


Energize Eastside Project

Phase 2 Draft Environmental Impact Statement

Volume 1: Draft EIS

May 8, 2017

Prepared for the Cities of Bellevue, Newcastle, Redmond and Renton

Prepared by:
ESA

energize EASTSIDE EIS

DSD 010205

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

May 8, 2017

To Interested Parties, Agencies, and Organizations

Enclosed is the Phase 2 Draft Environmental Impact Statement (EIS) for the "Energize Eastside" project proposed by Puget Sound Energy (PSE). The Energize Eastside project is a proposal to construct approximately 18 miles of new 230 kilovolt (kV) electrical transmission lines and to 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) are jointly conducting a phased environmental review process under the State Environmental Policy Act for the Energize Eastside project. The Phase 1 Programmatic Draft EIS was completed and subject to public comment. Under WAC 197-11-060(5) the purpose of the Phase 1 Draft EIS is to evaluate, at a more general level, the environmental impacts of alternative methods to address the electrical transmission capacity deficiency identified by PSE. This Phase 2 Draft EIS has been prepared to analyze PSE's proposal and alternatives proposed by PSE. The EIS is not a permit - it is one of many sets of information permitting agencies will consider as they decide whether to approve the project and issue necessary permits.

The comment period opens May 8, 2017. The deadline for submitting comments is Wednesday, June 21, 2017. All comments related to the Draft EIS must be received by this date. Mailed items that are postmarked by Wednesday, June 21, 2017 will be accepted. Comments may be submitted orally at the public hearings or in writing. A valid physical mailing address is required to establish status as an official party of record.

Comments may be submitted orally at the public hearings or in writing.

Tuesday, May 23, 2017 6:00 – 8:30 PM: Oliver Hazen High School - 1101 Hoquiam Ave NE, Renton, WA 98059
Thursday, May 25, 2017 6:00 – 9:00 PM: Bellevue City Hall - 450 110th Ave NE, Bellevue, WA 98004
Saturday, June 3, 2017 2:00 – 4:30 PM: Rose Hill Elementary - 8110 128th Ave NE, Kirkland, WA 98033

Written comments may be submitted:

Online at:	www.EnergizeEastsideEIS.org
By email to:	Info@EnergizeEastsideEIS.org
By mail to:	City of Bellevue Development Services Department Attn: Heidi Bedwell, Environmental Planning Manager P.O. Box 90012 Bellevue, WA 98009-9012

For questions about public hearings or commenting, email info@EnergizeEastsideEIS.org or contact: Heidi Bedwell, Environmental Planning Manager/Energize Eastside EIS Program Manager, City of Bellevue Development Services Department, 425-452-4862.

Following receipt and consideration of public comment on the Phase 2 Draft EIS, a Final EIS will be issued that incorporates the information from both the Phase 1 and Phase 2 Draft EISs.

Thank you for your interest and participation in the environmental review of the Energize Eastside project. We welcome your comments.

Sincerely,

Carol V Helland

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

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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 18 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 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, along with route and pole options within some segments of the 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 Phase 1 Draft EIS (released in January 2016) broadly evaluated the general impacts and implications associated with feasible and reasonable options available to address PSE's identified objectives for the project. This Phase 2 Draft EIS is a project-level evaluation, describing impacts at a project-specific level. This includes details of development at specified geographic locations, including a more detailed analysis of potential environmental impacts. The project-level Phase 2 Draft EIS incorporates the Phase 1 Draft EIS by reference. Although the City of Kirkland is a Partner City, no project-level analysis was evaluated in 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. PSE would also continue its energy conservation program systemwide and for the Eastside.[1] As appropriate, conductor replacement on existing lines would occur. New 230 kV overhead transmission lines and a new substation would not be constructed.	
Alternative 1: 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 18 miles of new 230 kV overhead transmission lines between the Sammamish and Talbot Hill substations. This would generally occur within the existing transmission line corridor connecting these two substations. Several options are also evaluated for the portion of the project extending through central and south Bellevue.

[1] Energy efficiency improvements described under the No Action Alternative apply to all of the alternatives.

CONSTRUCTION TIMING FOR THE PROJECT

PSE intends to construct the project by the summer of 2018, if possible. This timeframe is based on a projected capacity deficiency that could affect system reliability by that date.

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

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City of Renton

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GOVERNMENTAL ACTIONS

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

Federal

- Section 10/404 permit—U.S. Army Corps of Engineers
- Endangered Species Act consultation—National Marine Fisheries Service and/or 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
- 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 Conditional Use Permit		●		●	
Zoning Conditional Use Permit		●	●	●	
Essential Public Facilities Permit	●				
Critical Areas Permit		●	●	●	
Building and Related Permits		●	●	●	●
Clearing and Grading Permit	●	●	●	●	●
Right-of-Way Permit	●	●	●	●	●

AUTHORS AND PRINCIPAL CONTRIBUTORS

This Phase 2 Draft EIS has been prepared under the direction of the City of Bellevue, in consultation with the Co-Lead Agencies.

Research and analysis 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, and ecosystem services; 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.

DATE OF ISSUE

May 8, 2017

END OF COMMENT PERIOD

All comments must be postmarked or emailed before midnight, June 21, 2017.

COMMENTING ON THE DRAFT EIS

Individuals may comment on the Draft EIS by emailing or mailing written comments to:

Heidi Bedwell
Energize Eastside EIS Program Manager
Environmental Planning Manager, Land Use Division, Development Services
City of Bellevue
P.O. Box 90012
Bellevue, WA 98009-9012
Email: info@EnergizeEastsideEIS.org

Online at: www.EnergizeEastsideEIS.org

Commenters should include "Energize Eastside" in the subject line of the email or letter, and must provide their mailing address.

Individuals may also provide comments at any of the three public hearings to be held in May and June 2017. Each hearing will begin with an open house, followed by a short presentation and an oral comment period. Hearings will be held as follows:

Oliver Hazen High – 6:00 PM–8:30 PM
1101 Hoquiam Avenue NE
Renton, WA 98059
Tuesday, May 23, 2017

Bellevue City Hall – 6:00 PM–9:00 PM
450 110th Ave NE
Bellevue, WA 98004
Thursday, May 25, 2017

Rose Hill Elementary – 2:00 PM–4:30 PM
8110 128th Avenue NE
Kirkland, WA 98033
Saturday, June 3, 2017

AVAILABILITY OF THE DRAFT EIS

Copies of the Phase 2 Draft EIS and/or Notices of Availability have been distributed to agencies, tribal governments, and organizations on the Distribution List in Chapter 9.

The Draft 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
2902 NE 12th St
Renton, WA 98056

Renton Library
100 Mill Ave S
Renton, WA 98057

Lake Hills Library
15590 Lake Hills Blvd
Bellevue, WA 98007

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

Printed copies are available to purchase for cost of reproduction ($300) by contacting the project email at info@EnergizeEastsideEIS.org or by calling Environmental Science Associates at (206) 789-9658. Copies of the EIS on CD may also be obtained (available at no charge) at all four of the city offices listed directly above.

AVAILABILITY OF BACKGROUND MATERIALS

The Draft EIS includes appendices with information that is important to help understand the EIS analysis. Other background materials developed specifically for this project and used by the consultants are available on the project website at www.EnergizeEastsideEIS.org.

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Introduction and Summary

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 second phase (i.e., Phase 2) of the Environmental Impact Statement (EIS) process assesses project-level alternatives, as described in Section 1.5. The previous Phase 1 Draft EIS assessed a comprehensive range of impacts and implications associated with broad alternatives for addressing PSE's objectives, in a non-project or *programmatic* EIS. This project-level Phase 2 Draft EIS incorporates the Phase 1 Draft EIS by reference.

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

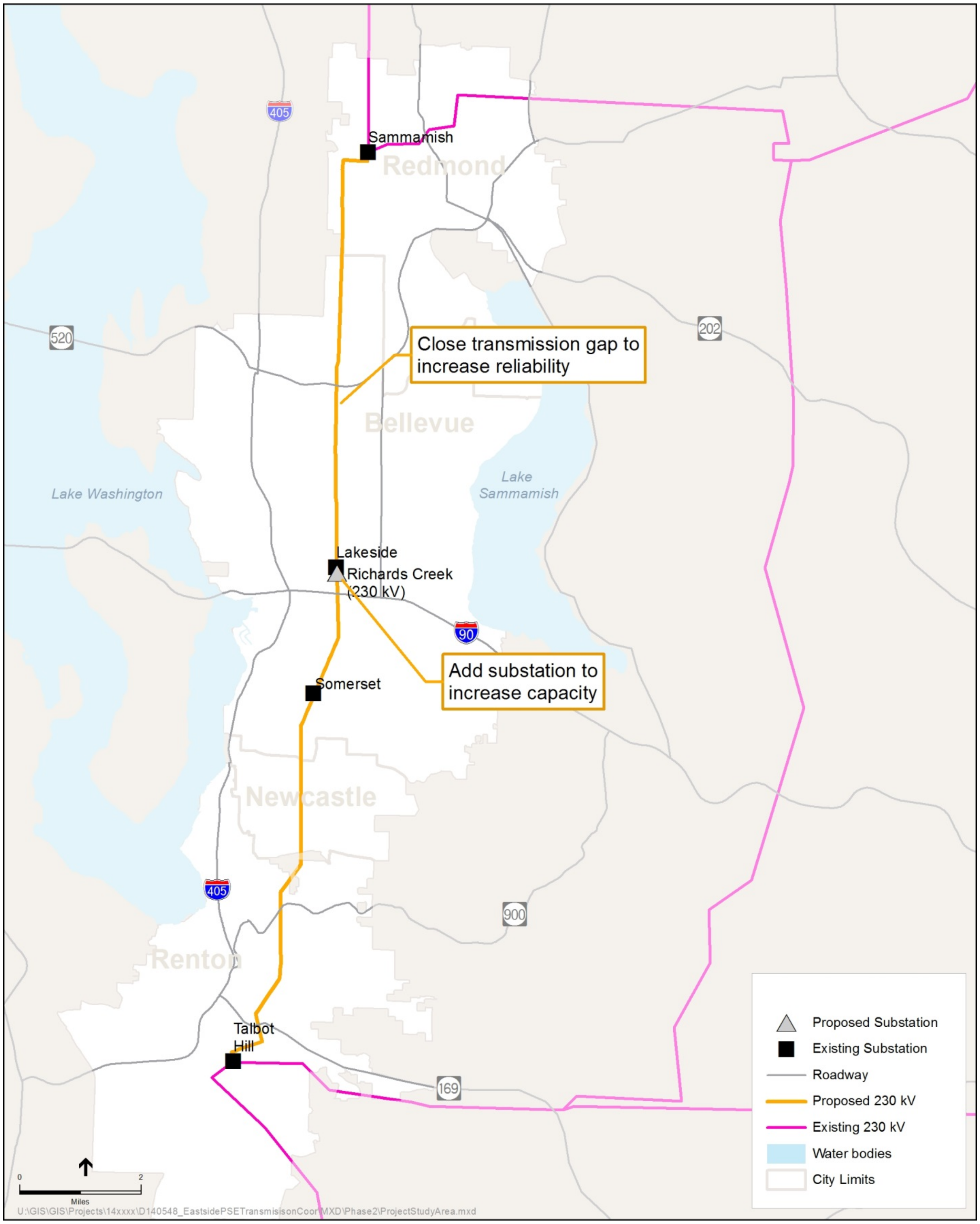
This chapter provides an overview of the project and a summary of the findings of the Phase 2 Draft EIS. The project includes numerous terms that may not be familiar to all readers. Throughout the EIS, words shown in *italics* when they first appear in the document are included in the glossary (Chapter 10).

