transmission shortfall in the Eastside. No change in the Final EIS. See Key Theme OBJ-4 in Appendix J-1.

6.3 ALTERNATIVES

Comment Theme	Response
Alternatives considered in the Draft EIS	The Phase 1 Draft EIS was a programmatic-level analysis, whereas the Phase 2 Draft EIS was a project-level analysis. The project-level Phase 2 Draft EIS includes a more specific and detailed review of alternatives based on the analysis of Phase 1. The Partner Cities are not obligated to consider every conceivable scenario, but rather present a reasonable range of alternatives, per SEPA rules. No change in the Final EIS. See Key Theme ALT-1 in Appendix J-1.
Comparative summary of impacts	Lead Agencies are granted leeway in how they choose to present and format information on the comparative impacts of the alternatives. An error in Table 1-3 of the Phase 1 Draft EIS was corrected in the Errata section of the Final EIS. See Key Theme ALT-2 in Appendix J-1.

6.4 LAND USE AND HOUSING

Comment Theme	Response
Property condemnation	During the Phase 1 programmatic evaluation, project alignments were not definitively identified, and it was therefore not known whether property would need to be acquired for the project. For the Phase 2 Draft EIS, locations of the various project segments and options were identified, and no houses or businesses would be condemned or demolished under any of the segments or options analyzed. PSE's Proposed Alignment in the Final EIS would be entirely within the existing corridor and can be developed without need for displacement of houses or businesses. No change in the Final EIS. See Key Theme LU-1 in Appendix J-1.
Easement width required for safety	No houses or businesses would be condemned or demolished under any of the segments or options analyzed in the Phase 2 Draft EIS. The corridor would not need to be widened to accommodate the 230 kV transmission lines, and no new easements would be needed. No change in the Final EIS. See Key Theme LU-2 in Appendix J-1.
Essential public facility (EPF)	The proposed project will follow the conditional use, shoreline, and critical areas permit processes in the applicable jurisdictions. For the Final EIS, no Partner City has indicated that the project will go through the EPF permit process. This clarification is reflected in the analysis presented in the Final EIS. See Key Theme LU-3 in Appendix J-1.
Greater impacts in denser residential or natural areas	The Phase 1 Draft EIS addressed impacts to communities in the project area at a programmatic level, whereas specific alignments were chosen for the alternatives for the Phase 2 Draft EIS analysis, allowing an examination of impacts to the specific neighborhoods that would be crossed by the 230 kV transmission lines. PSE's Proposed Alignment in the Final EIS would be entirely within the existing corridor. Therefore, the land uses within this corridor would be the same as are currently identified. No changes in the Final EIS. See Key Theme LU-4 in Appendix J-1.

6.5 SCENIC VIEWS AND THE AESTHETIC ENVIRONMENT

Comment Theme	Response
Study area and key viewpoints	The study area for the Phase 1 Draft EIS was broad because it focused on a broad range of approaches rather than project-specific details. For the Phase 2 analysis, the project-specific analysis includes a GIS-analysis based on more detailed information. Roadways are considered to be viewpoints programmatically in the Phase 1 Draft EIS. Specific roadway corridors were evaluated in the Phase 2 Draft EIS, and key viewpoints were added. The Phase 1 Draft EIS lists public viewpoints provided at parks, trails, and public open spaces. For the Phase 2 Draft EIS, all recreation areas within the study area (parks, trails, outdoor recreation facilities) were assessed regardless of their ownership. Additional key viewpoints were simulated for the Final EIS. See Key Theme VR-1 in Appendix J-1.
Methodology	There is no adopted or widely recognized methodology for evaluating visual impacts of transmission lines in urban environments. The Phase 1 and Phase 2 Draft EIS visual impact assessment methodologies were based in part on the 2015 Federal Highway Administration guidance for evaluating highway projects and on guidance for evaluating wind farms. Viewer sensitivity was assigned based on a viewer's proximity to the project and their level of awareness. The Phase 2 analysis included a more refined methodology for viewer sensitivity than what was used in the Phase 1 analysis. Visual simulations are provided in the Phase 2 Draft EIS and the Final EIS. Potential significant adverse visual impacts were identified in the Phase 2 Draft EIS, and the Final EIS refines the analysis with additional maps and key viewpoints. See Key Theme VR-2 in Appendix J-1.
Vegetation clearing would reduce visual quality	Project-specific vegetation clearing is described and assessed in the Phase 2 Draft EIS, which includes the use of PSE’s existing 100-foot-wide Sammamish-Lakeside-Talbot Hill 115 kV corridor. Regulations for 230 kV transmission lines call for the removal of trees with a potential height of greater than 15 feet within the managed right-of-way, while 115 kV lines allow 25-foot trees within the managed right-of-way zone. Updated vegetation removal information is provided in the Phase 2 Draft EIS and in the Final EIS. No changes were made to the visual analysis in the Final EIS. See Key Theme VR-3 in Appendix J-1.
Project would be inconsistent with comprehensive plan policies	Updated vegetation removal information is provided in the Phase 2 Draft EIS and the Final EIS, and the resulting impacts to the aesthetic environment are also evaluated in greater detail. There is no overarching policy that states that vegetation removal is inconsistent with Eastside aesthetic values, although policies discouraging tree removal in certain areas are discussed in the Phase 2 Draft EIS. The Phase 2 Draft EIS did find some areas where the project would be inconsistent with policies protecting neighborhood character. In Newcastle, new policies were adopted after the Phase 1 Draft EIS was published and were included in the Phase 2 analysis. No changes in the Final EIS, except the addition of the Code Variance Option in Newcastle, which would reduce the visual impacts compared to the No Code Variance Option. See Key Theme VR-4 in Appendix J-1.

Comment Theme	Response
Condemning of homes and installation of a new transmission line would change the visual character of Eastside neighborhoods	The Phase 1 Draft EIS acknowledged that condemnation and removal of homes for a new corridor could have significant impacts on neighborhood character. For the Phase 2 Draft EIS alternatives and for PSE's Proposed Alignment in the Final EIS, no houses or businesses would be condemned or demolished. No changes in the Final EIS. See Key Theme VR-5 in Appendix J-1.
Light and glare	Aviation warning lights would not be required for this project. The EIS Consultant Team evaluated light and glare impacts associated with construction and operation of the project. No significant impacts were identified regarding light and glare. No changes in the Final EIS. See Key Theme VR-6 in Appendix J-1.
Mitigation	Additional details on potential mitigation are presented in the Phase 2 Draft EIS. The Final EIS shows that the Code Variance Option in Newcastle would have lesser visual impacts in the Olympic Ridge neighborhood than the No Code Variance Option. PSE has also committed to using a combined shield wire/communication line, which would reduce the total number of wires in the air. See Key Theme VR-7 in Appendix J-1.

6.6 WATER RESOURCES

Comment Theme	Response
Water resources not identified in the Phase 1 Draft (e.g., springs, streams, lakes, Coal Creek basin resources, etc.)	The Phase 1 Draft EIS provides a high-level, programmatic assessment of potential impacts to water resources within the combined study area. Comments on the Phase 1 Draft EIS were considered when developing the scope for the Phase 2 Draft EIS analysis. The Phase 2 Draft EIS provides a more thorough, project-level assessment of the potential impacts of PSE's proposal. The Phase 2 Draft EIS reports the results of geotechnical studies conducted along the existing corridor. No changes in the Final EIS. See Key Theme WTR-1 in Appendix J-1.
Stormwater management	A project-level assessment of potential impacts to water quality is provided in the Phase 2 Draft EIS. The amount of new impervious surface would be minimal. In addition, once installed, the new poles would not affect groundwater infiltration or shallow groundwater flow. For tree-removal impacts to stormwater, the Phase 2 Draft EIS found that impacts would be less-than-significant because PSE would comply with state and local stormwater permit requirements and would implement BMPs to control surface water runoff. In the Final EIS, PSE's Proposed Alignment would be constructed entirely within the existing corridor. The Final EIS states that approximately 60% of the poles for PSE's Proposed Alignment would be directly embedded, which requires a smaller impervious footprint than poles with concrete foundations. See Key Theme WTR-2 in Appendix J-1.
Groundwater pollution and diversion	If coal ash were present in the soil, it is unlikely that it would contaminate the groundwater because of requirements for preventing pollution during construction. Construction for pole installation would also require excavation for pole foundations or direct embedding, which could encounter shallow groundwater and could require dewatering. Because the area of excavation for each pole would be limited to approximately 8 feet in diameter, any dewatering would be minimal. No changes in the Final EIS. See Key Theme WTR-3 in Appendix J-1.

Comment Theme	Response
Construction-related impacts	It would not be necessary to reroute springs under any of the alternatives considered for this project. The implementation of BMPs, and compliance with local and state permit requirements, would be required to reduce potential water quality impacts, which is covered in both the Phase 1 and Phase 2 Draft EISs, as well as the Final EIS. Alternative 2 in the Phase 1 Draft EIS has a lower potential for construction impacts to water resources, but was determined not to be a feasible alternative and therefore was not carried forward for additional analysis in the Phase 2 Draft EIS or the Final EIS. No changes to the Final EIS. See Key Theme WTR-4 in Appendix J-1.
Water quality and permitting	Case-by-case analysis is required to confirm the applicability of Section 404 and Section 10 permit requirements to surface waters such as rivers, streams, ditches, lakes, ponds, territorial seas, and wetlands. During the permitting process, PSE would be required to demonstrate compliance with the NFIP BiOp, which includes showing that proposed development activities in a floodplain do not result in an adverse effect on listed species or habitat. No changes in the Final EIS. See Key Theme WTR-5 in Appendix J-1.
Tribal treaty rights	These comments relate specifically to Alternative 1, Option D as presented in the Phase 1 Draft EIS. That option, which would involve construction in Lake Washington where treaty rights would need to be taken into account, was not carried forward for additional analysis in Phase 2 or the Final EIS.

6.7 PLANTS AND ANIMALS

Comment Theme	Response
Habitat	The Phase 2 Draft EIS provides a project-level assessment of impacts to habitat associated with Coal Creek Park Natural Area within 0.5 mile of the project alignment, and notes that Coal Creek supports Chinook salmon and steelhead. The potential presence of amphibians and reptiles in the combined study area has been added to the Errata. PSE's existing corridor provides habitat and migration corridors for area wildlife, as well as specific critical habitat areas. Specific impacts to hedgerows were not assessed; however, vegetation removal within the right-of-way is covered. There is no evidence that animals avoid high voltage lines in urban areas beyond what would occur as a result of human presence and vegetation clearing. See Key Theme P&A-1 in Appendix J-1.
Tree removal/vegetation clearing	The Phase 1 Draft EIS examined the worst-case scenario for new overhead transmission lines, which assumed that a new corridor for a 230 kV line would be 120 to 150 feet wide. The 40% existing tree canopy coverage cited in the Phase 1 Draft EIS was based on the average tree coverage mapped in the project area jurisdictions, based on the best available information. Updated vegetation removal information, including a more detailed discussion of the managed right-of-way, is provided in the Phase 2 Draft EIS and in the Final EIS. The Phase 2 Draft EIS assessment did not estimate the amount of noise attenuation lost as a result of tree removal because dense forested vegetation must be greater than 60 feet in depth to have a noticeable effect. Tree removal and mitigation will be evaluated as part of the permitting process. Note that the corridor width as evaluated in the Phase 2 Draft EIS and Final EIS is 100 feet. See Key Theme P&A-2 in Appendix J-1.
Fish and wildlife	Larger wire sizes for the 230 kV transmission lines would be more visible to flying species, resulting in increased avoidance behavior, which is expected to reduce direct impacts from collision or potential air quality changes resulting from ionization of pollutant particles by the corona discharge. EMF impacts to wildlife species are generally unknown or inconclusive. Discussion of EMF impacts is included in the Phase 2 Draft EIS and expanded in the Final EIS. Noise impacts from the corona discharge were found to be negligible, although noise impacts from peak generators were moderate to significant. The effects of power lines on wildlife species are highly variable and limited information is available. Western big-eared bat, Keen's myotis, long-legged myotis, and long-eared myotis have been added to the Bellevue list in the Final EIS (See Errata, Chapter 3). See Key Theme P&A-3 in Appendix J-1.
Impacts to birds	The Phase 2 Draft EIS states that the project would reduce the electrocution and collision rates for avian species due to the increased separation between conductors and larger, more visible conductors. Eagle nest locations were considered during development of the Phase 2 Draft EIS. No changes in the Final EIS. See Key Theme P&A-4 in Appendix J-1.
Mitigation	The Phase 1 Draft EIS states that impacts on vegetation and habitat would be mitigated through site and facility design to minimize the need for vegetation and tree removal to the extent feasible. The Phase 2 Draft EIS also includes a mitigation measure to increase pole heights to allow greater separation between poles so that some poles can be moved out of critical areas or associated buffers. The Final EIS takes into account the more fully developed design, including refined pole locations. See Key Theme P&A-5 in Appendix J-1.

6.8 GREENHOUSE GASES

Comment Theme	Response
Phase 1 Draft EIS scope, analysis, mitigation, and conclusions	Alternative-specific mitigation measures are listed in the Phase 2 Draft EIS. Mitigation is not limited to the measures listed in the EIS, and additional mitigation could be required. Alternatives 2 and 3 were not carried forward for analysis in the Phase 2 Draft EIS. Given the relatively small level of emissions from a worst-case assumption regarding project emissions for concrete foundations, it was concluded that the project would not result in significant emissions from manufacturing construction materials. More project-specific estimates were included in the Phase 2 Draft EIS analysis. No changes in the Final EIS. See Key Theme GHG-1 in Appendix J-1.
Tree clearing analysis and GHG effects	An updated vegetation removal assessment, including a more detailed discussion of the tree inventory assessment, is provided in the Phase 2 Draft EIS and the Final EIS. See Key Theme GHG-2 in Appendix J-1.
Sustainable utilities and climate change	Whether or not a utility should be required to purchase or implement carbon offsets or its willingness to adopt new technologies to reduce fossil fuel use is beyond the scope of this EIS analysis. Information and analysis on impacts of coal-based generation are not included because they are outside the scope of the EIS analysis. No changes in the Final EIS. See Key Theme GHG-3 in Appendix J-1.
Need for air quality analysis under SEPA	Construction of a new power plant, such as a peak generation facility, was not carried forward as an alternative in the Phase 2 Draft EIS analysis. The project is not being constructed to increase power production; therefore, impacts associated with increased power production, such as mercury emissions and other air pollutants from existing power sources, were not evaluated as part of this EIS process. No changes in the Final EIS. See Key Theme GHG-4 in Appendix J-1.

6.9 RECREATION

Comment Theme	Response
Trails in utility corridors	Improvements to recreational resources, including trails, can be identified as permit conditions by the appropriate municipality, where an adverse impact has been identified. There is a potential for permanent impacts to recreation within the existing transmission corridors if vegetation removal results in a permanent conversion of vegetation type. The Phase 2 Draft EIS found that within the existing corridor, impacts to recreation would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. No changes in the Final EIS. See Key Theme REC-1 in Appendix J-1.
Birding as a recreation activity	Potential impacts to wildlife, including birds, are discussed in the Phase 1 and Phase 2 Draft EISs. The Phase 2 Draft EIS did not evaluate the Cross Kirkland Trail because the alignment route and options did not extend into the City of Kirkland. Potential impacts to the Eastside Rail Corridor were evaluated in the Phase 2 Draft EIS. No changes in the Final EIS. See Key Theme REC-2 in Appendix J-1.
Permanent loss of recreation sites	For the Final EIS, PSE's Proposed Alignment would occur within its existing right-of-way and would not require new easements or property acquisition. Safety issues, as they relate to recreation resources, are described in the Phase 2 Draft EIS. Mitigation measures in the Phase 1 Draft EIS were in keeping with the programmatic nature of the document, and mitigation measures proposed were high-level in nature. The Phase 2 Draft EIS provides more specific mitigation strategies. No changes in the Final EIS. See Key Theme REC-3 in Appendix J-1.
Cumulative impacts	Cumulative impacts are described in the Phase 2 Draft EIS and Final EIS. No changes in the Final EIS. See Key Theme REC-4 in Appendix J-1.

6.10 CULTURAL AND HISTORIC RESOURCES

Comment Theme	Response
Interpretation of impacts	The potential for ground disturbance and associated impacts under the No Action Alternative is addressed in the Phase 2 Draft EIS. The Eastside Transmission System has been recommended eligible for listing on the National Register of Historic Places, and PSE is conducting further evaluation of the resource and consulting with DAHP to obtain an eligibility determination for the system as part of a historic property inventory field assessment. If the Eastside Transmission System is determined eligible by DAHP for listing in the NRHP, pole replacement could be a significant impact, but it is possible that the impacts could be mitigated. Noise and vibration are addressed in the Historic and Cultural Resources chapter of the Phase 1 Draft EIS. Implementation of the No Action Alternative could have minor to moderate impacts to aboveground historic properties, primarily from the installation of components associated with energy conservation measures. No changes in the Final EIS. See Key Theme H&C-1 in Appendix J-1.
Analytical process	The Phase 2 Draft EIS addresses the analysis of individual properties. PSE has begun conducting site-specific historic property and archaeological studies for the resources identified in the EIS, and has committed to completing the analysis prior to construction so that impacts can be avoided or mitigated. No changes in the Final EIS. See Key Theme H&C-2 in Appendix J-1.
Existing and proposed cultural resources	The Phase 2 Draft EIS describes the Newcastle Cemetery, noting its historic significance, and the Somerset neighborhood, and describes potential mitigation measures. PSE will request a determination from DAHP regarding the cemetery's eligibility for inclusion on the National Register of Historic Places. Analysis of components associated with peak generation plants and energy efficiency (as presented in the Phase 1 Draft EIS) was not included in the Phase 2 Draft EIS because these project elements are no longer under consideration. No changes in the Final EIS. See Key Theme H&C-3 in Appendix J-1.

6.11 ENVIRONMENTAL HEALTH– ELECTRIC AND MAGNETIC FIELDS (EMF)

Comment Theme	Response
Potential health effects from electric and magnetic fields	Extensive health studies have not found a causal link between adverse health effects and EMF from electrical transmission lines. An analysis of the potential health impacts is included in the Phase 1 Draft EIS due to public concerns raised during scoping. Dr. Asher Sheppard, a consultant with the EIS Consultant Team who has a scientific background in evaluating human health effects from electrical transmission lines, reviewed the additional citations to research as provided by commenters to determine whether the findings presented by the cited studies would change the conclusions provided in the Phase 1 Draft EIS. Dr. Sheppard's findings are summarized in the Final EIS. See Key Theme EMF-1 in Appendix J-1.
Potential health effects from corona ions	Available studies and research, including those in Section 8.3.6 of the Phase 1 Draft EIS, are considered inconclusive and do not suggest a probable health impact associated with corona ionization, either during the construction or the operation of PSE's proposed project. Dr. Sheppard reviewed the other studies cited by commenters. Dr. Sheppard's findings are summarized in the Final EIS. See Key Theme EMF-2 in Appendix J-1.
Populations particularly susceptible to electric and magnetic fields	Exposure to magnetic fields in homes, schools, parks, and daycare facilities is acknowledged in the Phase 2 Draft EIS. The calculated magnetic field levels would be well below the lowest reference guideline, even assuming 24-hour exposure. No changes in the Final EIS. See Key Theme EMF-3 in Appendix J-1.
Potential for increase in magnetic fields	The magnetic field levels associated with the project are anticipated to be lower than existing field levels along the existing transmission line corridor. No changes in the Final EIS. See Key Theme EMF-4 in Appendix J-1.

6.12 ENVIRONMENTAL HEALTH – PIPELINE SAFETY

Comment Theme	Response
Risk of catastrophic explosions and leaks caused by construction	The risks of accidents in the pipeline corridor is acknowledged in the Phase 1 Draft EIS, and more fully discussed in the Phase 2 Draft EIS. Most accidents are caused by a failure to properly locate the underground utility during construction. In the case of the corridor shared by PSE's transmission line and the Olympic Pipeline system, PSE and Olympic have worked together in the corridor for 40 years, and communicate regularly to coordinate activities related to pole replacement and other maintenance work. Risk assessment completed for the Phase 2 Draft EIS indicate that there would be a very small increase in total risk during construction. The risk to the Olympic Pipeline system due to vibrations from construction equipment is addressed in the Phase 2 Draft EIS. Regarding mitigation, PSE will follow protocols established by the pipeline operator during construction. No changes in the Final EIS. See Key Theme PLS-1 in Appendix J-1.

Comment Theme	Response
Risk of catastrophic explosions, fires, or leaks caused by natural forces, such as earthquakes, windstorms, and lightning	Operational risks related to natural forces were broadly analyzed in the Phase 1 Draft EIS. The Phase 1 Draft EIS and the Phase 2 Draft EIS both acknowledge that earthquakes and lightning strikes or wires downed by extreme weather events present risks of fault conditions or arcing from the transmission lines to the pipelines. The risk assessment included in the Phase 2 Draft EIS took into account historical incident rates for natural force-caused pipeline incidents on similar systems nationwide, and current risks in the corridor in consideration of fuel type/flammability, pipe parameters, safety features, and other factors, and determined that the project is not expected to increase the risks of accidental release due to seismic activity or other natural forces. Additional information on seismic risks in the corridor and how these risks are accounted for is provided in the Final EIS. See Key Theme PLS-2 in Appendix J-1.
Risk of pipeline corrosion caused by electrical interference from power lines	PSE retained DNV GL to develop a detailed analysis of risks and recommendations for the Energize Eastside project, which was used in preparing the analysis for the Phase 2 Draft EIS. The Phase 2 Draft EIS also contained additional recommendations beyond those presented in the DNV GL report, to be used to analyze potential for AC interference once final pole locations are developed. Even using conservatively high assumptions for risk factors, the analysis showed that there would be a small increase in total risk during operation. Mitigation can decrease those risks even further. No changes in the Final EIS. See Key Theme PLS-3 in Appendix J-1.
Evaluation of worst-case scenario involving pipeline rupture and fire	For a buried pipeline transporting refined petroleum product, the greatest risk to the public is posed by pool fires. EDM Services used data specific to the Olympic Pipeline system, including an estimated maximum release volume based on pipe size, pressure, and other factors, to model a release and subsequent pool fire size. The risk assessment modeled a worst-case scenario using the maximum release volume from U.S. Hazardous Liquid Pipeline release data, which is described in detail in the Phase 2 Draft EIS. The focus of the risk assessment in the Phase 2 Draft EIS was estimating the change in risk that would occur with PSE's proposal, compared to existing conditions. The Phase 2 Draft EIS acknowledged that local conditions could affect the shape and consequences of a fire. The Final EIS discusses the variable conditions that could affect the spread and impact of a fire in each segment. See Key Theme PLS-4 in Appendix J-1.
Risk of non-compliance with safety regulations that apply to Olympic and PSE	The Partner Cities, in issuing permits, can decide that additional conditions are required. PSE and Olympic have coordinated regarding the project since 2012, and both have indicated they would continue their coordination through final design and construction. PSE plans to integrate, where applicable, the results and recommendation of DNV GL's AC Interference Study (2016) to the design of pole locations, layout, and configuration in order to mitigate potential electrical interference-related impacts on the pipelines. Olympic, however, is responsible for the safety of its pipeline system in compliance with federal safety requirements. To estimate the probability of pipeline failures, historical data on pipeline incidents/spills that have occurred on similar systems are most commonly used. However, the historical incident/spill data do not include information on these similar systems' violations record, which means that comparison in this case is not feasible. No change in the Final EIS. See Key Theme PLS-5 in Appendix J-1.

Comment Theme	Response
Engagement of Olympic in the EIS process	The Partner Cities and the EIS Consultant Team contacted Olympic during the development of the Phase 1 Draft EIS, and made additional inquiries during the project-specific phase of the EIS. Olympic, however, did not provide some requested information for the Phase 2 analysis, which could be attributed to proprietary or security concerns. PSE cannot compel Olympic to release the information. PSE has limited authority to influence specific mitigation measures undertaken by Olympic Pipe Line Company related to pipeline operation or monitoring, but can provide information to assist pipeline operators in protecting the pipeline. No change in the Final EIS. See Key Theme PLS-6 in Appendix J-1.

6.13 NOISE

Comment Theme	Response
Noise from corona discharge	Corona noise was analyzed as a part of the Phase 1 Draft EIS and was found to be relatively low for nearby residential environments and virtually the same as existing noise levels, which is well below the limits required by local noise regulations. No changes in the Final EIS. See Key Theme NOI-1 in Appendix J-1.
Construction and operational noise	Because of the short duration of construction and the restrictions imposed by noise regulations, construction impacts were not expected to be significant. Operational noise would also be regulated at the local level, both through permit review and also through enforcement of local codes after the project is operational. Substations are not exempt from local noise regulations, but are also not subject to the 10 dBA reduction per Washington State law. Noise was not analyzed in the Phase 2 Draft EIS because no significant and unavoidable noise impacts were identified in the Phase 1 Draft EIS, assuming compliance with noise regulations. No changes in the Final EIS. See Key Theme NOI-2 in Appendix J-1.
Applicable noise regulations and significance thresholds	Noise regulations are based on the Washington Administrative Code (WAC), which informs the noise regulations at the local level. Per WAC 197-11-794, significance involves context and intensity, magnitude and duration, and is determined by the Lead Agency. For the Phase 1 Draft EIS, the City of Bellevue (along with the other Partner Cities) determined that the project would have a significant impact if it would generate operational noise that would conflict with local ordinances or would increase ambient noise levels by 5 dBA or greater at a sensitive land use. No changes in the Final EIS. See Key Theme NOI-3 in Appendix J-1.

DSD 005795

6.14 ECONOMICS

Comment Theme	Response
Property value depreciation	SEPA does not require that economic impacts be evaluated, although it was included in the EIS because it was highlighted as a concern during scoping. The Phase 1 Draft EIS provided a review of the impacts at a programmatic level; therefore, no site-specific data were analyzed. Further economic analysis regarding impacts to property values from transmission lines was included in the Phase 2 Draft EIS. This analysis did not find studies that indicated a negative effect on property values due to the replacement of lower voltage with higher voltage transmission lines in an existing utility corridor. The Phase 2 Draft EIS includes a detailed analysis of the visual impacts and found that there would be no significant unavoidable impacts to scenic views. PSE's Proposed Alignment evaluated in the Final EIS would be entirely in the existing utility corridor, so economic impacts due to property acquisitions were not further analyzed. No changes in the Final EIS. See Key Theme ECON-1 in Appendix J-1.
Tax revenue impacts	The Phase 2 Draft EIS analyzed the potential loss of property tax revenue, using Newcastle as a proxy for impacts. This was to provide a comparison with similar analysis in the Phase 1 Draft EIS regarding the City of Bellevue. Impacts on property values from the conversion of land to a utility use are not evaluated in the Phase 2 Draft EIS because no land would be acquired for the project. No changes in the Final EIS. See Key Theme ECON-2 in Appendix J-1.
Need for a full cost-benefit analysis	Economic analysis is not required under SEPA. The analysis of property tax effects on the City of Newcastle and the value of lost ecosystem services due to reduced tree cover were conducted in response to comments received during the public comment periods for the Phase 1 Draft EIS and the scoping period for the Phase 2 Draft EIS. Based on estimates provided by PSE, the proposed project is not anticipated to significantly affect the price of electricity in the Eastside. No changes in the Final EIS. See Key Theme ECON-3 in Appendix J-1.
Fairness of financial burden	It is the responsibility of the Washington Utilities and Transportation Commission (WUTC) to determine if the cost of electrical upgrades is appropriate. PSE has stated that the cost for the project would be included in future annual capital projects budgets, and that $1 to $2 of the average monthly bill for residential customers would go toward the project. PSE determined that Alternative 2 was not a feasible approach for solving the transmission capacity deficiency. No changes in the Final EIS. See Key Theme ECON-4 in Appendix J-1.