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 18 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.

This deficiency is expected as a result of anticipated population and employment growth on the Eastside, and it is expected to negatively affect electric service reliability for PSE's Eastside customers within the next few years. The project would improve reliability for Eastside communities and would supply the needed electrical capacity for anticipated growth projected by PSE.

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, 2017). 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.



Source: King County, 2015; Ecology, 2014.

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

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The 230 kV system is proposed because that is the next highest voltage line (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 Phase 2 Draft EIS evaluates the proposed 230 kV improvements as part of PSE's proposal, as described in more detail in Chapter 2.

1.2 NEED FOR A SEPA EIS

Discussions between the Partner Cities (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.

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 Phase 2 Draft EIS and provided input on its preparation. The City of Kirkland has not been involved in the review of this Phase 2 Draft 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. This Phase 2 Draft EIS is a project-level evaluation, describing impacts at a site-specific and project-specific level. This approach is consistent with the requirements for Phased Review outlined in WAC 197-11-060 (5)(c).

While this is a project-level EIS, it is being prepared at an early stage of design development for the project. 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). This means that information about the project is approximate and subject to change and refinement as the design is developed. Where there is uncertainty about potential impacts, the Phase 2 Draft EIS uses conservatively high impact assumptions to ensure that any potential significant impacts are addressed.

1.3 PURPOSE OF AND NEED 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.

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 1.7) 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 Phase 2 Draft 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 transmission line. The EIS 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 reliability than was required in the past. Heightened concerns about reliability 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).

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.

[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.

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 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).

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.

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, 2017). 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 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 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. Both conditions 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, 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, 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

[2] PSE annually updates projected electrical demand systemwide.

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 load and feed the area (Stantec, 2015).

1.4 SEPA REVIEW PROCESS FOR THE PROJECT

1.4.1 Phase 1 and Phase 2 EIS

The Energize Eastside EIS is a Phased EIS (WAC 197-11-060(5)). 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 this Phase 2 Draft EIS.

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 were used to inform the selection of alternatives carried forward into the Phase 2 Draft EIS, which includes 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 includes project-level alternatives based on more defined geographic locations, and a more detailed analysis of potential environmental impacts. Figure 1-2 illustrates the overall process for preparing the two phases of the Draft EIS. A Final EIS will be prepared to respond to comments on both Draft EIS documents. Comments that resulted in corrections or other modifications to information presented in the Phase 1 Draft EIS are included in Chapter 7, *Errata*.

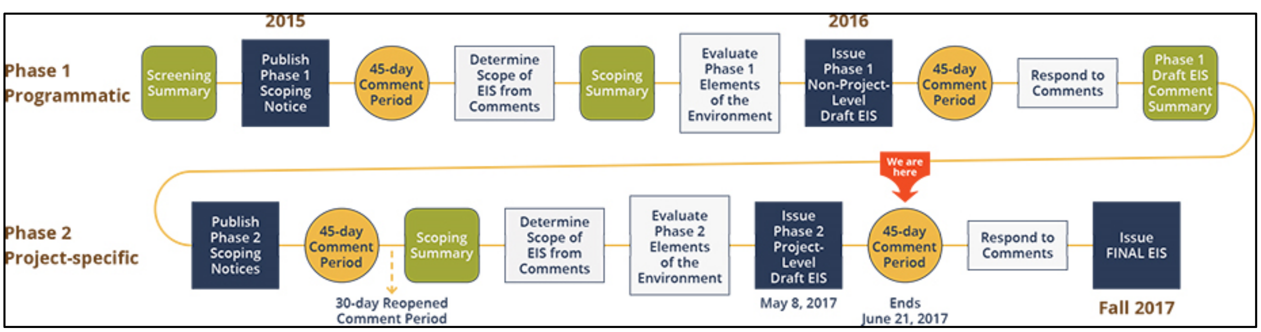


Figure 1-2. Phased EIS Process

Together, the Phase 1 Draft EIS and Phase 2 Draft EIS are intended to provide a comprehensive analysis of the project and alternatives. The Phase 2 Draft EIS supplements the analysis in the Phase 1 Draft EIS as part of a phased EIS process per WAC 197-11-060(5). Commenting is invited for each of the Draft EIS stages and at each of the scoping stages. The Final EIS, scheduled for release in fall 2017, will include responses to comments on both Draft EIS documents and will be used by the Partner Cities to support any permit decisions required.

1.5 HOW THIS EIS WAS DEVELOPED

The Phase 2 Draft 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 Phase 2 Draft EIS:

1. Following publication of the Phase 1 Draft EIS comment period, comments that related to the scope of project-level review were reviewed (City of Bellevue, 2016a). The Phase 1 Draft EIS and these comments, along with PSE's proposed design and alignment options, were used to develop an initial request for comments on the scope for the project-level Phase 2 Draft EIS.
2. Public scoping outreach was conducted to assist in developing the alternatives to study as part of the Phase 2 EIS. Scoping comments were requested to focus on the identification of viable alternatives, potential route segments and options, and associated impacts. Three public meetings were held at venues in Bellevue, Kirkland, and Renton, along with opportunities to provide comments online. After the close of the initial scoping period (May 31, 2016), PSE proposed two additional potential bypass options (as described in more detail in Chapter 2). To allow the public to comment on these options, the scoping period for Phase 2 was "reopened" specifically to obtain scoping input on the new bypass options. The comment period closed on August 1, 2016. Approximately 780 comments in the form of website forms, emails, oral testimony, and letters were received during scoping (both initial and reopened), as summarized in the *Phase 2 Draft EIS Scoping Comment Summary Reports (Parts 1 and 2)* (643 comments received during the initial scoping period, and 137 comments received during the reopened scoping period to address the new bypass route options) (City of Bellevue, 2016b, 2016c).
3. The alternatives were refined based on scoping input received. The EIS Consultant Team reviewed all alternatives proposed during scoping, reviewed the technical efficacy of the proposed alternatives, and screened the alternatives against PSE's criteria for an effective solution as listed in PSE's 2015 *Supplemental Solutions Report* (Gentile et al., 2015). Staff representing each of the Partner Cities discussed the findings, and a final set of alternatives was established by agreement among the Cities. The Phase 2 Draft EIS includes one action alternative (Alternative 1) and the No Action Alternative. Alternative 1 includes six route segments, as well as seven route options within portions of those segments. The City of Bellevue prepared a report (*Phase 2 Draft EIS, Scope of Analysis*) to summarize the

alternatives and the elements of the environment that would be evaluated in the Phase 2 Draft EIS (City of Bellevue, 2016d).

4. Input received during scoping was also used to define the environmental analysis needed, including methods used, area of study, and other topics.
5. Chapter 3, which addresses operational (long-term) impacts, and Chapter 4, which addresses construction (short-term) impacts, of this Phase 2 Draft EIS describe the methods used by the EIS Consultant Team to analyze potential environmental impacts, by element of the environment.
6. The City of Bellevue and the other Partner Cities reviewed drafts prepared by the EIS Consultant Team and provided comments for EIS Consultant Team response. PSE reviewed Chapter 2, Section 2.1 and provided appropriate clarifying revisions to the description of Alternative 1. The City of Bellevue, as SEPA lead agency, performed final review of the Phase 2 Draft EIS prior to publication.

The documents cited above, as well as other project background materials, are available on the Energize Eastside EIS Project website, via the Library tab (www.EnergizeEastsideEIS.org/library.html).

1.6 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 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 are summarized in the *Phase 2 Draft EIS Scoping Comment Summary Reports (Parts 1 and 2)* (City of Bellevue, 2016b, 2016c).

1.7 OBJECTIVES FOR THE ENERGIZE EASTSIDE PROJECT

The purpose and need for the project, summarized in Section 1.3, helped to define PSE's broad objectives for the project, which are 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.

1.8 ALTERNATIVES EVALUATED IN THE PHASE 2 DRAFT EIS

Chapter 2 describes in detail the alternatives included in the Phase 2 Draft EIS. The EIS evaluates a No Action Alternative and one action alternative (Alternative 1), summarized below.

Under either alternative, it is assumed that PSE would continue to achieve 100 percent of the company's conservation goals as outlined in its *2015 Integrated Resource Plan* (PSE, 2015), 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 Alternative 1: New Substation and 230 kV Transmission Lines

PSE's proposed project (Alternative 1) includes two main components:

1. **A new 230 kV overhead transmission line,** connecting the Sammamish substation in Redmond and the Talbot substation in Renton, a distance of approximately 18 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 line would increase electrical capacity and improve reliability of the electrical grid for Eastside communities. PSE has proposed an alignment for the transmission line, including route options within two segments of the alignment, described in Section 2.2.2. In general, PSE proposes to use the existing 115 kV corridor, replacing the existing poles and conductors with new poles and conductors. In the two segments where route options are proposed, PSE has identified its preferred alignment. In the other segments of the corridor, no alternative routes are proposed.

The segments are broken down by jurisdiction. The Redmond, Newcastle, and Renton Segments each consists of one alignment that extends through that jurisdiction. Bellevue is divided into three segments. The Bellevue North Segment has one alignment only. The Bellevue Central Segment has three route options. The Bellevue South Segment has four route options.

1.9 NEXT STEPS IN THE ENERGIZE EASTSIDE EIS PROCESS

The Fact Sheet at the beginning of this Phase 2 Draft EIS includes the timeframe for public comment, including times and locations for public meetings to take comment, and the addresses where comments can be submitted. After publication of the Phase 2 Draft EIS, public meetings will be held to take comments. The Final EIS will include responses to comments on both the Phase 1 and Phase 2 Draft EIS documents, as well as any additional analysis that may be required to provide a thorough project-level environmental review for the Energize Eastside project. The Final EIS, expected to be completed in fall 2017, will be used by each of the Partner City communities in making permit decisions regarding the project. PSE will prepare and submit permit applications to each jurisdiction that the project goes through. Each jurisdiction will conduct its own permit process.

1.10 ELEMENTS OF THE ENVIRONMENT NOT ANALYZED IN THE PHASE 2 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 this Phase 2 Draft EIS.

Earth – 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. However, impacts under all alternatives would be less-than-significant with regulatory compliance, and implementation of industry standards, geotechnical recommendations, and best management practices (BMPs).

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.

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) would 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 are addressed in this Phase 2 Draft EIS under Environmental Health.

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. Transportation impacts resulting from construction of Alternative 1 would be below the level of significance and addressed through regulatory requirements as part of the right-of-way use permit.

Energy and Natural Resources – The project does 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 Alternative 1. The project would consume other natural resources, but such consumption is not considered a significant impact.

1.11 KEY FINDINGS OF THE PHASE 2 DRAFT 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 3 and Chapter 4 of this Phase 2 Draft 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 3 and Chapter 4.

Impacts are generally categorized as less-than-significant, or significant. Each subsection of Chapters 3 and 4 defines these categories 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, and therefore less-than-significant.

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 (38 percent), vacant land (16 percent), and commercial (11 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 (58 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 783 single-family and 3,440 multi-family residences in the study area, with the highest density areas in the Bellevue Central and Bellevue South Segments.

Microsoft campus, Redmond

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 crossings of shorelines, consistency with shoreline plans requires the demonstration that no feasible alternative exists outside the shoreline.
- Option routes that require new easements to be purchased may interfere with future land use policies that allow or encourage development close to the street edge.

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.
- Adhere to land use code zoning district regulations in the central and south Bellevue segment corridors that encourage development with multistory buildings built up to or near the parcel frontage or street edge.

Significant Unavoidable Adverse Impacts

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

Scenic Views & Aesthetic Environment

Lake Hills Connector 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, and Kelsey 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., along SE 30th Street) 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), the Botanical Gardens, areas abutting the Lake Hills Connector, 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, or placing poles in new locations.
- 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.
- Bypass Options 1 and 2 could result in significant adverse impacts because the transmission line would be in a new corridor, resulting in a high level of contrast, where viewer sensitivity would be high.
- In the Newcastle Segment and the Bellevue South Segment – Willow 1 Option, significant impacts are expected 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 distribution lines where feasible.
- 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 bypass options could be reduced if:
  - Vegetation clearance and height restrictions are reduced through placement of poles closer to the roadway.
  - An option that uses existing transmission corridors is selected.
- Significant aesthetic impacts from Willow 1 could be avoided by selecting a different option for the Bellevue South Segment.
- Significant aesthetic impacts from the Newcastle Segment could be reduced if a pole configuration that is shorter and centrally located within the existing corridor is used.
- All significant impacts could be avoided if the line 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 Willow 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. The majority are small Category II or III wetlands, but major wetland complexes are located at the north end of the transmission line in connection with Willows Creek in Redmond, and in Bellevue associated with Kelsey Creek. Three of the Kelsey Creek wetlands are Category I.

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 and excavation, 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

- Compliance with Partner Cities' critical areas regulations for wetland and buffer impacts.
- Compliance with Bellevue's and Renton's Shoreline Master Programs for Kelsey Creek and the Cedar River, respectively.
- Compliance with Partner Cities' stormwater regulations.
- Implementation of BMPs to reduce construction impacts.
- Development and implementation of 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.
- Compliance 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, associated mainly 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 maintenance activities and facility maintenance.
- Loss of wildlife habitat due to tree removal, trimming, and 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 reduction 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

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.

Traffic on I-90 heading west

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 maintenance yards.
- No changes to vegetation maintenance activities.
- No new employee vehicle trips.

Mitigation Measures

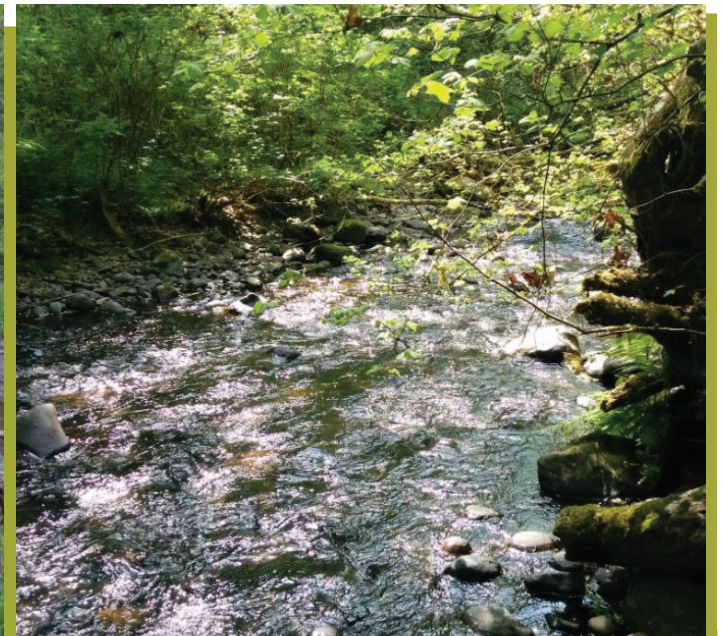
- Install SF6 equipment at substations with manufactured guaranteed leakage rate of 0.1 percent.
- Limit vegetation disturbance.
- Plant an equivalent number of trees to those removed for the project.

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 and new corridors, and road corridors and parcels adjacent to the segment and option routes.

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 27 recreation sites plus many miles of trails. This encompasses approximately 633 acres in recreation sites owned and operated primarily by local governments, and includes five 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

- Potential need for easement acquisition of publicly owned recreation sites.
- 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. The significant impacts to recreation sites from Alternative 1 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.
- Work with the City of Bellevue to relocate the trailhead at Woodridge Open Space, if needed, under Bypass Option 2.
- 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

- Acquisition of easements in publicly owned recreation sites is not consistent with the City of Bellevue recreation plans and policies (Bypass Option 1, Bypass Option 2, Oak 1 Option, Oak 2 Option, and Willow 2 Option).

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 seven 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, Safeway Distribution Center Truck Repair Building, Wilburton Trestle, 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.


Wilburton Trestle, Bellevue

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 conducted, prior to publication of the Final EIS. 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.
- 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

City of Bellevue, existing transmission lines

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 Alternative 1.

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

Industry 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 line would result in a decrease of magnetic field levels for all segments and options that utilize the existing corridor. Where Alternative 1 would utilize new corridor alignments, there would be an increase in magnetic field levels. A new source of power frequency EMF would be introduced to areas that do not currently have an overhead transmission line. These include: along portions of the road rights-of-ways that Bypass Option 1 and Bypass Option 2 utilize; along 124th Avenue SE and SE 38th Street as part of the Oak 2 Option; and along SE Newport Way as part of the Willow 2 Option.
- 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 industry guidelines. Therefore, under Alternative 1, 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 existing corridors; therefore, there would be no cumulative effect. In new corridors, the project would add a new source of magnetic fields to existing sources, but no adverse cumulative effects are expected.

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 industry 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.

Environmental Health
Pipeline Safety

Pipeline warning sign in the existing corridor

Buried hazardous liquids pipeline, similar to the Olympic Pipelines

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 project could increase the risk of damage to the Olympic Pipelines. 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, and 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.

City of Newcastle, colocation with existing transmission lines

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 Pipelines 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 Alternative 1.

Mitigation Measures

- To minimize the potential for electrical interference, PSE could utilize optimized conductor geometry, where the configuration provides the greatest level of field cancellation. PSE could also operate both circuits at 230 kV at project start-up.
- To reduce the potential for external corrosion, PSE could model the final design for instances where additional protection is needed. The pipeline operator could conduct field monitoring, testing, and provide additional mitigation (such as grounding mats).
- 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 Section 3.9.7.

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.

Economics

Newcastle City Hall

Stormwater inlet

Affected Environment

Although economic analysis is not a required element under SEPA, this Phase 2 Draft EIS examines three economic topics, based on results of the Phase 1 analysis as well as input received during scoping. The three topics include: (1) the potential loss of property tax revenue, especially to the smallest affected city (Newcastle), due to reduced property values; (2) the potential cost to the community requesting the placement of the 230 kV transmission line underground as mitigation; and (3) the monetary value of lost ecosystem services due to reduced tree cover as a result of the proposed overhead transmission line.

Property Tax Revenue: The City of Newcastle relies on various taxes to cover the cost of governing, including public safety, community development, transportation projects, and parks. Property taxes make up the majority of Newcastle's revenues.

Cost of Undergrounding a Transmission Line: The cost of the new transmission line would be paid for by all of PSE's customers. Any cities and/or property owners requesting underground alignments would likely be required to pay for undergrounding the lines.

Tree Cover along Transmission Line Corridor: 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.

Property views of Lake Sammamish in Bellevue

Summary of Impacts

OPERATIONAL IMPACTS

- Potential loss of property tax revenue for the City of Newcastle.
- Potential cost to the community for undergrounding transmission lines. The burden on a very small number of payees would be considerable, while the cost for a single mile when shared among 100,000 payees could be on the order of $20 per year or less.
- Loss of tree cover means the natural environment of the study area communities would be less able to reduce air pollutants and stormwater runoff, and sequester carbon dioxide.

CONSTRUCTION IMPACTS

- None; the economic aspects of the project do not relate to construction impacts.

CUMULATIVE IMPACTS

- Property values are likely to rise with growth and development; the project could also contribute to the combined loss of ecosystem services, in combination with other development projects in the area.

NO ACTION ALTERNATIVE IMPACTS

- Not applicable to economics.