DSD 005796

6.15 EARTH

Comment Theme	Response
Earthquake-related hazards	The Phase 1 Draft EIS indicates that the proposed project would not increase the probability of an earthquake to occur nor increase the amount of damage that would occur to the pipeline in an earthquake. The final structural design would comply with NESC 2017 as adopted by the WUTC, as well as seismic recommendations from an engineer licensed in Washington. An expanded discussion of seismic and liquefaction impacts and requirements is included in the Final EIS, Section 4.11. See Key Theme EARTH-1 in Appendix J-1.
Impacts from taller poles and pole installation	PSE stated that there have been no structure failures of its steel transmission poles due to geologic hazards, and failures of wood poles have been rare, involving extenuating circumstances like placement in a bog or being impacted by a landslide in a remote mountain setting. Key findings from the PSE geohazard reports are included in the Final EIS Section 4.11. See Key Theme EARTH-2 in Appendix J-1.
Earthwork activities near Olympic Pipeline system	The project would be required to comply with all regulations regarding erosion-prone areas, such as steep slopes. The Olympic Pipe Line Company has stringent construction requirements in the area of its pipelines and would continue its close coordination with PSE and local jurisdictions for all construction activities located adjacent to the pipelines. A risk assessment that took into account the risks in the corridor was conducted as part of the Phase 2 Draft EIS. No changes in the Final EIS. See Key Theme EARTH-3 in Appendix J-1.
Regulatory thresholds and mitigation measures	The mitigation measures identified in the Phase 1 Draft EIS were prepared in the context of a programmatic level of analysis. These mitigation measures are not specific to certain facilities, but would be applied where needed. BMPs are developed on a project-specific basis and determined by the local regulatory agency. The project will incorporate seismic recommendations of an engineer licensed in Washington. Use of appropriate stormwater management (detention) facilities to reduce stream flow velocities and flooding, as well as NESC seismic engineering design requirements have been included as mitigation in the Phase 1 Draft EIS, and carried forward into the Final EIS. The Final EIS Section 4.11 clarifies that NESC standards for transmission lines do not include specific seismic requirements because addressing wind and ice loads results in structures that are more than adequate to address seismic requirements. See Key Theme EARTH-4 in Appendix J-1.
Request for more location-specific data	The Phase 1 Draft EIS determined that impacts under all alternatives would be minor with the implementation of BMPs, geotechnical recommendations, regulatory requirements, and industry standards. Revised pole location data are included in the Final EIS analysis, and Section 4.11 discusses the seismic risks in each segment. See Key Theme EARTH-5 in Appendix J-1.

6.16 TRANSPORTATION

Comment Theme	Response
General congestion /transportation impacts associated with construction	The Phase 1 Draft EIS contains an analysis of impacts due to the use of construction vehicles and other construction activities. In Phase 2, it was determined that no houses would need to be removed for the project. The methods used to install new steel poles will depend on the type of pole used and both its physical and functional location. The Final EIS includes a discussion of the pole types expected for PSE's Proposed Alignment. Driveways along the transmission line route would be passable during construction unless there is an alternative driveway serving a property that can accommodate vehicles if one driveway is temporarily closed. Brief road closures may be required for pulling wires, but PSE will prepare traffic control plans and work closely with City public works staff regarding road closures, traffic plans, etc. No change in the Final EIS. See Key Theme TRAN-1 in Appendix J-1.
Potential need to truck contents of the pipelines	The estimate included in the Phase 1 Draft EIS was provided by Olympic, and would result in a substantial reduction in the amount of fuel being transported through the region, or a substantial amount being transported by means other than truck, such as by barge or rail. A higher estimate of 4,000 truck trips per day is considered a worst-case estimate because it assumes no reduction in volume of products being shipped through the region, and all of the products being shipped by truck. This is noted in the Errata in the Final EIS. See Key Theme TRAN-1 in Appendix J-1.
Transporting project components	Construction timing/scheduling was not known at the time of the Phase 1 Draft EIS or the Phase 2 Draft EIS, but the projected project schedule, including phasing, is described in the Final EIS. Replacement of large equipment happens infrequently, and operational transportation impacts would be minor, as described in the Phase 1 Draft EIS. No changes in the Final EIS. See Key Theme TRAN-3 in Appendix J-1.
Mitigation of transportation impacts during construction	The Phase 1 Draft EIS presents general mitigation measures identified to avoid or reduce the potential transportation impacts expected during construction. There are no plans to relocate residential customers to hotels. However, this is a potential mitigation measure that could be employed, if warranted, as described in the Phase 2 Draft EIS. No changes to the Final EIS. See Key Theme TRAN-4 in Appendix J-1.

6.17 ENERGY AND UTILITIES

Comment Theme	Response
Energy use of peaker plants	Construction of new peaker plants was not carried forward as an alternative because the noise they produce would be incompatible with the predominately residential surroundings. The distributed generation component and peaker plants would rely on non-renewable resources (fossil fuels such as diesel or natural gas) to operate, as discussed in the Phase 1 Draft EIS. No changes to the Final EIS. See Key Theme EGY-1 in Appendix J-1.
Alternative 1 would increase demand for energy and therefore require more fossil fuel use	Alternative 1 would provide more than adequate capacity to meet the projected transmission shortfall in the Eastside. However, there is no intermediate size of transmission facility that would meet PSE's stated objectives. There is no indication in its IRP that PSE plans to increase reliance on or transmission from the Colstrip plant. No changes in the Final EIS. See Key Theme EGY-2 in Appendix J-1.
The need for utility providers to adopt measures that reflect sustainability, conservation, and efficiency	PSE has a conservation program that is part of its IRP. Consistency of the project with adopted energy policies was conducted for the Phase 1 Draft EIS analysis. The Energize Eastside project would not adversely affect PSE's conservation program. No changes in the Final EIS. See Key Theme EGY-3 in Appendix J-1.
Impacts to other utilities	The Phase 1 Draft EIS describes the potential for interference with other electronic communications equipment. If the project is constructed, PSE will work with telecom companies to reinstall cellular equipment onto the new 230 kV poles, subject to the requirements of Chapter 80.54 RCW, Chapter 480-54 WAC, and local jurisdiction regulations. PSE will continue to coordinate with King County Water Treatment Division as the project design is refined. No changes in the Final EIS. See Key Theme UTL-1 in Appendix J-1.
Utility disruptions caused by terrorism or natural hazards	Public safety risks associated with terrorist attacks are discussed in the Phase 1 Draft EIS as an unlikely, but possible worst-case scenario, although the project is not expected to increase this risk. Redundancy is considered by PSE as part of its long-range planning efforts. No changes in the Final EIS. See Key Theme UTL-2 in Appendix J-1.
Utility oversight	WUTC regulation of the Olympic Pipeline system is independent from PSE's project. The IRP process is separate from the setting of rates and relates to the sources of power that PSE plans to use to provide electricity to its customers. No changes in the Final EIS. See Key Theme UTL-3 in Appendix J-1.
Co-location with Olympic Pipeline system	Olympic Pipe Line Company is responsible for operating its pipeline system safely. Olympic does not have legal authority to deny PSE's project. Liability due to a pipeline failure would depend on the cause. No change to the Final EIS. See Key Theme UTL-4 in Appendix J-1.
Conclusions of the Phase 1 Draft EIS	PSE stated that this project is needed in part to protect the regional grid from harm that could result from an overloading of PSE's system due to growing demand within the Eastside. Conformance with industry standards and regulatory requirements would ensure that potential hazards are identified and design plans developed to minimize adverse effects from these hazards. Maintenance activities for 230 kV lines and poles are similar to those for the current 115 kV lines. No changes to the Final EIS. See Key Theme UTL-5 in Appendix J-1.

6.18 PUBLIC SERVICES

Comment Theme	Response
Response to pipeline-related incident	Existing local service providers are expected to be adequate to address the demand for fire and other emergency response for most incidents that could occur during construction and operation of the transmission lines. The need for emergency response services would be the same for the project as they would be for the No Action Alternative. The Phase 1 Draft EIS analysis was based on a review of the comprehensive plans and policies of each jurisdiction, as well as phone interviews with the major police and fire departments. The Bellevue Fire Department Standards of Response Coverage document was not reviewed at the time of the Phase 1 Draft EIS because it was not identified as a source, but the data from the report are consistent with the findings in the Phase 1 and Phase 2 Draft EISs. The Phase 1 Draft EIS did not discuss the potential need for additional personnel from adjacent jurisdictions if there were a major fire on the pipeline, but this has been included as a mitigation measure in the Final EIS. With the additional mitigation measures proposed in the Phase 2 Draft EIS and Final EIS, the project would not substantially increase the risk of an accidental release from the pipelines, and could decrease some aspects of the risk. Insurance rates are not expected to increase as a result of the project. The Final EIS discusses the Bellevue Fire Department Standards of Response Coverage in responses to comments on the Phase 1 Draft EIS and Phase 2 Draft EIS. See Key Theme SVC-1 in Appendix J-1.
Interference with communication devices	Overhead transmission lines do not generally interfere with radio or television reception, although corona can affect AM radio frequencies. No corona-generated interference with police and emergency personnel communication/ emergency devices is anticipated. PSE would design the new 230 kV lines in consideration of the Institute of Electrical and Electronics Engineers design guidelines. No changes in the Final EIS. See Key Theme SVC-2 in Appendix J-1.
Safety measures and plans	Operation of the alternatives presented in both the Phase 1 and Phase 2 Draft EISs could increase demand for emergency services in the study area. However, mitigation can decrease impacts. Current safety measures, including emergency service providers, levels of service, and response times, are detailed in the Phase 1 Draft EIS. Access to residential and commercial properties would be maintained at all times. The Phase 1 Draft EIS presented a general analysis of risks regarding pipeline safety. For the Phase 2 Draft EIS, a more detailed pipeline safety risk assessment was conducted to further evaluate pipeline safety risks, including construction risks. The Final EIS describes the variable conditions that could affect the spread and impact of a fire in each segment. See Key Theme SVC-3 in Appendix J-1.
Reliable energy is required for community services to operate	PSE has clarified how the project relates to reliability, which is presented in the Phase 2 Draft EIS and the Final EIS. PSE determined that, without the project, under certain circumstances the Eastside communities would need to be placed at risk of load shedding (deliberate power outages) in order to protect the regional grid. The degree of additional system reliability provided by the project is unknown because of the complexity of the system and the variety of factors that can cause equipment failure. No changes in the Final EIS. See Key Theme SVC-4 in Appendix J-1.

7

Cumulative Impacts

energize EASTSIDE EIS

CHAPTER 7. CUMULATIVE IMPACTS

"Cumulative impact" is not defined in the SEPA rules, but it is defined under federal rules implementing the National Environmental Policy Act (NEPA). "Cumulative impact" is defined in the Council on Environmental Quality (CEQ) Regulations as the "*impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions*" (40 CFR Part 1508). This chapter considers the effects of the Energize Eastside project when considered with other proposed actions or projects within the potentially affected area.

Washington courts have limited the requirement for cumulative impact analysis under SEPA, stating that an analysis of the cumulative impacts of a proposed project is not required under SEPA unless: (1) there is some evidence that the project will facilitate future action that will result in additional impacts, or (2) the project is dependent on subsequent proposed development. A project's cumulative impacts that are merely speculative need not be considered (Boehm v. City of Vancouver, 111 Wn. App. 711(2002) – Cumulative impacts).

7.1 LAND USE AND HOUSING

In general, as population and employment growth occurs, there is an increased likelihood that land uses will change, although consistency with comprehensive plans and subarea plans helps to decrease the potential for adverse impacts. The Energize Eastside project is proposed in response to expected growth, because a reliable electrical transmission system is needed to support that growth. The Energize Eastside project is not expected to affect the scale of future development, but it could affect the timing of future development, depending on the schedule of implementation. The availability of reliable electricity is not expected to represent a cumulative impact to land use. It will not incrementally increase or alter proposed land uses because it is being undertaken to supply land uses that have been identified in adopted land use plans.

7.2 SCENIC VIEWS AND THE AESTHETIC ENVIRONMENT

In general, as development occurs, there is an increased likelihood that scenic views and the aesthetic environment will be adversely impacted. Development can result in large buildings or structures that block or obscure views, and the trend of urbanization and densification results in changing views and vistas. The Energize Eastside project will contribute to that trend, by providing electricity to supply projected development. The incremental visual impact from the project will add to the increasingly urbanized visual environment within the study area. Because development is expected to conform to each community's plans, policies, and regulations regarding aesthetics, these cumulative impacts are not expected to be significant (beyond those identified for the Bellevue South and Newcastle Segments in Sections 4.2.5 and 8.2).

7.3 WATER RESOURCES

No long-term impacts to water resources would occur as a result of PSE's Proposed Alignment, and the project is not expected to contribute to indirect or direct impacts resulting from other projects; therefore, no cumulative impacts to water resources would occur.

7.4 PLANTS AND ANIMALS

Urbanization has resulted in an overall loss and degradation of available fish and wildlife habitat throughout the study area, although current regulations have slowed the trend of habitat loss to a degree, and in the case of fish passage in particular, future projects will likely improve habitat. The Energize Eastside project would contribute to the trend toward degradation directly by removing trees and altering available habitat conditions, and indirectly by continuing to supply energy to support a growing, developing region. Mitigation would help to reduce cumulative impacts, but it would 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. In accord with regulations, over time the loss of function would be replaced through replacement trees and habitat restoration, reducing the net impact of development. Other large projects, such as Sound Transit's East Link project, overlap with the proposed Energize Eastside project. The East Link project will impact plants and animals by continuing to contribute to the trend of reducing habitat (forested areas) in Bellevue, Redmond, and King County (Sound Transit, 2011).

7.5 GREENHOUSE GASES

All GHG emissions contribute to cumulative climate change impacts. The analysis of the effects of GHG emissions is essentially a cumulative effects analysis that is subsumed within the general analysis and discussion of climate change impacts. Therefore, direct and indirect effects analysis for GHG emissions will adequately address the cumulative impacts for climate change from the project, and a separate cumulative effects analysis for GHG emissions is not needed (CEQ, 2016).

7.6 RECREATION

In general, there is pressure on recreation areas from development and increased use. The significant impacts to recreation sites from PSE's Proposed Alignment could contribute to the degradation of existing recreation resources and limit the ability for municipalities to provide additional recreation opportunities, unless mitigation is provided. Construction activity throughout the region could result in potential impacts to parks and other recreation sites. The most likely future action that could alter or affect recreation sites within the Energize Eastside study area is Sound Transit's East Link project, which could be constructed during the same general time frame as the project. The East Link project will impact some parks in Bellevue, Redmond, and King County (Sound Transit, 2011). In combination with the East Link project and other projects planned in the study area, the Energize Eastside project could potentially cause cumulative impacts to recreation if the same recreation sites are affected or if the construction periods overlap. The Energize Eastside project may avoid direct impacts to recreation sites by siting facilities outside of designated parks or recreation areas. Construction of the East Link project is scheduled to occur between 2015 and 2021. Construction for the Energize Eastside project may occur during this same period; however, construction of Energize Eastside and East Link could be coordinated to avoid or minimize impacts to recreation areas by limiting the duration of construction that would result in the closure of recreation areas or disruption of access to recreation areas. Coordination with potentially affected Cities will reduce potential impacts through facility siting, and would comply with applicable permitting requirements to mitigate impacts. With appropriate mitigation, the cumulative construction and operation effects of the project and other planned projects are not expected to change long-term trends related to the use of recreation facilities in the study area.