Mitigation Measures

- While mitigation for economic impacts from a project is not required under SEPA, potential impacts to City revenues due to a decreased assessed value for property could be mitigated by an adjustment to the mil rate for all tax payers (i.e., the rate of taxation of the City Government in each city).

Significant Unavoidable Adverse Impacts

- None.

2

Project Alternatives

energize EASTSIDE EIS

CHAPTER 2. PROJECT ALTERNATIVES

This chapter describes the project alternatives evaluated in the Phase 2 Draft EIS. The alternatives were developed based on discussions among the Partner Cities, the EIS Consultant Team, and PSE, and public comments on the Phase 1 Draft EIS and Phase 2 scoping periods. The alternatives were designed to identify, analyze, and feasibly attain PSE's objectives for the project (as defined in Chapter 1; see Section 1.7). This chapter also identifies alternatives considered but not evaluated in the Phase 2 Draft EIS because they did not meet PSE's project objectives (see Section 2.2). As required by SEPA (Washington Administrative Code [WAC] 197-11-440), benefits and disadvantages of delaying PSE's project are 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 more general 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 feasible and reasonable alternatives available to address PSE's identified objectives for the project. The evaluation conducted during Phase 1 was used in part to narrow the range of alternatives for consideration in the Phase 2 Draft EIS. Informed by the Phase 1 analysis, the Phase 2 Draft EIS is project-specific and focuses on PSE's preferred alignment and alternative alignment routes also called options. 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 EIS; the reader is referred to the Phase 1 Draft EIS for additional information on those topics, and cross references are included in the Phase 2 Draft EIS for convenience of readers.

The Phase 2 Draft 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. Information on context is included as needed to provide a complete analysis for the project-level Phase 2 Draft EIS, with more detailed supporting information incorporated by reference to the Phase 1 Draft EIS and appendices.

To keep the information in Chapter 2 focused and understandable, project details that relate to a specific element of the environment are presented in Chapter 3, *Long-term (Operation) Impacts and Potential Mitigation*, and Chapter 4, *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 3.4 and 4.4, *Plants and Animals*. Similarly, information on pipeline safety, both during construction and operation, is presented in Sections 3.9 and 4.9, *Environmental Health – Pipeline Safety*. Chapter 2 focuses on the key components of the segments and options at an appropriate level of detail to support the analysis presented in Chapters 3 and 4.

2.1 PHASE 2 PROJECT ALTERNATIVES

This Phase 2 Draft EIS evaluates PSE's proposed Energize Eastside project, 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 project 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 grid reliability for Eastside communities. PSE has proposed a preferred alignment for the transmission lines, along with route and pole options within some segments of the alignment, 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. In some segments of the corridor, no alternative route options are proposed because no reasonable alternatives would attain or approximate PSE's objectives for the proposed project and have lower environmental cost.

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., Alternative 1) can be evaluated and compared. For the Phase 2 Draft EIS, the No Action Alternative is defined as those actions

Project Terminology

The Phase 2 Draft EIS uses the following terms:

Alternative 1 – Refers to PSE's entire proposed project, including the new Richards Creek substation and the transmission line.

Segment – Segments are components of Alternative 1 and include identified portions of the transmission line route, generally divided by city boundaries, except there are three segments for Bellevue. The Phase 2 Draft EIS evaluates six distinct segments.

Option – Options are alternative routes identified by PSE for specific segments, designed to address public comments or jurisdictional considerations. For the Phase 2 analysis, four options have been identified for the Bellevue South Segment, and three options have been identified for the Bellevue Central Segment.

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 Preferred Alignment – PSE's Preferred Alignment is Alternative 1, comprised of the six segments; within the Central Bellevue Segment, the Preferred Alignment is the Existing Corridor Option; within the Bellevue South Segment, the Preferred Alignment is the Willow 2 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. Where possible, PSE prefers to place 230 kV lines in easements, rather than on public right-of-way, because within public right-of-way, PSE can be required to move the lines if needed to accommodate road expansion or other infrastructure improvements.

PSE would undertake to serve the project objectives without requiring the issuance of state or local permits (something PSE could build or undertake 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.

Project Area and Study Area

This Phase 2 Draft 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 3 subsection, and often shown on a map for clarity.

Under the No Action Alternative, PSE would continue to manage its system in largely the same manner as at present. This includes maintenance programs to reduce the likelihood of equipment failure, and stockpiling additional equipment so that in the event of a failure, repairs could be made as quickly as possible.

Implementation of the No Action Alternative would not meet PSE's objectives for the proposed project, which are to maintain a reliable electrical system and to address a deficiency in transmission capacity on the Eastside. Implementation of the No Action Alternative would increase the risk to the Eastside of power outages or system damage during peak power events.

2.1.2 Alternative 1: New Substation and 230 kV Transmission Lines

Alternative 1 includes a new substation (Richards Creek) and approximately 18 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 Option A under Alternative 1 in the Phase 1 Draft EIS. For the Phase 2 Draft EIS, the proposed 230 kV transmission line corridor is divided into six main segments (some of which include additional route options) to aid in the analysis and organize material for the decision-makers. To assist Bellevue and the other Partner Cities in evaluating the preferred alignment 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 various route options, the route within Bellevue is separated into three segments (Bellevue North, Bellevue Central, and Bellevue South). In the Bellevue Central and Bellevue South Segments, there are options for routing the transmission lines along various corridors other than PSE's existing 115 kV corridor.

Table 2.1-1 lists the segments and route options that comprise Alternative 1 as presented in the Phase 2 Draft EIS, resulting in 12 possible project scenario combinations. To be viable, Alternative 1 requires continuous transmission lines across all six segments. Where there are route options, only one option is needed per segment. Figure 2.1-1 shows a diagram of the route segments and options. The segments and options are color-coded throughout this Phase 2 Draft EIS.

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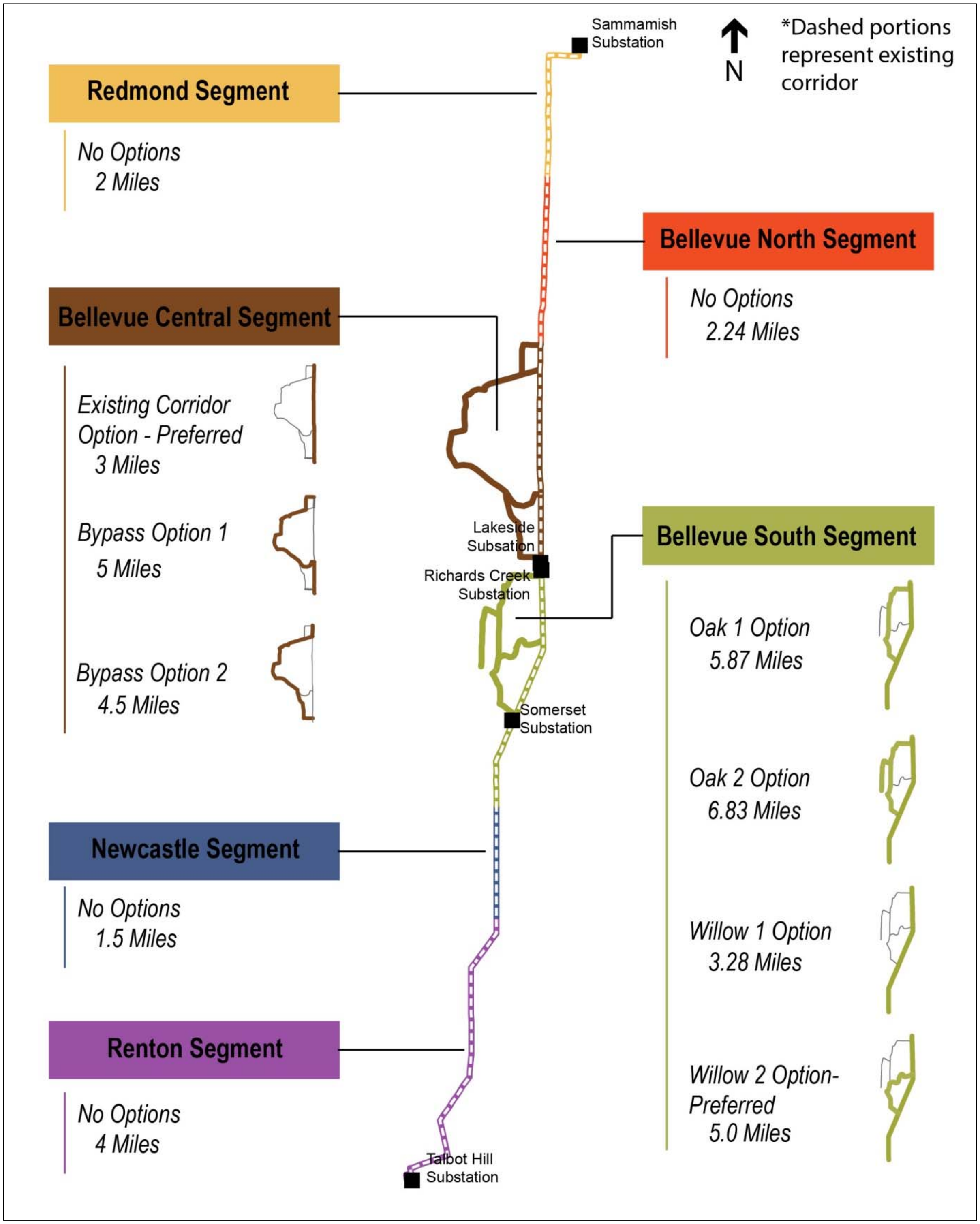
Table 2.1-1. Alternative 1 Components, Segments, and Options

Alternative	Name Used in the Phase 2 Draft EIS
1A-S	Richards Creek Substation and Improvements to Other Substations
1A-1	Redmond Segment
1A-2	Bellevue North Segment
1A-3a	Bellevue Central Segment, Existing Corridor Option [PSE's Preferred Alignment]
1A-3b	Bellevue Central Segment, Bypass Option 1
1A-3c	Bellevue Central Segment, Bypass Option 2
1A-4a	Bellevue South Segment, Oak 1 Option
1A-4b	Bellevue South Segment, Oak 2 Option
1A-4c	Bellevue South Segment, Willow 1 Option
1A-4d	Bellevue South Segment, Willow 2 Option [PSE's Preferred Alignment]
1A-5	Newcastle Segment
1A-6	Renton Segment



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

Figure 2.1-1. Alternative 1 230 kV Transmission Line Corridor Summary, by Segment (Conceptual)

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 line are presented separately, in Section 2.1.3, *Construction.* This section describes the major components (substation equipment, pole design, vegetation management, etc.) of the identified alternatives. Potential significant environmental impacts and mitigation are identified in Chapter 3 (*Long-term (Operation) Impacts and Potential Mitigation*) and Chapter 4 (*Short-term (Construction) Impacts and Potential Mitigation*).

(Note to the reader: the names of the alternatives, segments, and options presented in the Phase 2 Draft EIS differ from the names used during earlier parts of the project, such as in the Phase 1 Draft EIS and during the Phase 2 scoping comment period. In particular, definition and design of the segments has evolved during preparation of the Phase 2 Draft EIS, partially in response to discussion among PSE, the EIS Consultant Team, and the City of Bellevue, which has refined the alternatives identified for full analysis.)

2.1.2.1 New Richards Creek Substation and Improvements to Other Substations

PSE proposes to construct a new substation under Alternative 1, regardless of route option. The new Richards Creek substation would be immediately south of the existing Lakeside substation (see Figure 2.1-2) on parcels 102405-9083 and 102405-9130 in the City of Bellevue (see Figure 2.1-3). 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 2.1-2) and associated electrical equipment such as circuit breakers, 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

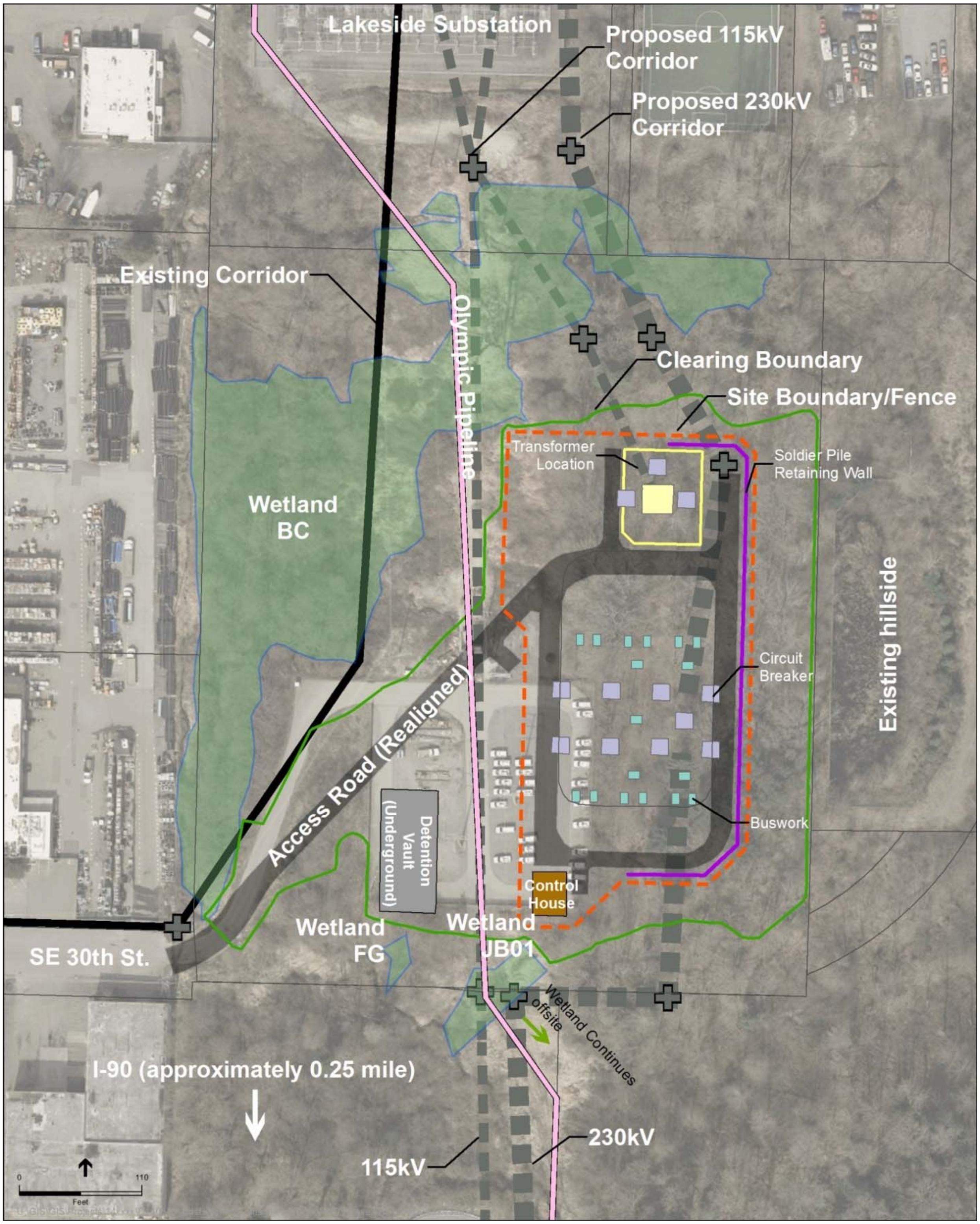


Figure 2.1-2. Conceptual Site Plan for the New Richards Creek Substation

(Note: configuration shown for Willow 1 and Willow 2 Options; for Oak 1 and Oak 2 Options, the 115 kV transmission line would run west to SE 30th Street just south of the control house)

Gravel surface

Looking north to the Lakeside substation

View to SE 30th Street access

Vegetated hillslope of the east boundary

Figure 2.1-3. Existing Conditions at the New Richards Creek Substation

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 2.1-3).

The 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 2.1-2). The existing access roadway to the Richards Creek site (SE 30th Street) is paved; however, it would be reconfigured to improve access. 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. There is an existing unimproved, degraded road between the Richards Creek substation site and existing Lakeside substation. This road would not be improved as part of the Energize Eastside project. The yard surfacing inside the substation fence and for a perimeter 5 feet outside the fence will consist of 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 preliminary grading quantities based on the 60 percent design are 26,500 cubic yards of excavation and 8,000 cubic yards of fill. The fence will be a 7-foot chain link fence with three strands of barbed wire on top.

Under the Bellevue Land Use Code, Electrical Utility Facilities require 15 feet of Type 1 Landscaping on all sides (LUC 20.20.520(F)(2)(a). Landscaping is expected to be installed along the western substation boundary, with natural screening used along the north, east, and south boundaries.

Natural resources on the site, including streams, wetlands, vegetation, and slopes, are described in Section 3.3, *Water Resources*, and Section 3.4, *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 Lakeside, Talbot Hill, and Sammamish substations, as well as the Somerset substation (only associated with the Oak 2 and Willow 2 Options of the Bellevue South Segment). Substation locations are shown on Figures 1-1 and 2.1-1. In general, all upgrades to the existing substations would 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 this Phase 2 Draft EIS.

- At the Lakeside substation, PSE would install new lines to interconnect with the existing 115 kV system that serves the Eastside. Additionally, a new 115 kV capacitor bank would be added to the station.
- At the Talbot Hill substation, PSE would add new circuit breakers and wires.
- At the Sammamish substation, PSE would add a new 230 kV line bay.
- For system operational reasons, at the Somerset substation (under the Oak 2 and Willow 2 Options only), PSE would upgrade the system from a radial to a loop system, allowing the substation to be fed from more than one transmission line. PSE would install 230 kV equipment to run at 115 kV for the near term; and install a new 115 kV transformer, three switches, and a control building. If the Somerset substation requires improvements, additional temporary work area in the immediate vicinity is anticipated as the substation yard is small. The footprint of the substation would not be expanded.

2.1.2.2 Overview of the New 230 kV Transmission Lines

Alternative 1 is to construct and operate two 230 kV transmission lines, one from the Sammamish substation in Redmond to the proposed Richards Creek substation in Bellevue, and one from Richards Creek substation to the Talbot Hill substation in Renton, a distance of approximately 18 miles. For analysis in the Phase 2 Draft EIS, the Alternative 1 corridor is divided into six segments, organized by city jurisdiction. The project includes six route options within some of the segments being considered as alternative routes to PSE's preferred alignment. Alternative 1 follows an existing 115 kV transmission line corridor for the majority (from 93 percent up to 100 percent, depending on route) of its length, using the existing PSE right-of-way and would not require new easements. PSE's existing 115 kV corridor is referred to in this Phase 2 Draft EIS as the "existing corridor." For the route options, which are in central and south Bellevue, the project would depart the existing corridor and follow adjacent roads and associated right-of-way, referred to in this Draft EIS as the "new corridor." The new corridor would require some new easements (the amount of which depends on the route options selected).

Transmission Line Terminology

Transmission Line – A system of structures, wires, insulators, and associated hardware that carry 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 Draft 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 (either 115 kV or 230 kV), and each pole would support three wires. A double-circuit line carries wires for two circuits (one 115 kV and one 230 kV), and each pole would support six wires.

High-capacity 115 kV Line –A high-capacity 115 kV line would use a larger conductor (the same as the proposed 230 kV line) to allow for a greater amount of electrical current to be transmitted using a single line. This would be used to replace the two existing lower capacity 115 kV lines that are in service today. The high-capacity 115 kV line could be converted to 230 kV at some point in the future.

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 (along most of the route) with a 230 kV line and a high-capacity 115 kV line (designed to be operable at 230 kV in the future) on new poles. The plan for the Energize Eastside project is to first operate one circuit at 115 kV while operating the other at 230 kV, then eventually operate both circuits at 230 kV. Generally, the project, as proposed by PSE, would upgrade an existing line and increase capacity with a new line largely within the existing corridor, rather than construct a new transmission line corridor. The majority (approximately 95 percent) of the existing 115 kV 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 115 kV 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 steel monopoles and steel H-frame structures. The new poles would be taller in most cases than the existing H-frame structures. The typical height of the existing H-frame structures is 60 feet (ranging from 39 to 115 feet); the typical height of the proposed poles is approximately 90 feet (ranging from 80 to 125 feet) in the existing corridor. 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 along the line to avoid sensitive resources, such as wetlands or streams. In general, Alternative 1 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 higher than at present. More details on pole designs, including illustrations and photographs, are presented in Section 2.1.2.2.

The existing 115 kV transmission line corridor contains two of several transmission lines in this developed and growing 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, however, the line is collocated with other transmission line poles and structures, and the line also crosses and/or runs parallel to other transmission line corridors in several locations (including a 230 kV line typically on steel lattice towers owned and operated by Seattle City Light [SCL]).