7.7 CULTURAL AND HISTORIC RESOURCES

The project has the potential for cumulative impacts by supporting development and redevelopment within the Eastside area. Development has the potential for ground disturbance, which could impact additional belowground archaeological resources, if present. For historic resources, development could involve demolition or alterations to the setting of existing historic resources, if present. It is probable that potential impacts to historic and cultural resources would be mitigated through appropriate preservation planning and, at the time of development, through consultation with DAHP, affected Tribes, and local governments, as applicable to the type of impacted resource.

7.8 ENVIRONMENTAL HEALTH – ELECTRIC AND MAGNETIC FIELDS

The project would reduce magnetic fields along existing transmission line corridor; therefore, there would be no cumulative effect. All of PSE's Proposed Alignment is entirely within PSE's existing corridor, with no new sources of magnetic fields associated with a new corridor. Overall, no adverse cumulative effects are expected because existing sources combined with magnetic fields associated with the project are expected to be well below reference guidelines.

7.9 ENVIRONMENTAL HEALTH – PIPELINE SAFETY

No significant adverse impacts to environmental health related to pipeline safety are likely from the Energize Eastside project. The likelihood of a pipeline incident would remain low in the shared corridor, and no substantial increase in risk compared to existing conditions has been identified. With implementation of mitigation measures, these risks would be even lower. Other activities by other parties (e.g., ground-disturbing activities), unrelated to the Energize Eastside project, may occur in the corridor on occasion. While these activities remain a source of potential pipeline safety risk in the corridor, the project would not contribute to adverse impacts resulting from these other activities; therefore, no cumulative impacts to environmental health from pipeline safety would occur.

7.10 ECONOMICS

The economic impacts of the project have not been fully evaluated in this EIS because SEPA does not require an economic analysis. To the extent that the project supports growth and development as described under Land Use and Housing, property values are likely to rise, offsetting any potential adverse impacts to assessed value used for property tax assessment. The effects to ecosystem services would be cumulative with other development that removes trees. If mitigation is provided per codes and regulations, over time the loss of ecosystem services would be replaced through replacement trees, reducing the net impact of development. Temporal losses could also be offset with additional mitigation.

7.11 EARTH RESOURCES

Although the entire region is a seismically active area, geologic and soil conditions vary widely within a relatively short distance. Other projects in the area would also be required to adhere to the same Washington state and local building codes as the Energize Eastside Project, which would reduce the risk to people and property in the region. While future seismic events cannot be predicted, adherence to federal, state, and local programs, requirements, and policies pertaining to building safety and construction would limit the potential for injury or damage. The project would not increase the risk of damage or injury due to seismic events. Therefore, the Energize Eastside project, combined with past, present, and other foreseeable development in the area, would not result in a cumulatively significant impact related to geologic hazards, soils, or seismic conditions.

8

Significant Unavoidable Adverse Impacts

energize EASTSIDE EIS

CHAPTER 8. SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

8.1 LAND USE AND HOUSING

Construction of the Energize Eastside project would not require significant excavation, inhibit access to adjacent land uses, or create significant noise; therefore, any nuisance caused by the construction activities of PSE's Proposed Alignment would be less-than-significant. Long-term impacts to land use and housing would also be less-than-significant for PSE's Proposed Alignment because all of the segments and options and the proposed substation are land uses anticipated in city and subarea plans, and the project would not adversely affect existing or future land use patterns. Therefore, the project would not result in significant unavoidable adverse impacts to land use and housing.

The No Action Alternative would not be consistent with city comprehensive plan policies, as discussed in the Phase 1 Draft EIS. The No Action Alternative could lead to unavoidable significant adverse land use impacts in the long term if unreliable power supply were to outweigh the regional factors amenable to growth and development, leading to development inconsistent with regional growth plans and targets.

8.2 SCENIC VIEWS AND THE AESTHETIC ENVIRONMENT

The project could have significant unavoidable adverse impacts to the aesthetic environment in the Bellevue South Segment and the Newcastle Segment, Option 1 (No Code Variance) and Option 2 (Code Variance), as described below (Figure 8-1). There would be no significant unavoidable adverse impacts on scenic views.

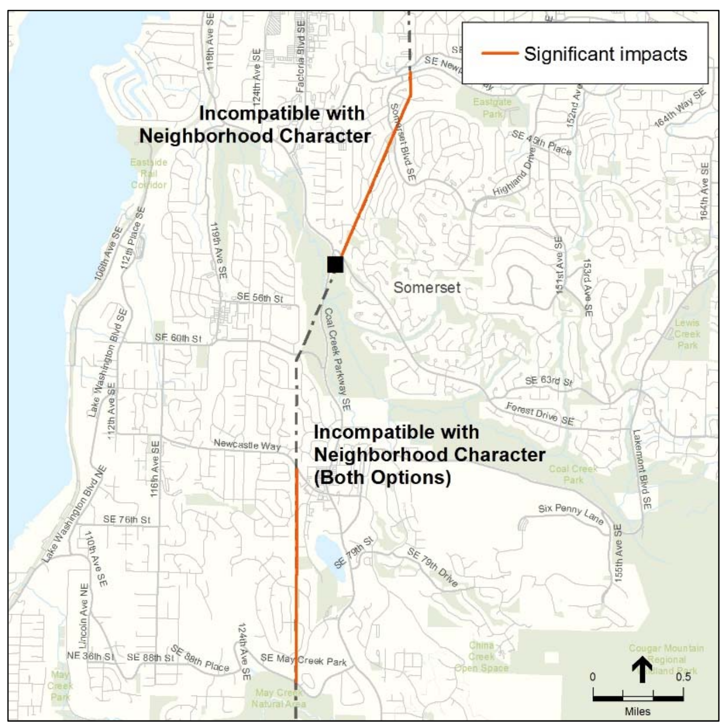


Figure 8-1. Areas with Significant Impacts to the Aesthetic Environment

Significant aesthetic impacts associated with the Bellevue South Segment would occur where it traverses the Somerset neighborhood. The Somerset neighborhood has neighborhood covenants that restrict building and vegetation height to protect views (i.e., the View Guideline for Somerset). These neighborhood covenants also result in increased viewer awareness of the impact. The increased pole height associated with the Bellevue South Segment would contrast substantially with this unique neighborhood of low buildings and vegetation. Impacts could be avoided by selecting a different alignment option for this segment or if the Somerset portion were placed underground.

Significant aesthetic impacts associated with the Newcastle Segment would occur where the project would be inconsistent with the Newcastle Comprehensive Plan, which protects the scale and character of existing neighborhoods through policies that call for transmission lines to be sited and designed to minimize visual impacts to adjacent land uses. North of the May Creek ravine, impacts of the Newcastle Segment on the aesthetic environment would be significant because the new transmission line would change the neighborhood character. It would introduce a taller transmission line that would be less concealed by vegetation. In addition, its location on the ridge would make it a defining feature that contrasts strongly with the existing built environment. Although impacts would be less under the Code Variance Option, which introduces shorter poles than the No Code Variance Option and creates less contrast due to the position of the poles more centrally within the corridor, impacts under both options would be significant. Inconsistency with the Newcastle Comprehensive Plan could be mitigated if the transmission line were placed underground.

8.3 WATER RESOURCES

Impacts from construction of PSE's Proposed Alignment would be temporary and minor with the implementation of BMPs, and all long-term impacts would be minor and could be fully mitigated through compliance with applicable regulations and implementation of BMPs. Therefore, there would be no significant unavoidable adverse impacts to water resources.

8.4 PLANTS AND ANIMALS

Although the overall magnitude of impacts would vary by segment and option, PSE's Proposed Alignment would not result in significant unavoidable adverse impacts to plants and animals. The primary impacts are related to the number of trees, including significant trees, that would be removed. Protected species are not known to occupy the habitat within the study area, and the overall urbanized settings throughout the study area are unlikely to provide suitable habitat for these species in the future. Therefore, no significant unavoidable adverse impacts are expected, within any of the segments or options.

8.5 GREENHOUSE GASES

Construction-related GHG emissions would be less-than-significant because they would be temporary, would not represent a continuing burden on the statewide inventory, and would likely be below state reporting thresholds. Although PSE's Proposed Alignment would result in long-term increases in fugitive SF6 emissions (from gas-insulated circuit breakers at substations) and CO2e sequestration losses due to tree removal, the emissions would be substantially below the State of Washington GHG reporting threshold. Therefore, there would be no significant unavoidable adverse impacts to greenhouse gas emissions.

8.6 RECREATION

Construction of the Energize Eastside project would not require significant excavation, inhibit access to adjacent recreation sites or facilities, or create significant noise; therefore, any nuisance to recreation activities caused by the construction activities of PSE's Proposed Alignment would be less-than-significant. Long-term impacts to recreation would also be less-than-significant for PSE's Proposed Alignment because the project would not adversely affect recreation use or opportunities. Some of the option routes in the Bellevue Central and Bellevue South Segments analyzed in the Phase 2 Draft EIS would require easements in park property, which could result in significant impacts on recreation resources; those option routes, however, are not part of PSE's Proposed Alignment.

8.7 HISTORIC AND CULTURAL RESOURCES

Potential operational impacts to belowground protected archaeological resources or aboveground significant historic resources could be mitigated during the construction phase. Thus, no significant unavoidable adverse impacts to belowground archaeological resources or aboveground historic resources are anticipated. Mitigation measures for historic and cultural resources would be developed through consultation between PSE and DAHP, with involvement from KCHPP, affected Tribes, and municipal governments as applicable. PSE will consult with DAHP to request an eligibility determination for the Eastside Transmission System; if determined eligible, PSE will consult with DAHP regarding potential mitigation measures.

8.8 ENVIRONMENTAL HEALTH – ELECTRIC AND MAGNETIC FIELDS

No adverse impacts are likely from power-frequency EMF at the levels of public exposure from the Energize Eastside project. It follows that no significant unavoidable adverse impacts under SEPA would occur.

8.9 ENVIRONMENTAL HEALTH – PIPELINE SAFETY

A pipeline release or fire resulting from construction or operation of the Energize Eastside project would result in potentially significant adverse environmental impacts. The specific impacts would depend on the location and the nature of the incident. Section 4.9.1 of the Phase 2 Draft EIS explains the legal requirements to prevent, prepare for, and respond to a pipeline incident. Even with worst-case assumptions related to the increased risk during operation and construction, the likelihood of a pipeline release and fire would remain low, and no substantial increase in risk compared to the existing conditions was identified. It is likely that with the implementation of additional measures included in Section 4.9.8 and Section 5.9.4, any increase in risks within the corridor can be fully mitigated. As a result, no significant unavoidable adverse impacts for pipeline safety have been identified.

8.10 ECONOMICS

The economic aspects of the Energize Eastside project that are evaluated in this Final EIS do not relate to construction impacts. Long-term impacts to economics are expected to be less-than-significant. As noted in the Phase 2 Draft EIS, no significant unavoidable adverse impacts would be associated with a change in assessed property value.

As noted in the Phase 2 Draft EIS, undergrounding a portion of the transmission line could result in significant economic impacts if the burden of paying for undergrounding is shared over a small number of property owners, or a minor impact if shared by a large enough number. However, the EIS does not determine whether or how much of the transmission line should go underground, or assess how many people should share the costs.

PSE's Proposed Alignment would require tree removal along the existing corridor; however, the value of total ecosystem services lost as a result of tree removal would be minimal.

8.11 EARTH RESOURCES

Damage and potential injury or death from a significant seismic event are never completely avoidable. The Energize Eastside project would not increase these risks. The project would meet the most recent scientifically based seismic design standards. As a result, there would be no probable significant adverse impacts related to earth resources from the Energize Eastside project.

9

References

CHAPTER 9. REFERENCES

Chapters 1, 2, and 3

City of Bellevue, 2016a. *Scoping Comment Summary Report, Part 1 (April 14 – May 31, 2016 Scoping Period).* Energize Eastside Project, Phase 2. Prepared for the City of Bellevue by ESA Consultant Team, Seattle, WA. June 30, 2016.

City of Bellevue, 2016b. *Scoping Comment Summary Report, Part 2 (June 30 – August 1, 2016 Scoping Period).* Energize Eastside Project, Phase 2. Prepared for the City of Bellevue by ESA, Seattle, WA. August 30, 2016.

City of Redmond. 2013. Transportation Master Plan. Available: http://www.redmond.gov/PlansProjects/Transportation/TransportationMasterPlan. Accessed September 1, 2016.

City of Renton. 2010. City of Renton Hazard Mitigation Plan. April 2010. 183 pp.

Earthquake Engineering Research Institute and Washington Military Department Emergency Management Division. 2005. Scenario for a Magnitude 6.7 Earthquake on the Seattle Fault. First Edition, June 2005. Available: https://www.washington.edu/uwem/files/2014/11/seattscen_full_book.pdf.

Gentile, T.J., D.J. Morrow, Z.A. Gill Sanford, C.O. Jaeger, and J.V. Nedrud. 2014. Puget Sound Energy and Quanta Technology. Eastside Transmission Solutions Report, King County Area. October 2013. Updated February 2014.

Gentile, T.J., D.J. Morrow, E.M. Ewry, and C.O. Jaeger. 2015. Puget Sound Energy and Quanta Technology. Supplemental Eastside Needs Assessment Report, Transmission System, King County. April 2015.

Nexant. 2015. Puget Sound Energy Energize Eastside Outage Cost Study. Prepared for Puget Sound Energy. October 30, 2015.

Olympic (Olympic Pipe Line Company). 2016. Letter to Rich Crispo, Mayor of City of Newcastle (via Email) from Marc Horn, President of Olympic Pipe Line Company. July 19, 2016.