Additional details are presented by segment and option in Section 2.1.2.3.

230 kV steel lattice tower in the study area, owned and operated by SCL

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 (Table 2.1-2), including the following:

- One double-circuit steel monopole
- Two single-circuit steel monopoles
- Single-circuit steel H-frame

Along most of the Alternative 1 corridor, the new poles would be double-circuit steel monopoles with a typical height of 90 to 100 feet, although they could be as high as 125 feet in some locations (e.g., at road crossings or to accommodate major topographic changes). However, different pole types, pole heights, and span lengths can be used to respond to topographic conditions and other landscape features, as well as to mitigate potential visual impacts within specific areas. The single-circuit monopoles and single-circuit H-frame structures would be used in select locations, especially in the Bellevue Central, Bellevue South, and Newcastle Segments. Pole type and placement are also influenced by location within the landscape and other site-specific factors, such as where PSE shares their 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.

To meet *National Electric Safety Code* (NESC) and Federal Energy Regulatory Commission (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 be located 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 line, typically 550 to 650 feet. Spacing can range from 125 to 1,650 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 and on unstable slopes to the greatest extent feasible.

For some of the route options, the line would run along existing roadways. Where possible, PSE prefers to place 230 kV lines in easements rather than on public right-of-way, because within public right-of-way, PSE can be required to move the lines if needed to accommodate road expansion or other infrastructure improvements. If it is not possible to obtain an easement for a pole, PSE generally places the pole along the outermost part of the road right-of-way and acquires an easement of up to 55 feet in width on the adjacent private property to ensure that the necessary electrical clearances are met. Typical easements widths for both the existing corridor and along road rights-of-way are illustrated in Figure 2.1-4.

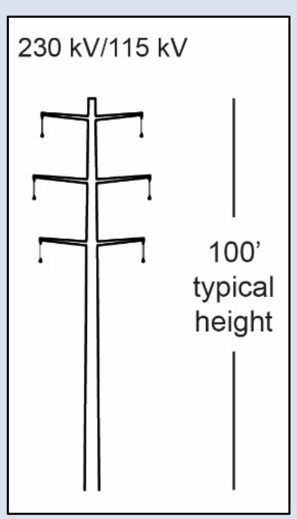
The diameter of the poles depends on height, as well as loading, and would be greatest at the base. Typical (tangent) poles would be 2 to 4 feet in diameter at the base, while typical corner and termination poles may need to be 4 to 6 feet in diameter at the base depending on the angle and the terrain. Tangent poles are poles that are in a straight line with other poles. Termination poles and 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 for lightning protection. Any existing fiber-optic cable would need to be transferred to the new poles, or a single combination shield wire/fiber optic line could be used (i.e., optical ground wire [OPGW]).

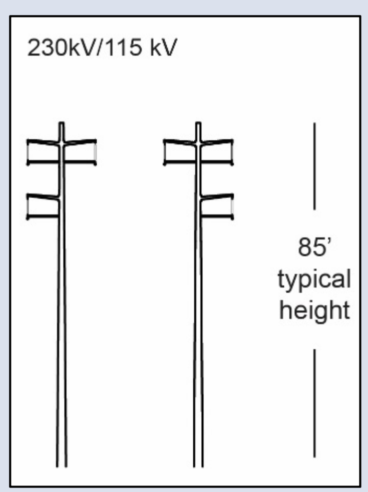
In addition to the height and diameter of the poles, the diameter of the conductor (i.e., wire) will also increase. The wire on the existing corridor is currently 1.063 inches in diameter; the wire diameter of the proposed new wires will be 1.545 inches to accommodate the increased voltage.

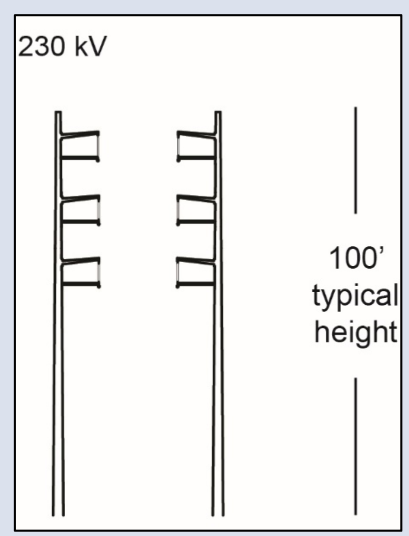
The main characteristics of the various pole types are summarized and illustrated in Table 2.1-2.

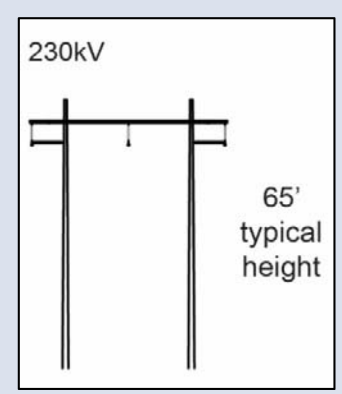
Table 2.1-2. Summary of Proposed Pole Types

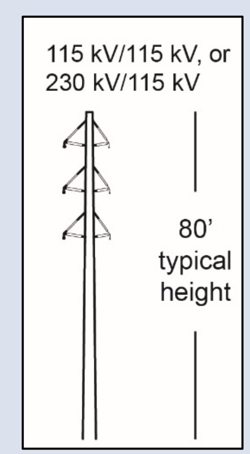
	1 Double-Circuit Monopole	2 Single-Circuit Monopoles	2 Single-Circuit Monopoles	Single-Circuit H-Frame	1 Double-Circuit Monopole	1 Single-Circuit Monopole	1 Single-Circuit Monopole (Wood)
Line Configuration	6 wires total, 3 on each side of the pole	3 wires stacked vertically or in a delta configuration (shown below)	3 wires stacked vertically on each pole	3 wires horizontal on cross-arm	6 wires with 3 wires on each side of the pole	3 wires stacked vertically on the pole	3 wires stacked vertically on the pole
Typical Height	100 feet (tallest of the pole designs)	85 feet	100 feet	65 feet (shortest of the pole designs)	80 feet	80 feet	70 feet
Pole Replacement	Replaces 4 existing poles (2 H-frame structures) with 1 pole in most areas	Replaces 4 existing poles (2 H-frame structures) with 2 poles in some areas	Replaces 4 existing poles (2 H-frame structures) with 2 poles in some areas	Replaces 4 existing poles (2 H-frame structures, 2 single-circuit) with 2 poles (1 single-circuit H-frame structure)	New double-circuit (115 kV/115 kV, or 230 kV/115 kV, depending on option) pole to replace existing single-circuit 115 kV line along roadway	Replaces existing 115 kV line along Factoria Blvd/Coal Creek Pkwy in Oak 2 and Willow 2, or installed along Newport Way in Willow 2	Installed along 124th Ave SE to relocate existing 115 kV line from Factoria Blvd
Segments and options using this pole type	This is the main pole design and is used in all segments except Newcastle and parts of South Bellevue.	Proposed for use in the Willow 1 Option (in the Bellevue South Segment) and the north portion of the Renton Segment. Generally used on either side of the Olympic Pipeline when the pipeline is the center of the corridor.	Proposed for use in the Newcastle Segment. One monopole would be placed on the outer edge of the right-of-way on each side of the Olympic Pipeline, with the pipeline in the center of the corridor.	Proposed for use in the Oak 2 and Willow 2 Options (Bellevue South Segment). A single-circuit design can only be used where there is an option for re-routing the 115 kV line outside of the existing corridor. The H-frame design provides a shorter configuration for the 230 kV line than a monopole.	Proposed for use in the Oak 1, Oak 2, and Willow 2 Options (in the Bellevue South Segment).	Proposed for use in the Oak 2 and Willow 2 Options (in the Bellevue South Segment). Taller (typical height = 100 feet) versions of these poles are proposed in Bypass Options 1 and 2.	Proposed for use in the Oak 2 Option (in the Bellevue South Segment).
Diameter for typical poles (at base)	2.5–6 feet (largest of the pole designs)	Typically 2.5–5 feet (similar to the H-frame structures; smaller than double-circuit monopoles)	Typically 3–5.5 feet (similar to the double-circuit monopoles)	Typically 2.5–5 feet (similar to the single-circuit monopoles; smaller than double-circuit monopoles)	Typically 2.5–5 feet	Typically 2.5–5 feet	Typically 1.5–2.5 feet

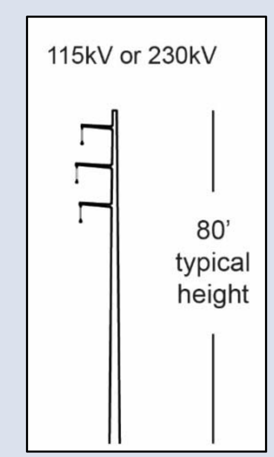


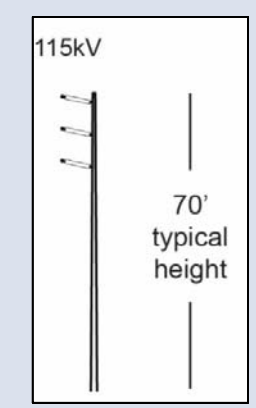




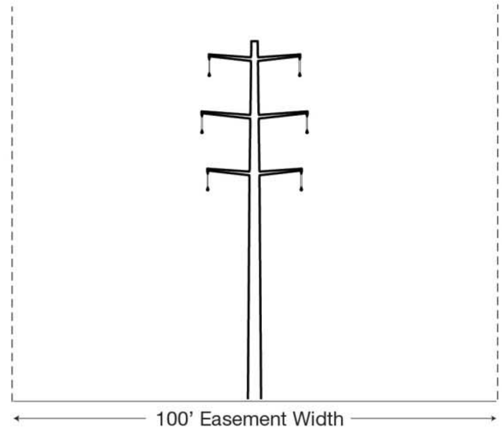








Note: An additional shield wire would be installed on top of the new poles for lightning protection. For more information, see Section 2.1.2.2.



Typical Easement Widths - Existing Corridor:

- Existing 100-foot width

Typical Easement Widths - New Easements along Roadway:

35-foot width (range of 30 to 55 feet)	• Richards Road • SE 30th Street • Factoria Blvd SE (north of SE 38th Street)
20-foot width (range of 20 to 30 feet)	• Factoria Blvd SE (south of SE 38th Street) • Coal Creek Parkway • SE Newport Way
10-foot width (range of 5 to 25 feet)	• 124th Avenue SE • SE 38th Street

Figure 2.1-4. Typical Easement Widths for the Existing Corridor and New Corridor along Roadways (Conceptual).

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 in portions of the Energize Eastside project area. 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-inch and one 20-inch in diameter. In the project area in general, the pipelines are co-located with PSE's transmission line within all of the segments, although in the Renton Segment it is not located near the southern terminus. The transmission line corridor predates the pipeline by approximately three decades. In most of the segments, the pipeline system is located 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).

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

Due to the level of public concern expressed during scoping regarding the potential risk of a leak, fire, or explosion that could occur as a result of constructing or operating the transmission line in the same corridor as the Olympic Pipeline, 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 3.9 and 4.9, *Environmental Health – Pipeline Safety*.

Telecommunications Equipment and Other Underbuild Components

Along portions of the transmission lines (both the existing and new corridors), telecommunications 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' use of transmission line infrastructure is 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. Underbuild located on a 115 kV line may be undergrounded in certain situations, such as when a 115

Utility pole carrying transmission wires (top section), distribution wires (middle section), and telecom wires (lower section) kV line is converted to 230 kV. If PSE undergrounds a 115 kV pole, the telecom equipment would also be undergrounded or moved; in general, an existing pole cannot remain with just telecom equipment if the electrical equipment has been removed.

In the project area, cellular equipment is co-located along the existing corridor in seven locations. Upon completion of construction of the proposed project, PSE will work with telecom companies to reinstall the equipment onto the 230 kV poles, per local jurisdiction regulations.

In the project area, distribution lines are located along the following roadways: SE 26th Street, SE 30th Street, Coal Creek Parkway, Newport Way, and Factoria Boulevard SE. Distribution lines would be undergrounded along these roadways except on SE 30th Street.

Additional information on the co-located telecom equipment and distribution lines is included in Sections 3.2, *Scenic Views and the Aesthetic Environment*.

Vegetation Management and Maintenance

Alternative 1 includes both initial vegetation clearing to accommodate the new 230 kV transmission line, 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. 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.) Additional details on vegetation management are presented in Sections 3.4 and 4.4, *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, under all segments and options. 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.

2.1.2.3 Transmission Line Segments and Options

The following sections describe each of the segments and options of the Alternative 1 230 kV transmission line, from north (Redmond) to south (Renton). In two segments, options have been identified for analysis in the Phase 2 Draft EIS. All segments and options display sample simulations of the proposed transmission poles, except for the Oak 2 and Willow 2 Options in the Bellevue South Segment. Simulations for this segment can be found in Section 3.2, *Scenic Views and Aesthetic Environment*.

Route Options for the Bellevue Central Segment

In addition to the Existing Corridor Option of the Bellevue Central Segment, PSE has identified for environmental analysis two options that would bypass the East Bellevue Community Council (EBCC) boundaries, recognizing that the EBCC could deny a permit and thus delay or preclude PSE's preferred alternative. The two bypass options would not require approval by the EBCC. If EBCC denied approval, PSE would seek permit approval of one of the bypass options from the City of Bellevue. The bypass options are not PSE's preferred alignment, but have been included for analysis in the Phase 2 Draft EIS at PSE's request.

Route Options for the Bellevue South Segment

The existing 115 kV transmission line route through the Bellevue South Segment presented some challenges for accommodating the Energize Eastside project. Much of the existing right-of-way travels through residential areas, and some of these residents have expressed particular concern about potential adverse impacts, including aesthetic impacts, in this area.

What is EBCC's Role?

EBCC is empowered by state law with approval/disapproval authority over certain land use actions in a part of East Bellevue. The EBCC may also act in an advisory capacity on other land use issues that directly or indirectly affect its jurisdiction.

A portion of PSE's existing 115 kV transmission corridor passes within EBCC's jurisdiction along the western border. EBCC could therefore have approval/disapproval authority over that portion of the project. EBCC's approval is required in addition to approval by the City of Bellevue.

Community Involvement in Developing Options in Bellevue South Segment

PSE has conducted public outreach for the project since 2013. This outreach effort has included distributing regular project update letters; attending community events; holding meetings with individuals, neighborhoods, Cities, and other stakeholders; hosting public open houses; and responding to public comments. Input received during public outreach has been used to inform the project design and route options.

In 2014, PSE convened the Energize Eastside Community Advisory Group (often referred to as "the CAG") to inform the development of the proposed alignment alternative and associated route options. The group included 24 representatives from various interests across the Eastside. The process also involved targeted community outreach, including public events at key milestones. The goals of the Community Advisory Group were to identify and assess community values in the context of evaluating which route the new transmission lines should follow, and to develop route recommendations for PSE's consideration. Holding regular meetings throughout 2014, the group helped evaluate numerous potential route options for the Energize Eastside project. Part of the outcome was the recommendation of the initial Oak and Willow route options within the Bellevue South Segment. The initially identified Oak and Willow options were further refined by PSE in 2016, with the result being the four options for the Bellevue South Segment (i.e., Oak 1, Oak 2, Willow 1, and Willow 2) presented and analyzed in this Phase 2 Draft EIS. Additional information on the Community Advisory Group process is available on PSE's project website (www.EnergizeEastside.com; see the Library tab).

Options outside the existing corridor within this segment are more commercial in character (e.g., along Factoria Boulevard), and these commercial areas host existing utilities, including transmission and distribution lines. This presented an opportunity for PSE to consider alternative routes for parts of the Energize Eastside project within the nearby utility corridors, rather than using only the existing 115 kV corridor with the H-frame structures. Three of the four options developed (Oak 1, Oak 2, and Willow 2) explore areas outside the existing 115 kV corridor to address these community concerns.

Simulations for the Bellevue South Segment Options can be found in Section 3.2, *Scenic Views and Aesthetic Environment*.

REDMOND SEGMENT

No Options

Part of PSE's Preferred Alignment

DESCRIPTION

Start: Sammamish Substation
End: Redmond-Bellevue Boundary

PROPOSED POLES & LOCATION

- Approximately 47 wooden H-frames replaced with approximately 35 double-circuit, 230 kV/115 kV steel monopoles.
- One circuit energized at 230 kV, the other circuit energized at 115 kV.
- Height:
  - 95' (typical)
  - 120' (maximum)
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.
- Two poles required at Sammamish substation for dead-end structures.

QUICK FACTS

Jurisdiction: Redmond

Segment Length: 2 miles

Easement / Property Acquisition

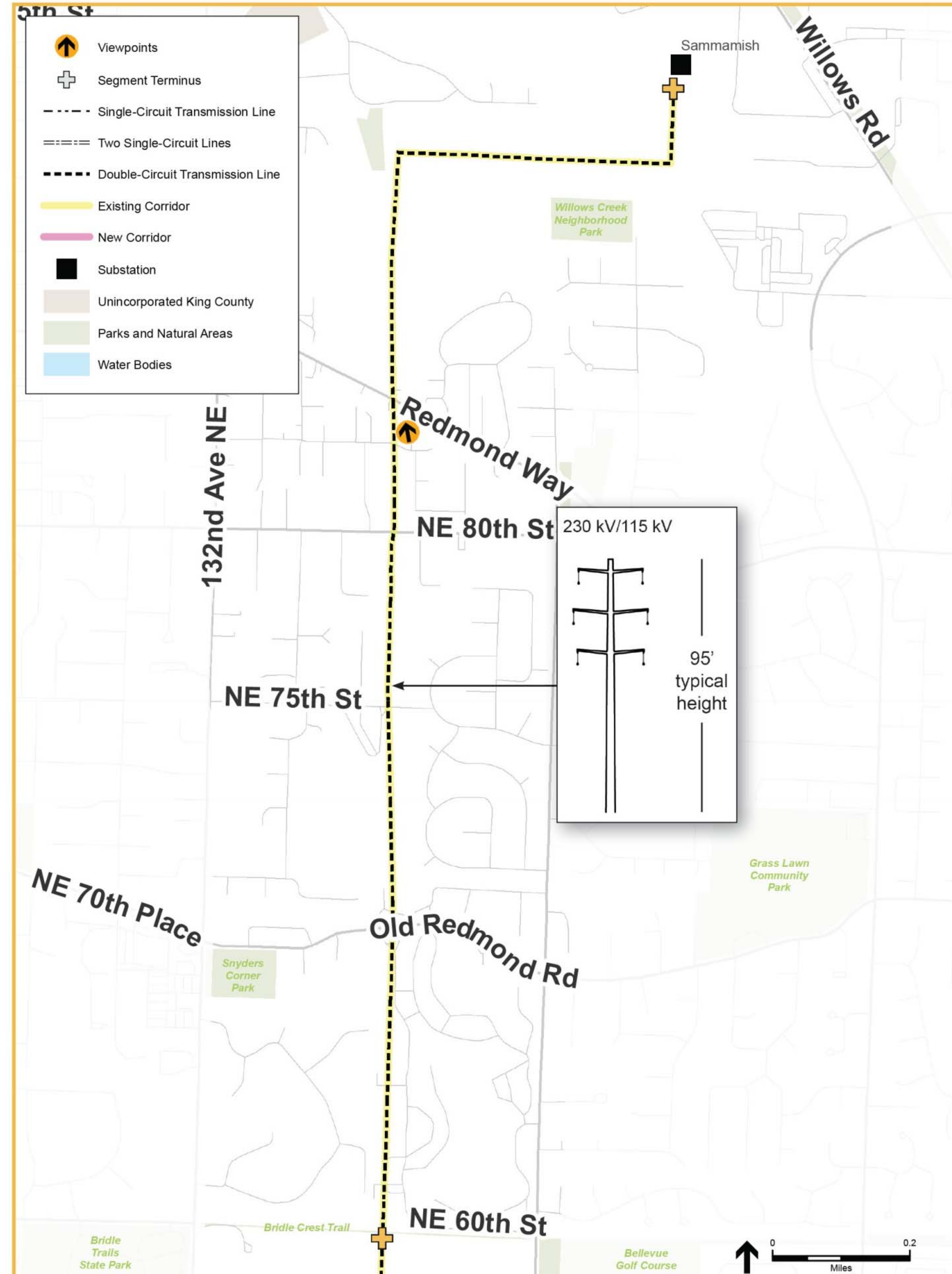
- Entirely in PSE's existing 100-foot, 115 kV corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in existing corridor; pipeline 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, 2016)



BELLEVUE NORTH SEGMENT

No Options

Part of PSE's Preferred Alignment

DESCRIPTION

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

PROPOSED POLES & LOCATION

- Approximately 38 wooden H-frames replaced with approximately 21 double-circuit, 230 kV/115 kV steel monopoles.
- One circuit energized at 230 kV, the other circuit energized at 115 kV.
- Height:
  - 95' (typical)
  - 100' (maximum)
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.
- Two poles required at SR 520 for dead-end structures.