Olympic (Olympic Pipe Line Company). 2017. Olympic Pipe Line Operations Fact Sheet. Olympic Pipe Line Company. Downloaded from http://www.workingwaterfrontportland.org/profiles/olympic_pipeline.pdf on April 24, 2017.

Power Engineers, Inc. 2017. Photo Simulations for the Energize Eastside Transmission Line Project. Prepared January and February 2017. Meridian, ID.

PSE (Puget Sound Energy). 2017a. Email from Brad Strauch, PSE, to Heidi Bedwell, City of Bellevue, regarding CAPS with Load Shedding – Timing. February 1, 2017.

PSE (Puget Sound Energy). 2017b. Permit submittal package to the City of Bellevue for PSE's Energize Eastside Project. Includes forms, reports, and design plans. Submitted September 8, 2017, File No. CUP - 17-120556-LB, File No. Critical Areas Permit - 17-120557-LO. Available: https://development.bellevuewa.gov/zoning-and-land-use/public-notices-and-participation/energize-eastside-updates/. (Cited throughout the Final EIS).

PSE (Puget Sound Energy). 2017c. Permit submittal package to the City of Newcastle for PSE's Energize Eastside Project. Includes forms, reports, and design plans. Submitted November 9, 2017 (determined incomplete); resubmitted January 18, 2018, as Conditional Use Permit #17-002, Critical Areas Review #17-013, and Variance application #17-004. Available: http://newcastlewa.gov/departments/community_development/energize_eastside/. (Cited throughout the Final EIS).

PSE (Puget Sound Energy). 2017d. Puget Sound Energy 2017 Integrated Resource Plan. Available at https://pse.com/aboutpse/EnergySupply/Pages/Resource-Planning.aspx. Accessed December 15, 2075.

Stantec. 2015. Energize Eastside Project Memorandum from Keith DeClerck to Mark Johnson, dated July 31, 2015. Available at http://www.energizeeastsideeis.org/library.html.

Land Use and Housing

City of Bellevue. 1993. City of Bellevue, Washington Comprehensive Plan. Volume 2: Subarea Plans and Comprehensive Transportation Project List. Includes BelRed Subarea Plan, Bridle Trails Subarea Plan, Crossroads Subarea Plan, Eastgate Subarea Plan, Factoria Subarea Plan, Newport Hills Subarea Plan, Wilburton/NE 8th St Subarea Plan, Adopted December 6, 1993, Updated August 2015.

City of Bellevue. 2015. City of Bellevue Comprehensive Plan. Land Use Element. August 2015. Available: http://www.ci.bellevue.wa.us/pdf/PCD/03_Land_Use_FINAL_20150727.pdf.

City of Newcastle. 2016. City of Newcastle: 2035 Newcastle Comprehensive Plan. Adopted March 2016.

City of Redmond. 2011. Redmond 2030: City of Redmond Comprehensive Plan. 2011. Adopted December 6, 2011. Available: http://user-6418068785.cld.bz/Redmond-20305#1.

City of Renton. 2015. City of Renton Comprehensive Plan. Adopted June 22, 2015. Available: http://rentonwa.gov/uploadedFiles/Business/CED/planning/2015/Comprehensive%20Plan1.pdf.

FCS Group. 2016. Economic Considerations, Supplemental Analysis – Energize Eastside Phase 2 Draft EIS. Draft, September 15, 2016.

Henning, J. 2017. Personal communication. Email from Jennifer Henning, AICP, Planning Director, City of Renton, to multiple recipients; dated November 6, 2017.

Scenic Views and Aesthetic Environment

City of Bellevue. 2015. Bridle Trials Subarea Plan. City of Bellevue, Washington Comprehensive Plan. Volume 2: Subarea Plans and Comprehensive Transportation Project List. Originally adopted December 6, 1993 and includes major Comprehensive Plan updates through August 2015 (Ordinance 6251).

City of Newcastle. 2016. City of Newcastle: 2035 Comprehensive Plan. Adopted March 2016.

City of Renton. 2015. City of Renton Comprehensive Plan. Updated July 2015.

Power Engineers. 2014. Eastside 230 kV Project Underground Feasibility Study. Prepared for PSE, Bellevue, WA; prepared by Power Engineers, Kent, WA; provided to ESA, Seattle, WA. March 2014.

Power Engineers. 2017. Visual simulations of the Energize Eastside project. Prepared for PSE, Bellevue, WA; prepared by Power Engineers, Kent, WA; provided to ESA, Seattle, WA. Various dates, July through December 2017.

PSE (Puget Sound Energy). 2017. Emails from Bradley Strauch, Energize Eastside Project Manager, PSE, to Reema Shakra and Mark Johnson, ESA. August 23, 2017, and December 1, 2017.

Somerset. 2016. View Guideline for Somerset. Last updated 12/21/2016. 7 pages. Available: https://www.somerset98006.org/uploads/4/7/5/8/47585659/view_guidelines_12-21-16_tc__final.pdf.

The Watershed Company. 2016. GIS Dataset Labeled as twc_ee_veg_impact_results_20160914. September 14, 2016.

The Watershed Company. 2017. GIS Dataset Labeled as 2017-12-15 Data for EIS Consultant. December 15, 2017.

Water Resources

City of Bellevue. 2016a. Storm and Surface Water System Plan. Available: http://www.bellevuewa.gov/storm-surface-water-plan.htm. Accessed: October 2016.

City of Bellevue. 2016b. Water System Supply Plan. June 2016.

Ecology (Washington State Department of Ecology). 2006. Wetland Mitigation in Washington State - Part 1: Agency Policies and Guidance. Ecology Publication # 06-06-011a. March 2016. Available: https://fortress.wa.gov/ecy/publications/summarypages/0606011a.html.

Ecology (Washington State Department of Ecology). 2014. 2012 Stormwater Management Manual for Western Washington, as amended December 2014. Ecology Publication Number 14-10-055.

GeoEngineers. 2016. Geotechnical Engineers Services for the Energize Eastside Project, Redmond to Renton, Washington. Prepared for Puget Sound Energy. June to August 2016.

Hruby, T. 2004. Washington State Wetland Rating System for Western Washington – Revised. Washington State Department of Ecology Publication # 04-06-025. August 2004.

Hruby, T. 2014. Washington State Wetland Rating System for Western Washington: 2014 Update. (Publication #14-06-029). Olympia, WA: Washington Department of Ecology. October 2014.

King County. 2016. Map of Groundwater Management Areas in King County. Available: http://www.kingcounty.gov/environment/water-and-land/groundwater/maps-reports/maps.aspx. Accessed: August 26, 2016.

The Watershed Company. 2016. City of Bellevue Critical Areas Delineation Report. Prepared for Puget Sound Energy – Energize Eastside Project. May 2016.

The Watershed Company. 2017. Richards Creek Substation Property, Wetland and Stream Delineation Report. The Watershed Company Reference Number: 111103.6. Submitted to Molly Reed, PSE. June 22, 2017.

WDFW (Washington Department of Fish and Wildlife). 2016. SalmonScape. Available: http://apps.wdfw.wa.gov/salmonscape/. Accessed: August 2016.

WDFW (Washington Department of Fish and Wildlife). 2017. Priority Habitats and Species (PHS) – PHS on the Web. Available: http://wdfw.wa.gov/mapping/phs/.

Plants and Animals

Armson, D., P. Stringer, and A.E. Ennos. 2013. The effect of street trees and amenity grass o urban surface water runoff in Manchester, UK. Urban Forest & Urban Greening. Vol. 12(3).

City of Bellevue. 2016a. Storm and Surface Water System Plan. Available: http://www.bellevuewa.gov/storm-surface-water-plan.htm. Accessed: October 2016.

City of Bellevue. 2016b. Storm and Surface Water, Drainage Basins webpage. Available: http://www.ci.bellevue.wa.us/drainage-basins.htm. Accessed: August 2016.

Dwyer, J.F., R.E. Harness, and K. Donohue. 2013. Predictive Model of Avian Electrocution Risk on Overhead Power Lines. Conservation Biology 28(1):159-168.

Ecology (Washington State Department of Ecology). 2011. Waters requiring supplemental spawning and incubation protection for salmonid species. Washington State Department of Ecology publication 06-10-038. Revised January 2011.

Fernie, K.J. and S.J. Reynolds. 2005. The effects of electromagnetic fields from power lines on avian reproductive biology and physiology: A review. Journal of Toxicology and Environmental Health, Part B. 8:127-140.

Inkilainen, E.N.M, M.R. McHale, G.B. Blani, A.L. James, and E. Nikinmaa. 2013. The role of the residential urban forest in regulating throughfall: A case study in Raleigh, North Carolina, USA. Landscape and Urban Planning. Vol. 119.

King County. 2016. Watersheds and Rivers, Streams Data webpage. Including Stream report-Coal Creek-0442. Available: http://green2.kingcounty.gov/streamsdata/Default.aspx. Accessed: August, 2016.

PSE (Puget Sound Energy). 2014. Puget Sound Energy – Vegetation Management. Available: http://pse.com/safety/Tree-Trimming/Pages/Tree-Maintenance.aspx. Accessed: September 13, 2016.

PSE (Puget Sound Energy). 2015. GIS, CAD, and static map data provided to Environmental Science Associates (ESA), Seattle, WA, by PSE, Bellevue, WA.

PSE (Puget Sound Energy). 2016a. Puget Sound Energy Noxious Weed Management Program. Available: http://pse.com/aboutpse/Environment/Pages/Wildlife-Habitat.aspx. Accessed: September 29, 2016.

PSE (Puget Sound Energy). 2016b. Puget Sound Energy Avian Protection Program. Available: http://www.pse.com/aboutpse/Environment/Pages/Bird-Protection.aspx. Accessed: September 13, 2016.

SCL (Seattle City Light). 2014. Avian Protection Plan: Seattle City Light, Version 1. Environmental Affairs and Real Estate Division, Seattle, Washington. Available: http://www.seattle.gov/light/enviro/avian/. Accessed: August 31, 2016.

The Watershed Company. 2009. Bellevue Urban Wildlife Habitat, Literature Review. Report prepared for the City of Bellevue Development Services Department, Bellevue, Washington.

The Watershed Company. 2016a. Tree Inventory: Energize Eastside Project. Includes the following separate reports: City of Bellevue Tree Inventory Report; King County Tree Inventory Report; City of Newcastle Tree Inventory Report; City of Redmond Tree Inventory Report; City of Renton Tree Inventory Report; Richards Creek Parcel Tree Inventory Report; Segment O Tree Inventory Report; Segment P Tree Inventory Report; and Bypass Routes 1 and 2 Tree Inventory and Analysis Report. Prepared for Puget Sound Energy, Bellevue, WA. Prepared by The Watershed Company, Kirkland, WA. May and July 2016.

The Watershed Company. 2016b. Critical Areas Delineation and Analysis: Energize Eastside Project. Includes the following separate reports: City of Bellevue Critical Areas Delineation Report; King County Critical Areas Delineation Report; City of Newcastle Critical Areas Delineation Report; City of Redmond Critical Areas Delineation Report; and City of Renton Critical Areas Delineation Report. Prepared for Puget Sound Energy, Bellevue, WA. Prepared by The Watershed Company, Kirkland, WA. May and July 2016.

The Watershed Company. 2016c. GIS Dataset Labeled as twc_ee_veg_impact_results_20160914. September 14, 2016.

The Watershed Company. 2017. GIS Dataset Labeled as 2017-12-15 Data for EIS Consultant. December 15, 2017.

Tyler, N., K. Stokkan, C. Hogg, C. Nellemann, A. Vistnes, and G. Jeffery. 2014. Ultraviolet Vision and Avoidance of Power Lines in Birds and Mammals. Conservation Biology. Vol 28(3) 630-631.

WDFW (Washington Department of Fish and Wildlife). 2016a. Priority Habitat and Species Database. Available: http://apps.wdfw.wa.gov/phsontheweb/. Accessed: August 2016.

WDFW (Washington Department of Fish and Wildlife). 2016b. SalmonScape Database. Available: http://apps.wdfw.wa.gov/salmonscape/map.html. Accessed: August 2016.

WDNR (Washington State Department of Natural Resources). 2016. Washington Natural Heritage Program database. Available: http://www1.dnr.wa.gov/nhp/refdesk/gis/wnhpgis.html. Accessed: October 2016.

WHO (World Health Organization). 2005. Electromagnetic fields and public health, Effects of EMF on the environment. International EMF Project Information Sheet. February, 2005. Available: http://www.who.int/docstore/peh-emf/publications/facts_press/fact_english.htm.

Greenhouse Gases

BAAQMD (Bay Area Air Quality Management District). 2017. CEQA Air Quality Guidelines. Available: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. May 2017.

Blackman, J., M. Averyt, and Z. Taylor. 2006. SF_6 Leak Rates from High Voltage Circuit Breakers - U.S. EPA Investigates Potential Greenhouse Gas Emissions Source. Prepared for the U.S. Environmental Protection Agency. Available: https://www.epa.gov/sites/production/files/2016-02/documents/leakrates_circuitbreakers.pdf. Accessed: September 14, 2016.

CAPCOA (California Air Pollution Control Officers). 2013. Association. California Emissions Estimator Model, Appendix A, page 48, 2013. Available at: http://www.caleemod.com/ Accessed: September 22, 2016.

Cary, S.M. 2013. High Voltage Circuit Breaker Standards – Comparative Guide. White Paper WP012001EN. Eaton, Cleveland, OH (www.eaton.com).

CEQ (Council on Environmental Quality). 2016. *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effect of Climate Change in National Environmental Policy Act Reviews*. August 2016, Available: https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance. Accessed: September 22, 2016.

EPA (Environmental Protection Agency). 2017. Electric Power Systems Partnership. Emission Sources. Last updated October 16, 2017. Available: https://www.epa.gov/f-gas-partnership-programs/electric-power-systems-partnership. Accessed: October 23, 2017.

IPCC (International Panel on Climate Change). 2013. Climate Change 2013, The Physical Science Basis, Working Group 1 Contribution to the 5th Assessment Report.

USFS (U.S. Forest Service). 2017. i-Tree. Public domain software suite developed by the USDA Forest Service. Available: https://www.itreetools.org/. Accessed: January 2018.

King County. 2015. Strategic Climate Action Plan. June 2015.

Kjellsen, K.O., M. Guimaraes, and A. Nilsson. 2005. CO2 Uptake During the Concrete Lifecycle: The CO2 Balance of Concrete in a Lifecycle Perspective.

Sandlin, Gail. 2016. Report to the Legislature on Washington Greenhouse Gas Emissions Inventory: 2010–2013. Department of Ecology. December 2016.

Seattle OSE (Seattle Office of Sustainability & Environment). 2012. Drive Clean Seattle FAQ's, Available: http://www.seattle.gov/Documents/Departments/OSE/DCS_FAQ_Final.pdf. Accessed September 20, 2016.

Stephenson, N.L. et al. 2014. Rate of Tree Carbon Accumulation Increases Continuously with Tree Size. Nature 507: 90-93. Contributions by N.L. Stephenson, A.J. Das, R. Condit, S.E. Russo, P.J. Baker, N.G. Beckman, D.A. Coomes, E.R. Lines, W.K. Morris, N. Rüger, E. Álvarez, C. Blundo, S. Bunyavejchewin, G. Chuyong, S. J. Davies, Á. Duque, C. N. Ewango, O. Flores, J.F. Franklin, H.R. Grau, Z. Hao, M.E. Harmon, S.P. Hubbell, D. Kenfack, Y. Lin, J.-R. Makana, A. Malizia, L.R. Malizia, R.J. Pabst, N. Pongpattananurak, S.-H. Su, I-F. Sun, S. Tan, D. Thomas, P.J. van Mantgem, X. Wang, S.K. Wiser & M.A. Zavala. March 6, 2014.

The Climate Registry. 2016. GHG Emissions General Reporting Protocol, version 2.1. January 2016. Available: http://www.theclimateregistry.org/tools-resources/reporting-protocols/general-reporting-protocol/.

The Watershed Company. 2016. Tree Inventory Excel Database titled Willow, Oak, Richards, Bypass_EIS Segments w VIA Result. Dated September 9, 2016.

TWC (The Watershed Company). 2017. Energize Eastside Vegetation Impact Analysis. Prepared for Puget Sound Energy, Bellevue, WA. Prepared by The Watershed Company, Kirkland, WA. November 2017.

USDA (U.S. Department of Agriculture). 2011. Assessing Urban Forest Effects and Values, Los Angeles' Urban Forest. March 2011.

Recreation

City of Bellevue. 2015. Comprehensive Plan. Available: http://www.ci.bellevue.wa.us/comprehensive_plan.htm. Accessed August 19, 2016.

City of Bellevue. 2016. Bellevue Parks & Open Space System Plan. City Council Approved Draft. Available: https://www.bellevuewa.gov/pdf/Parks/parks-open-space-plan_draft_5-2-16.pdf. Accessed July 6, 2016.

City of Newcastle. 2016. 2035 Comprehensive Plan. Available: http://www.ci.newcastle.wa.us/community_development/Plans/Newcastle%202015%20Comprehensive%20Plan%20FINAL%20DRAFT%202016-07-29.pdf. Accessed September 1, 2016.

City of Redmond. 2013. Transportation Master Plan. Available: http://www.redmond.gov/PlansProjects/Transportation/TransportationMasterPlan. Accessed September 1, 2016.

City of Redmond. 2015. 2030 City of Redmond Comprehensive Plan. Amended May 30, 2015.

City of Renton. 2011. Parks, Recreation, and Natural Areas Plan. November. Available: http://www.rentonwa.gov/cms/one.aspx?portalId=7922741&pageId=8838909. Accessed: February 2, 2018.

King County. 2016. King County Parks List. Available: http://gismaps.kingcounty.gov/ParkFinder/. Accessed July 14, 2016.

Historic and Cultural Resources

DAHP (Washington State Department of Archaeology and Historic Preservation). 2016. Washington Information System for Architectural and Archaeological Records Data (WISAARD) [restricted access database]. Last updated 2016. Accessed: July 22, 2016.

FTA (Federal Transit Administration). 2006. Noise and Vibration Impact Assessment. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed: July 20, 2016.

King County Assessor. 2016. King County iMap. Available: http://www.kingcounty.gov/services/gis/Maps/imap.aspx. Accessed: July 22, 2016.

NRCS (Natural Resources Conservation Service). 2016. Web Soil Survey. Available: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed: August 24, 2016.

Troost, Kathy G., and Derek B. Booth. 2008. Geology of Seattle and the Seattle Area, Washington. Reviews in Engineering Geology XX:1-35.

Environmental Health - Electric and Magnetic Fields

ACGIH (American Council of Governmental Industrial Hygienists). 2009. Threshold Limit Values for Chemical Substances and Physical Agents, Biological Exposure Indices. Cincinnati, ACGIH.

DNV GL. 2016. A Detailed Approach to Assess AC Interference Levels Between the Energize Eastside Transmission Line Project and the Existing Olympic Pipelines, OLP16 & OPL20. Memo to: Puget Sound Energy. September 9, 2016.

Enertech Consultants. 2017. Technical Review Memorandum Regarding the Power Engineers 230 kV Eastside Line Project, EMF Calculations and Report - Revision 2. March 23, 2017.

EPRI (Electric Power Research Institute). 2005. EPRI AC Transmission Line Reference Book—200 kV and Above, Third Edition, 1011974, page 7-25. Electric Power Research Institute, Palo Alto, CA.

ICNIRP (International Commission on Non-ionizing Radiation Protection). 2010. Guidelines for Limiting Exposure to Time-varying Electric and Magnetic Fields (1 Hz to 100 kHz). Healthy Phys 99(6): 818-836. Available at: http://www.icnirp.de/documents/LFgdl.pdf.

IEEE (Institute of Electrical and Electronics Engineers). 2002. IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0 – 3 kHz. IEEE Std C95.6-2002. Available at: http://www.sandiegocounty.gov/content/dam/sdc/pds/ceqa/Soitec-Documents/Final-EIR-Files/references/rtcref/ch9.0/RTCrefappx/2014-12-19_IEEE2002.pdf.

Kothapalli, Sunitha. 2017. Personal communication. Email communication between Reema Shakra of ESA, Sunitha Kothapalli, Consulting Engineer, Electric Transmission Planning of Puget Sound Energy, and Brad Strauch, Energize Eastside Project Manager of Puget Sound Energy, March 29, 2017.

Power Engineers. 2017a. *230 kV Energize Eastside Project, EMF Calculations and Report – Revision 2*. Power Engineers. March 7, 2017.

Power Engineers. 2017b. *230 kV Energize Eastside Project, Addendum to EMF Calculations and Report – Revision 0*. Power Engineers. March 31, 2017.

Severson R.K., R.G. Stevens, W.T. Kaune, D.B. Thomas, L. Heuser S. Davis, and L.E. Sever. 1988. Acute nonlymphocytic leukemia and residential exposure to power frequency magnetic fields. American Journal of Epidemiology 128(1):10-20. Available at: http://www.sandiegocounty.gov/content/dam/sdc/pds/ceqa/Soitec-Documents/Final-EIR-Files/references/rtcref/ch9.0/RTCrefappx/2014-12-19_Severson1988.pdf.

Silva, J.M., N. Hummon, D. Rutter, and C. Hooper. 1988. Power frequency magnetic fields in the home. Piscataway (NJ): Institute of Electrical and Electronics Engineers. 88 WM 101-8.

WHO (World Health Organization). 2002. Establishing a Dialogue on Risks from Electromagnetic Fields. Radiation and Environmental Health Department of Protection of the Human Environment World Health Organization. Geneva, Switzerland. Available: http://www.who.int/peh-emf/publications/en/EMF_Risk_Chpt3.pdf.

Zaffanella, L. 1993. Survey of residential magnetic field sources. Volume 1: Goals, results and conclusions (Final Report). Palo Alto, CA: EPRI. TR-102759-V1.

Environmental Health - Pipeline Safety

ASCE (American Society of Civil Engineers). 2009. ASCE Manual No. 74: Guidelines for Electrical Transmission Line Structural Loading. Edited by C. Jerry Wong and Michael D. Miller. 3rd Edition. 204 pp. Available: http://www.asce.org/templates/publications-book-detail.aspx?id=8072.

Bellevue Fire Department. Undated. Bellevue Fire Department Standards of Response Coverage. Prepared by Michael Eisner, Fire Chief, with Eric Keenan, Bruce Kroon, Babette Bechtold, William Lie, Kieron Gillmore, and Midge Tarvid. 91 pages.

BP and Olympic (Olympic Pipe Line Company). 2016. Olympic Pipe Line Company/BP Pipelines NA Inc. General Construction and Right-of-Way Requirements. Revision date: 03/11/2016. Available: http://www.energizeeastsideeis.org/uploads/4/7/3/1/47314045/olympic_pipe_line_construction_requirements_rev_03_11_2016.pdf.

CDE (California Department of Education). 2007. Guidance Protocol for School Site Pipeline Risk Analysis. February 2007.

City of Bellevue. 2013. Comprehensive Emergency Management Plan. Available at http://www.ci.bellevue.wa.us/fire_emergency_response.htm. Access on March 27, 2017.

City of Newcastle. 2008. Comprehensive Emergency Management Plan. Available at http://www.ci.newcastle.wa.us/emergency_preparedness.htm. Accessed on March 27, 2017.

City of Redmond. 2015. 2015 Comprehensive Emergency Management Plan Update. Available at http://www.redmond.gov/PublicSafety/DisasterPreparedness/plans/comprehensive/. Accessed on March 27, 2017.

City of Renton. 2012. Comprehensive Emergency Management Plan. Available at http://rentonwa.gov/emergencies/default.aspx?id=2084. Accessed on March 27, 2017.

DNV GL. 2016. A Detailed Approach to Assess AC Interference Levels Between the Energize Eastside Transmission Line Project and the Existing Olympic Pipelines, OLP16 & OPL20. Memo to: Puget Sound Energy. September 9, 2016.

Ecology (Washington State Department of Ecology). 2016. Focus on Environmental Harm from Oil Spills. Spill Prevention, Preparedness, and Response Program. Pamphlet prepared by Ecology. Publication Number: 10-08-001 (Rev. 02/16). Available: https://fortress.wa.gov/ecy/publications/documents/1008001.pdf. February 2016.

EDM Services. 2017. Pipeline Safety Technical Report (Technical Report, Pipeline Safety and Risk of Upset). Prepared for Environmental Science Associates, Seattle, WA. Prepared by EDM Services, Inc., Simi Valley, WA. April 2017.

Fieltsch, W., and B. Winget. 2014. Mitigation of Arcing Risks to Pipelines Due to Phase-to-Ground Faults at Adjacent Transmission Powerline Structures. Paper No. 4389 from Corrosion 2014 Conference. NACE International, Houston, TX.

Hoffman D., B.A. Rattner, G.A. Burton Jr., and J Cairns Jr. (eds.). 2003. Handbook of Ecotoxicology. Lewis Publishers. Washington, DC.

NOAA (National Oceanic and Atmospheric Administration). 2016. Oil Types. Developed by NOAA, Office of Response and Restoration. Available: http://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/oil-types.html. Revised September 19, 2016.

Olympic (Olympic Pipe Line Company). 2017a. Olympic Pipe Line Operations Fact Sheet. Olympic Pipe Line Company. Downloaded from http://www.workingwaterfrontportland.org/profiles/olympic_pipeline.pdf on April 24, 2017.

Olympic (Olympic Pipe Line Company). 2017b. Responses to Phase 2 Energize Eastside Draft EIS Questions for BP/Olympic. August 11, 2017.

PHMSA (Pipeline and Hazardous Materials Safety Administration). 2016. Pipeline Incident 20 Year Trends. Accessed October 12, 2016. Available at: http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends.

Stantec. 2017. Technical Review: Energize Eastside AC Interference Analysis. Prepared for ESA, Seattle, WA; prepared by Stantec Consulting Services, Inc., Markham, ON. May 2, 2017 (Rev 0).

USDA (U.S. Department of Agriculture). 2000. Wildland Fire in Ecosystems. Effects of Fire on Fauna. USDA Forest Service, rocky Mountain Research Station. General Technical Report RMRS-GTR-42 Volume 1. Available: http://www.fs.fed.us/rm/pubs/rmrs_gtr042_1.pdf. January 2000.

UTC (Utilities and Transportation Commission). 2017. Olympic Pipe Line Inspection Reports. Available online at https://www.utc.wa.gov/regulatedIndustries/transportation/pipeline/Pages/InspectionReports-OlympicPipeline.aspx.

West, Kim. 2016. Personal communication. Email from Kim West, Project Engineer (Olympic Pipe Line Company) to Karmen Martin (ESA). August 5, 2016 at 4:32 PM with attachment.

Economics

American Forests. 2008. Urban Ecosystem Analysis, City of Bellevue, WA. Calculating the Value of Nature. Available: https://www.google.com/?gws_rd=ssl#q=Urban+Ecosystem+Analysis%2C+City+of+Bellevue%2C+WA.+Calculating+teh+Value+of+Nature. Accessed: September 2016.

ACTrees (Alliance for Community Trees). 2011. Benefits of Trees and Urban Forests: A Research List. Available: http://www.actrees.org/files/Research/benefits_of_trees.pdf. Accessed: September 2016.

EPA (U.S. Environmental Protection Agency). 2015. The social cost of carbon. Available: http://www.epa.gov/climatechange/EPAactivities/economics/scc.html. As cited in i-Tree, 2016.

Interagency Working Group on Social Cost of Carbon. 2015. Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866. Available: http://www.whitehouse.gov/sites/default/files/omb/inforeg/scc-tsd-final-july-2015.pdf. As cited in i-Tree, 2016.

i-Tree. 2016. i-Tree Ecosystem Analysis, Eastside Energize. Urban Forest Effects and Values. October 2016.

The Watershed Company. 2016a. Tree Inventory: Energize Eastside Project. Includes the following separate reports: City of Bellevue Tree Inventory Report; King County Tree Inventory Report; City of Newcastle Tree Inventory Report; City of Redmond Tree Inventory Report; City of Renton Tree Inventory Report; Richards Creek Parcel Tree Inventory Report; Segment O Tree Inventory Report; Segment P Tree Inventory Report; and Bypass Routes 1 and 2 Tree Inventory and Analysis Report. Prepared for Puget Sound Energy, Bellevue, WA. Prepared by The Watershed Company, Kirkland, WA. May and July 2016.

The Watershed Company. 2016b. Tree Inventory Excel Database titled Willow, Oak, Richards, Bypass_EIS Segments w VIA Result. Dated September 9, 2016.

TWC (The Watershed Company). 2017. Energize Eastside Vegetation Impact Analysis. Prepared for Puget Sound Energy, Bellevue, WA. Prepared by The Watershed Company, Kirkland, WA. November 2017.

USFS (U.S. Forest Service). 2017. i-Tree. Public domain software suite developed by the USDA Forest Service. Available: https://www.itreetools.org/. Accessed: January 2018.

Earth Resources

ASCE (American Society of Civil Engineers). 2009. ASCE Manual No. 74: Guidelines for Electrical Transmission Line Structural Loading. Edited by C. Jerry Wong and Michael D. Miller. 3rd Edition. 204 pp. Available: http://www.asce.org/templates/publications-book-detail.aspx?id=8072.

City of Seattle. 2017. Emergency Management, Earthquakes. Available: http://www.seattle.gov/emergency-management/hazards/earthquake. Accessed October 3, 2017.

City of Seattle. 2015. Emergency Management, Earthquake Risks. Available: http://www.seattle.gov/emergency-management/what-if/hazards/earthquake. Accessed August 24, 2015.

CREW (Cascadia Region Earthquake Workgroup). 2013. Cascadia Subduction Zone Earthquakes: A magnitude 9.0 earthquake scenario, Update.

DNR (Department of Natural Resources). 2017. Modeling a Magnitude 7.2 Earthquake on the Seattle Fault Zone in Central Puget Sound. 2012–2013. Available: http://file.dnr.wa.gov/publications/ger_seismic_scenario_seattle.pdf. Accessed October 4, 2017.

GeoEngineers. 2016. Geotechnical Engineering Services Report for Energize Eastside Project. June 8, 2016.

IEEE (Institute of Electrical and Electronics Engineers). 2017. The National Electrical Safety Code. Available: https://www.techstreet.com/ieee/standards/ieee-c2-2017?product_id=1914980.

PNSN (Pacific Northwest Seismic Network). 2017. Cascadia Subduction Zone. Available: https://pnsn.org/outreach/earthquakesources/csz. Accessed October 3, 2017.

Cumulative Impacts

CEQ (Council on Environmental Quality). 2016. Final Guidance for Federal Departments and Agencies on Consideration of Greenhous Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews. Memorandum from Christina Goldfuss, CEQ. August 1, 2016. Available: https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance.

Sound Transit. 2011. East Link Project Final EIS July 2011. Available at http://www.soundtransit.org/Projects-and-Plans/East-Link-Extension/East-Link-Extension-document-archive/East-Link-Documents/East-Link-document-collections/East-Link-Final-EIS-document-collection. Accessed September 24, 2015.

Geographic Information System (GIS) Data Sources (for Maps and Analyses)

City of Bellevue. 2015. GIS data provided to Environmental Science Associates (ESA), Seattle, WA, by the City of Bellevue.

City of Issaquah. 2015. GIS data provided to Environmental Science Associates (ESA), Seattle, WA, by the City of Issaquah.

City of Kirkland. 2015. GIS data provided to Environmental Science Associates (ESA), Seattle, WA, by the City of Kirkland.

City of Newcastle. 2015. GIS data provided to Environmental Science Associates (ESA), Seattle, WA, by the City of Newcastle.

City of Redmond. 2015. GIS data provided to Environmental Science Associates (ESA), Seattle, WA, by the City of Redmond.

City of Renton. 2015. GIS data provided to Environmental Science Associates (ESA), Seattle, WA, by the City of Renton.

City of Sammamish. 2015. GIS data provided to Environmental Science Associates (ESA), Seattle, WA, by the City of Sammamish.

DAHP (Washington State Department of Archaeology and Historic Preservation). 2015. WISAARD (Washington Information System for Architectural & Archaeological Records Data) on-line database. Available: https://fortress.wa.gov/dahp/wisaardp3/.

Ecology (Washington State Department of Ecology). 2014. National Hydrology Dataset (NHD) watercourse layer. Available: http://www.ecy.wa.gov/services/gis/data/inlandWaters/NHD/NHDmajor.htm.

FEMA (Federal Emergency Management Agency). 2016. National Flood Hazard Layer (NFHL). Available: https://hazards.fema.gov/femaportal/wps/portal/NFHLWMS. Accessed November 2016.

HRA (Historical Research Associates). 2016. GIS data provided to Environmental Science Associates (ESA), Seattle, WA, by HRA, Seattle, WA, regarding parcel construction dates.

King County. 2015. King County GIS Data Portal. Available: http://www5.kingcounty.gov/gisdataportal/.

NAIP (National Agriculture Imagery Program). 2015. NAIP Imagery website. Available: https://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/naip-imagery/.

NOAA (National Oceanic and Atmospheric Administration). 2011. C-CAP Land Cover Atlas website. Office for Costal Management, Digitalcoast. Available: https://coast.noaa.gov/digitalcoast/tools/lca.

Open Street Maps. 2016. Open Street Maps Washington Excerpt. Available: https://www.geofabrik.de/data/download.html.

PSE (Puget Sound Energy). 2015. GIS, CAD, and static map data provided to Environmental Science Associates (ESA), Seattle, WA, by PSE, Bellevue, WA.

PSE (Puget Sound Energy). 2016. GIS, CAD, and static map data provided to Environmental Science Associates (ESA), Seattle, WA, by PSE, Bellevue, WA.

PSE (Puget Sound Energy). 2017. GIS, CAD, and static map data provided to Environmental Science Associates (ESA), Seattle, WA, by PSE, Bellevue, WA. Included files titled *North_8-3-17.dxf and South_8-3-17.dxf* (sent on August 3, 2017), geodatabase titled *AccessRoutes_StringSite* (sent on August 11, 2017), and file titled *energize eastside non-variance (4-1 to RIC)_plan strs only_rev p* (sent on December 27, 2017).

SCL (Seattle City Light). 2015. GIS, CAD, and static map data provided to Environmental Science Associates (ESA), Seattle, WA, by SCL, Seattle, WA.

The Watershed Company. 2017. GIS Dataset Labeled as *2017-12-15 Data for EIS Consultant*. December 15, 2017.

UTC (Washington Utilities and Transportation Commission). 2015. Pipeline Maps on UTC's Pipeline Safety Map Viewer. Available: https://www.utc.wa.gov/regulatedIndustries/transportation/pipeline/Pages/pipelineMaps.aspx.

10

Distribution

energize EASTSIDE EIS

CHAPTER 10. DISTRIBUTION LIST

The following parties have received the Final EIS by digital or printed copy:

Federal Agencies

Army Corps of Engineers

Environmental Protection Agency

Federal Highway Administration

Postal Service

National Oceanic and Atmospheric Administration Fisheries

U.S. Fish and Wildlife Service

Tribal Governments

Duwamish Tribe

Muckleshoot Indian Tribe

Snoqualmie Nation

Stillaguamish Tribe

Suquamish Tribe

Tulalip Tribes

Regional

Puget Sound Clean Air Agency

Puget Sound Regional Council

Sound Transit

Washington State

Attorney General's Office

Department of Agriculture

Department of Archaeology and Historic Preservation

Department of Commerce

Department of Community Development

Department of Corrections

Department of Ecology SEPA Unit

Department of Fish and Wildlife

Department of Health

Regional Department of Housing and Urban Development

Department of Natural Resources

Department of Social and Health Services

Department of Transportation

Parks & Recreation Commission

Recreation Conservation Office

Utilities and Transportation Commission

Local

City of Bellevue Fire Department

City of Bothell

City of Issaquah

City of Kenmore

City of Kent

City of Renton Fire Department

City of Sammamish

City of Tukwila

City of Woodinville

East Bellevue Community Council

Houghton Community Council

King County Boundary Review Board

King County Department of Permitting & Environmental Review

King County Department of Transportation

King County Executive Office

King County Historic Preservation Program

King County Metro Transit

King County Department of Natural Resources & Parks

King County Parks Department

King County Wastewater Treatment Division

King County Water and Land Resources Division

King Eastside Community Services Office

Seattle and King County Public Health

Seattle City Light

Seattle Public Utilities

Libraries

Bellevue Library

Fairwood Library

Lake Hills Library

Newcastle Library

Newport Way Library

Redmond Library

Renton Highlands Library

Renton Library

Seattle Public Library

University of Washington, College of Architecture & Urban Planning Library

Other

Bellevue Chamber of Commerce

Bellevue Downtown Association

Bellevue School District #405

Cascade Water Alliance

CenturyLink

Coal Creek Utility District

Comcast

Eastgate Public Health Center

Eastside Audubon Society

Energy Facility Site Evaluation Council

Evergreen Health

Greater Seattle Chamber of Commerce

Lake Washington School District #414

Meydenbauer Bay Neighbors Association

Northshore Utility District

Olympic Pipe Line Company

Puget Sound Energy

Puget Sound Partnership

Renton Chamber of Commerce

West Bellevue Community Club

Woodinville Water District

11

Acronyms and Glossary

energize EASTSIDE EIS

CHAPTER 11. Acronyms and Glossary

ACRONYMS AND ABBREVIATIONS

AC	alternating current
ACGIH	American Council of Governmental Industrial Hygienists
ASCE	American Society of Civil Engineers
BCC	Bellevue City Code
BMPs	Best Management Practices
BP	BP Pipelines-North America
BPA	Bonneville Power Administration
Btu	British thermal unit
CAP	Corrective Action Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO_2	carbon dioxide
CO_2e	CO_2 equivalent
COA	Certificate of Appropriateness
DAHP	Washington State Department of Archaeology and Historic Preservation
DC	direct current
EBCC	East Bellevue Community Council
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
ELF	extremely low-frequency
EMF	electric and magnetic fields
EPA	U.S. Environmental Protection Agency
EPF	Essential Public Facility
ERC	Eastside Rail Corridor
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency

FERC	Federal Energy Regulatory Commission
GHG	greenhouse gas
GIS	geographic information system
GMA	Growth Management Act
HB	House Bill
Hz	hertz
I-90	Interstate 90
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IDP	Inadvertent Discovery Plan
IEEE	Institute of Electrical and Electronics Engineers
JARPA	Joint Aquatic Resource Permits Application
KC Landmarks	King County and Local Landmarks List
KCHPP	King County Historic Preservation Program
kV	kilovolt
KVP	key viewpoint
LUC	City of Bellevue Land Use Code
mG	milligauss
MW	Megawatt
N_2O	nitrous oxide
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NMC	City of Newcastle Municipal Code
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
Olympic	Olympic Pipe Line Company
OPGW	optical ground wire
PGA	peak ground acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PHS	Priority Habitat and Species

PSE	Puget Sound Energy
RCW	Revised Code of Washington
RMC	City of Renton Municipal Code
RZC	City of Redmond Zoning Code
SCL	Seattle City Light
SEPA	State Environmental Policy Act
SF_6	sulfur hexafluoride
SMP	Shoreline Master Program
SPU	Seattle Public Utilities
SR 520	State Route 520
USC	United States Code
USDA	U.S. Department of Agriculture
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTC	Utilities and Transportation Commission
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WHBR	Washington Heritage Barn Register
WHR	Washington Heritage Register

GLOSSARY

Term	Description
303(d) List	A state's list of impaired and threatened waters (e.g., stream/river segments, lakes).
AC Density	A measure of electrical interference adjacent to the pipeline.
AC Interference	Co-located pipelines, sharing, paralleling, or crossing high voltage transmission lines, may be subject to AC (electrical) interference. If the interference effects are high enough, they may compromise the integrity of the pipeline. High voltage interference can occur during normal operations, generally referred to as steady state, or during a power line fault.
Aesthetic Environment	The physical influences of human perception of the world.
Alternating Current (AC)	An electric current that periodically reverses direction. Alternating current is the form in which electric power is delivered to businesses and residences.
Ancillary	Providing necessary support to the primary activities or operation of an organization, institution, industry, or system.
Arc Distances	The distance a fault current can travel to or through the ground, such as between a power pole and a buried pipeline.
Arcing	An electric current that is brief and strong between two points of contact, usually associated with a short circuit or current interruption.
Auger	A tool with a large helical bit for boring holes in the ground.
Auxiliary Rubber Tire Vehicle	A vehicle with spare rubber tires.
Backfill	To refill an excavated hole with the material dug out of it.
Backhoe	A mechanical excavator that draws toward itself a bucket attached to a hinged boom.
Best Management Practices (BMPs)	Measures developed on a project-specific basis to minimize potential construction-related impacts. BMPs vary depending on the activities involved.
Block Load	The expected increase in energy demand from a specific customer or group of customers.
Bucket Truck	A truck equipped with an extendable, hydraulic boom carrying a large bucket for raising workers to elevated, inaccessible areas.
Carbon Sink	A natural environment that absorbs more carbon dioxide than it releases.

Term	Description
Cathodic Protection System	Cathodic protection systems prevent corrosion from occurring on the exterior of pipelines by substituting a new source of electrons, commonly referred to as an anode. The anode is designed as the sacrificial material installed to purposely corrode and protect the pipeline. There are two basic types of anodes: the galvanic type and the impressed current type.
Certificate of Appropriateness (COA)	The entitlement required to alter an individual landmark and any property within a landmark district.
Climate Change	The changing of the earth's climate caused by natural fluctuations and human activities that alter the composition of the global atmosphere.
Coating Stress	Pipelines typically have an exterior coating to protect from corrosion. The susceptibility of this coating to breakdown is based on the type and thickness of the coating and the voltage the pipeline is subject to.
Coating Stress Voltage	During fault conditions, damage to a pipeline's coating can occur if the voltage between the pipeline and surrounding soil becomes excessive (see coating stress).
Collisions	When birds fly directly into conductors, resulting in injury or mortality from impact.
Concrete Pump Truck	A machine used for transferring liquid concrete via a pumping motion.
Conductor	An object or type of material that allows the flow of electrical current in one or more directions. A transmission line is an electrical conductor. Conductivity, in general, is the capacity to transmit electricity.
Contrast	The extent to which a viewer can distinguish between an object and its background.
Corrective Action Plan (CAP)	List of corrective actions that are to be made manually by local electrical system dispatchers to control local electrical problems.
Critical Areas	Areas identified by counties and local municipalities as needing to be protected. Critical areas include geologic hazard areas, frequently flooded areas, wetlands, streams, fish and wildlife habitat conservation areas (FWHCAs), and critical aquifer recharge areas.
Cultural Resource	Collective evidence of the past activities and accomplishments of people. Buildings, objects, features, locations, and structures with scientific, historic, and cultural value are all examples of cultural resources.
Dead-End Tower	Structure used where the line ends, turns with a high angle, or at major crossings (such as highways or rivers). Dead-end towers must be stronger than other poles because they are under tension from just one side. Often they have additional guy wires, are larger in diameter, and/or have larger footings than other poles.

Term	Description
Determined Eligible for Listing	A property that has been determined by the State Historic Preservation Office (SHPO) or local preservation office to meet required criteria for inclusion on a historic register.
Distribution System	The final stage in the delivery of electric power; it carries electricity from the transmission system to individual consumers.
Eastside	An area of King County, Washington, roughly defined as extending from Redmond in the north to Renton in the south, and between Lake Washington and Lake Sammamish.
Ecosystem Services	The benefits that the ecosystem provides to humankind.
Electric and Magnetic Fields (EMF)	Invisible areas of energy often referred to as radiation that are associated with the use of electrical power and various forms of natural and man-made lighting. Also referred to as electromagnetic fields.
Electrical Interference	Any electrical disturbance on a metallic structure (e.g., pipeline) as a result of a stray current.
Electrocution	When birds directly contact energized and grounded conductors or equipment.
Electromagnetic	Of or relating to the interrelation of electric currents or fields and magnetic fields.
Endangered Species	A species of animal or plant that is seriously at risk of extinction. These species are listed by state or federal agencies to implement protection measures.
Excavator	Large machine for removing soil from the ground, especially on a building site.
External Corrosion	Occurs when the metal of the pipeline reacts with the environment, causing the pipeline to corrode (or rust) on the outside of the pipe.
Facility Response Plan (FRP)	A plan prepared by certain facilities that store and use oil to demonstrate the facility's preparedness to respond to a worst-case oil discharge.
Fault Conditions	Fault conditions, usually initiated by lightning, result in the transfer of electrical power indirectly from one or more AC powerline conductors (i.e., wire) via the metallic transmission line pole to the ground, or directly to the ground as a result of an overhead conductor falling to the ground.
Fault Currents	Faults (or fault currents) are any abnormal current flow from the standard intended operating conditions. These faults are typically caused by lightning, insulator failure, mechanical failure, and transformer failure.
Fixed Value	The structural value + the carbon storage value.
Flash Fire	Can occur when a vapor cloud is formed, with some portion of the vapor cloud within the combustible range, and the ignition is delayed.

Term	Description
Foreground	The part of a view that is nearest to the observer.
Fossil Fuels	Buried combustible geologic deposits of organic materials, formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years.
Geologic Hazard Areas	Areas that are susceptible to erosion, sliding, earthquake, or other geologic events.
Greenhouse Gas (GHG) Emissions	Any of the atmospheric gases that contribute to the greenhouse effect by absorbing infrared radiation produced by solar warming of the Earth's surface. They include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (NO_2), and water vapor.
Hazardous Material	Any substance or material that could adversely affect the safety of the public, handlers, or carriers during transportation.
Hazardous Waste	Waste that is dangerous or potentially harmful to human health or the environment. Hazardous wastes can be liquids, solids, gases, or sludges. They can be discarded commercial products, like cleaning fluids or pesticides, or the byproducts of manufacturing processes.
Heat Flux	Humans in the vicinity of a fire receive heat from the fire in the form of thermal radiation. Radiant heat flux decreases with increasing distance from a fire.
High Voltage	Usually considered any voltage 69 kilovolts or higher.
Historic Archaeological Resources	Material remains of human life or activities that are at least 100 years of age, of archeological interest, and determined eligible for listing on the NRHP.
Historic Register-listed Resources	Resource within the study area that is included as a listed resource on a register of importance.
Historic Resource	A prehistoric or historic archaeological site, as well as historic sites, buildings, structures, objects, districts, and landscapes.
Incident	As used in pipeline safety regulations, an incident is an event occurring on a natural gas pipeline for which the operator must make a report to the Office of Pipeline Safety. Events of similar magnitude affecting hazardous liquid pipelines are considered accidents.
Individual Risk	The frequency that an individual may be expected to sustain a given level of harm from the realization of exposure to specific hazards, at a specific location. The individual risk results can be expressed as likelihood (e.g., fatalities per year).
In-Line Inspection	The inspection of a steel pipeline using an electronic instrument or tool that travels along the interior of the pipeline.

Term	Description
Insulator (electrical)	A material whose internal electric charges do not flow freely, and therefore make it nearly impossible to conduct an electric current under the influence of an electric field. Insulators are used in electrical equipment to support and separate electrical conductors without allowing current through themselves. They are often used to attach electric power distribution or transmission lines to utility poles and transmission towers. They support the weight of the suspended wires without allowing the current to flow through the tower to ground.
Integrated Resource Plan	A plan prepared by PSE and updated every 2 years, describing how forecasted annual peak and energy demand will be met into the future. The IRP process considers a full range of power sector investments to meet new demand for electricity, not only in new generation sources, but also in transmission, distribution, and demand-side measures such as energy efficiency on an equal basis.
Integrity	A term used to describe the condition of a pipeline. Pipeline integrity ensures that the pipeline can safely carry out its function under the conditions for which it was designed.
Integrity Management Program	A documented set of policies, processes, and procedures that an operator implements to ensure the integrity of a pipeline. Federal pipeline safety regulations specify what an operator's integrity management program must include.
Internal Corrosion	Metal loss due to corrosion on the internal surfaces of a pipeline.
Lead Agency	The agency responsible for all procedural aspects of SEPA compliance.
Lifecycle Emissions	Emissions associated with the creation and existence of a project, including emissions from the manufacture, transportation of the component materials, and from the manufacture of the machines required to produce the component materials.
Line Truck (electrical)	A truck used to transport personnel, tools, and material for electric supply line work.
Liquefaction	Occurs where saturated, loose granular soils are subjected to ground shaking such that the soil loses strength and begins to behave more like a liquid than a solid. Saturated loose soils within 50 feet of the ground surface are at most risk of liquefaction.
Load Shedding	Cutting off the electric current on certain lines when the demand for electricity exceeds the power supply capability of the network. A last-resort measure used by an electric utility company to avoid a total blackout of the power system.
Magnetic Field	Magnetic effect of electric currents and magnetic materials.

Term	Description
Managed Right-of-Way	To ensure safe and reliable operation of overhead transmission lines, the NESC specifies minimum horizontal and vertical clearances between the transmission lines and vegetation, buildings, and the ground. Trees and overhanging branches must be managed or removed to maintain appropriate clearances.
Material Failure	Defects in the pipeline as a result of the pipe manufacturing process, stress on the pipeline handling during transport, or weld failures.
Nameplate Capacity	The number registered with authorities for classifying the power output of a power station usually expressed in megawatts (MW).
National Electric Safety Code	The safety guidelines that PSE follows during the installation, operation, and maintenance of transmission lines and associated equipment. The NESC contains the basic provisions necessary for worker and public safety under specific conditions, including electrical grounding and protection from lightning strikes.
National Pollutant Discharge Elimination System	A program authorized by the Clean Water Act to control water pollution by regulating point sources that discharge pollutants into waters of the United States.
Olympic Pipeline System	Two steel pipeline systems, 16 inches and 20 inches in diameter, that transport gasoline, diesel, and jet fuel (petroleum products) from Blaine, Washington to Portland, Oregon. The pipelines are buried approximately 3 to 4 feet below the ground surface.
Overlapping Impressed Current Systems	Systems that consist of an array of metallic anodes buried in the ground along the pipeline with a connection to a source of direct current (DC) electric current to help drive the protective electrochemical reaction.
Partner Cities	The Eastside jurisdictions working together to prepare this SEPA EIS, including Kirkland, Redmond, Bellevue (as Lead Agency), Newcastle, and Renton.
Pool Fire	Occurs when flammable liquid pools on the ground and comes in contact with an outside ignition source.
Power Grid	A system of synchronized power providers and consumers connected by transmission and distribution lines and operated by one or more control centers.
Precontact Cultural Resources	Dating prior to the point of contact between European-American peoples (including explorers, fur traders, and military personnel) with Native American peoples. In Seattle, the Precontact period is considered to have ended with the arrival of the Denny Party in 1851.
Probabilistic Pipeline Risk Assessment	A type of risk assessment used to estimate event frequencies or probabilities, for a specified time period, associated with specific, measurable consequences.
Probability	A measure of the likelihood that an event will occur within some unit of time.

Term	Description
Programmatic EIS	An environmental impact statement (EIS) that addresses in general terms the environmental effects of long-term, multi-step programs.
Puller	A device for separating two components that are secured by press fitting them.
Recommended Eligible for Listing	Historic or cultural resource that is recommended eligible for listing.
Right-of-Way (electric)	A corridor of land on which electric lines may be located. The transmission owner may own the land in fee, own an easement, or have certain franchise, prescription, or license rights to construct and maintain lines.
Risk	A measure of the likelihood that an adverse event could occur, and the magnitude of the expected consequences should it occur.
Scenic Views	Views of visual resources that are considered special attributes of the study area and region.
Scoping	An initial step in the SEPA and NEPA environmental review process, where agencies, tribes, and the public learn about the proposed project and provide comments on the content that should be covered in the Environmental Impact Statement (EIS). Often, comments on the scope describe potential environmental impacts or suggest alternatives that should be evaluated.
Seismic Hazards	Include the primary effects of earthquakes, such as ground displacement from fault rupture and ground shaking and secondary effects such as liquefaction, landslides, tsunamis, and seiche waves.
Sequestration	Long-term storage of carbon dioxide or other forms of carbon.
Settlement	Increase in vertical strain on the soil causes the soil to compact.
Significant Historic Resources	A resource that is either register-listed, recommended eligible for listing, or determined eligible for listing.
Significant Tree	Trees that are specifically defined and protected for their unique ecological and aesthetic value.
Societal Risk	The annual probability that a specified number of people will be affected by a given pipeline release event.
Spill Prevention and Control Plan	A plan to prevent the discharge of oil or other substances into water bodies.
Stepped Down	To reduce or decrease voltage.
Stormwater Pollution Prevention Plan	A plan describing best management practices (BMPs) to control and treat stormwater.
Study Area Communities	Redmond, Bellevue, Newcastle, and Renton.
Substation	Facility with equipment that switches, changes, or regulates electric voltage.

Term	Description
Surcharge Loading	The presence of equipment and other loads on the soil surface.
Tangent Poles	Poles that are in a straight line with other poles.
Telecommunications Line	A pipe, cable, or an arrangement of lines of wire or other conductors, by which telephone or other kinds of communications are transmitted and received.
Tensioner	A device that applies a force to create or maintain tension. The force may be applied parallel to, or perpendicular to, the tension it creates.
Third-Party Damage	Damage to pipelines that can occur during excavation, digging, or other activities by persons not affiliated with the pipeline operator or their contractors.
Threatened Species	Any species (including animals, plants, fungi, etc.) that are vulnerable to endangerment in the near future.
Trackhoe	A hydraulic excavator that is used in construction to dig holes or trenches for infrastructure.
Traditional Cultural Property	A property that is eligible for inclusion in the National Register of Historic Places (NRHP) based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community.
Transformed	The byproduct of a process through which energy is changed from one form to another. Oftentimes, this refers to the change in voltage of an electrical current.
Transformer	A device used to change the voltage of an alternating current in one circuit to a different voltage in a second circuit, or to partially isolate two circuits from each other. Transformers consist of two or more coils of conducting material, such as wire, wrapped around a core (often made of iron). The magnetic field produced by an alternating current in one coil induces a similar current in the other coils. If there are fewer turns on the coil that carries the source of the power than there are on a second coil, the second coil will provide the same power but at a higher voltage. This is called a step-up transformer. If there are fewer turns on the second coil than on the source coil, the outgoing power will have a lower voltage. This is called a step-down transformer.
Transmission	The bulk transfer of electrical energy from generating power plants to electrical substations located near demand centers.
Transmission Lines	A system of structures, wires, insulators, and associated hardware that carry electric energy from one point to another in an electric power system. Lines are operated at relatively high voltages varying from 69 kV up to 765 kV, and are capable of transmitting large quantities of electricity over long distances.
Trench(ing)	To dig a long cut or trench into the ground.

Term	Description
Turbidity	A measure of water clarity indicating how much materials suspended in the water reduce the passage of light through the water. Suspended materials could include soil particles, algae, plankton, microbes, or other substances.
Underbuild	To place transmission and distribution lines on the same poles.
Unevaluated Historic Resource	Meets the minimum age threshold for listing but has not been evaluated for its historic significance.
Utility Locater	The process of identifying and labeling underground utility lines. Excavating without knowing the location of underground utilities can result in damage, which can lead to service disruptions.
Vapor Cloud Explosion	Occurs when there is a sudden release of flammable vapor, it mixes with air, and is ignited by an outside source.
Vault	An underground room providing access to subterranean public utility equipment, such as switchgear for electrical equipment. Utility vaults are commonly constructed of reinforced concrete boxes, poured concrete, or brick. They are placed at regular intervals along an underground transmission or distribution line to allow access to the line for installation and maintenance of the line.
Viewer Awareness	Considers viewers' attention and focus and whether affected views are protected by policy, regulation, or custom.
Viewpoints	Locations from which visual resources can be viewed. Typically associated with residential properties or publicly accessible recreation areas, such as parks, trails, and open spaces.
Visual Character	The aggregate of the visible attributes of a scene or object, including natural features (topography, water bodies, vegetation) and built features (building height and form, types of infrastructure).
Visual Resources	Natural and constructed features of a landscape that are viewed by the public and contribute to the overall visual quality and character of an area. Such features include distinctive landforms, water bodies, vegetation, or components of the built environment that provide a sense of place, such as city skylines.
Washington State Growth Management Act (GMA)	Requires state and local governments to manage Washington's growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, preparing comprehensive plans, and implementing those plans through capital investments and development regulations.
Wellhead Protection Area	A surface and subsurface land area regulated to prevent contamination of a well or well-field supplying a public water system. This program, established under the Safe Drinking Water Act (42 U.S.C. 330f-300j), is implemented through state governments.