QUICK FACTS

Jurisdiction: Bellevue

Segment Length: 2.2 miles

Easement / Property Acquisition

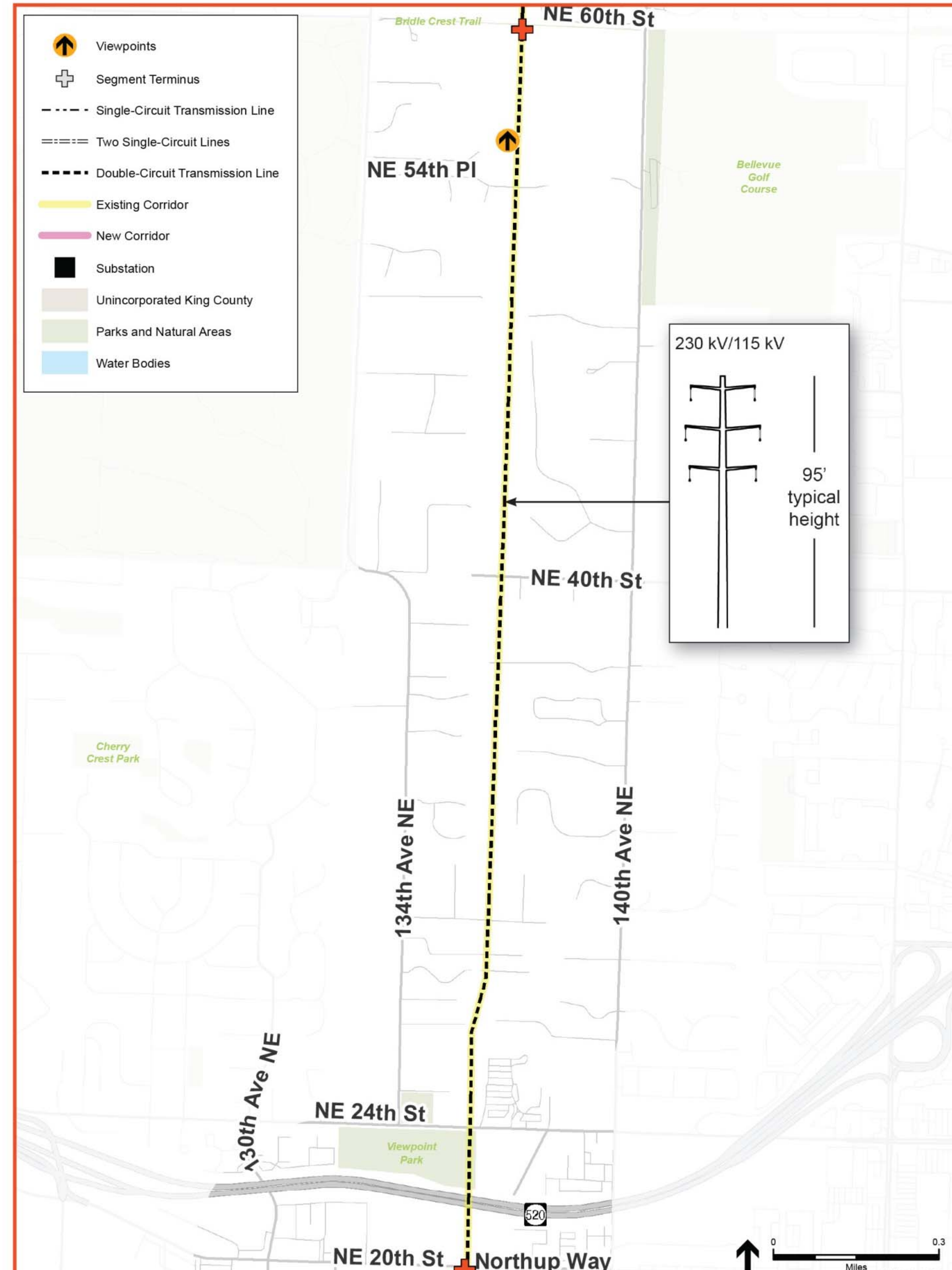
- Entirely in PSE's existing 100-foot, 115 kV corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in existing corridor; pipeline 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, 2016)



DSD 010265

BELLEVUE CENTRAL SEGMENT

Existing Corridor Option

Part of PSE's Preferred Alignment

DESCRIPTION

Start: Northup Way/NE 20th St
End: Richards Creek Substation (New)

PROPOSED POLES & LOCATION

- Approximately 59 wooden H-frames replaced with approximately 30 double-circuit, 230 kV/115 kV steel monopoles.
- One circuit energized at 230 kV, the other circuit energized at 115 kV.
- Height:
  - 95' (typical)
  - 115' (maximum)
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

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: 2.8 miles

Easement / Property Acquisition

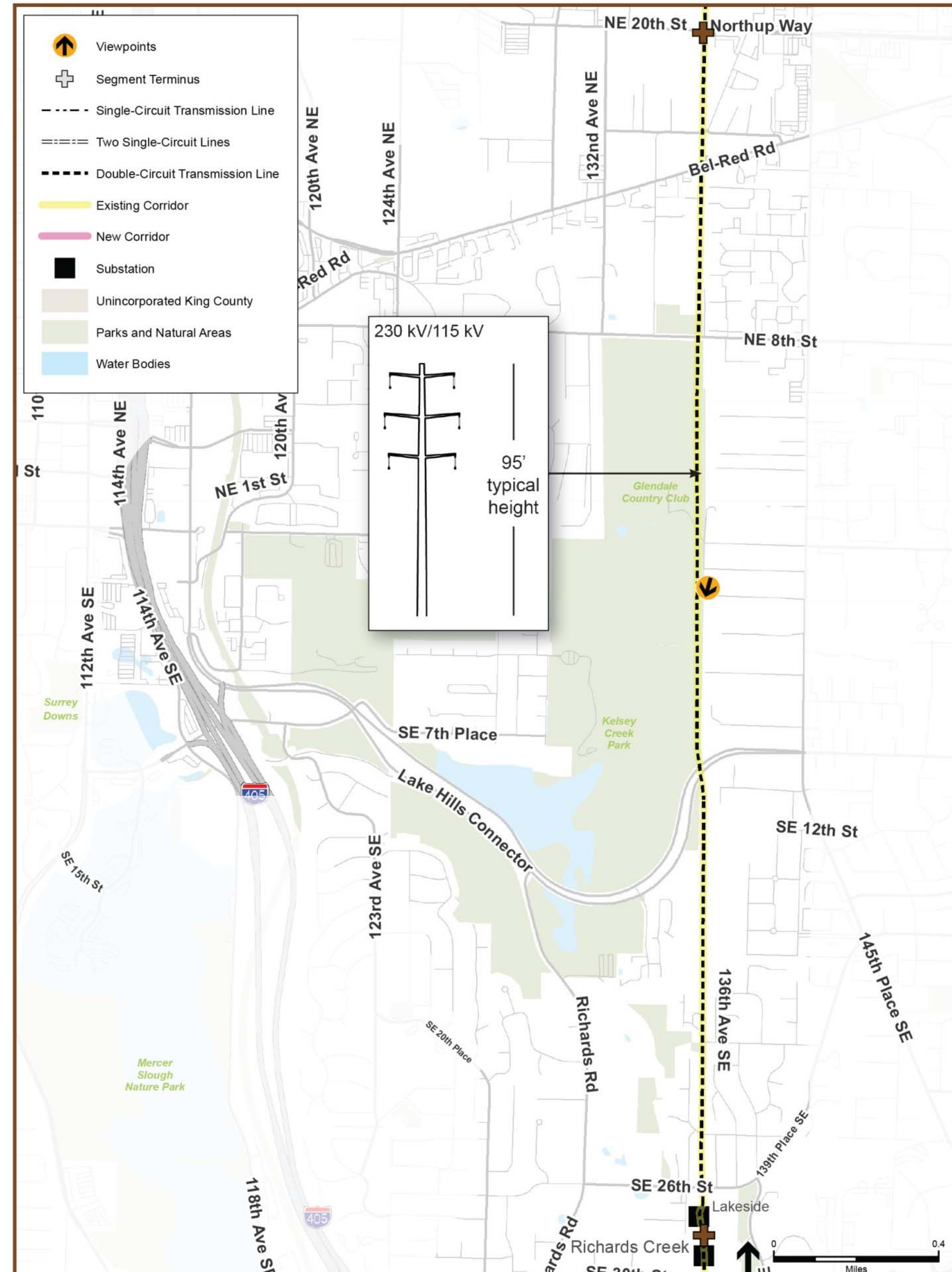
- Entirely in PSE's existing 100-foot, 115 kV corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

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

From 136th Ave SE looking south (existing conditions)

Simulation of proposed project (Power Engineers, 2016)



DSD 010266

BELLEVUE CENTRAL SEGMENT

Bypass Option 1

DESCRIPTION

Start: Northup Way/NE 20th St
End: Richards Creek Substation (New)

PROPOSED POLES & LOCATION

1 Single-Circuit Steel Monopole

- *Location:* NE 20th St/132nd Ave NE/Bel-Red Rd/120th Ave NE/NE 1st St/Lake Hills Connector.
- Approximately 50 new single-circuit 230 kV steel monopoles installed in the new corridor.
- Typical height = 100' (max. = 125').
- Typical easement width = 20' (range = 20 to 30').
- Clearing for vegetation over 15' in height = 16' from outside transmission wire, 6' from pole on wire-free side.
- SCL lattice towers raised by 12' and replaced with monopoles near intersection of Bel-Red Rd and 124th Ave NE.
- SCL towers may need to be raised and replaced with monopoles where SCL line crosses the Lake Hills Connector.

2 Double-Circuit Steel Monopole

- *Location:* Exiting corridor from intersection with Lake Hills Connector to Richards Creek Substation.
- Approximately 18 wooden H-frames replaced with approximately 10 double-circuit 230 kV/115 kV steel monopoles in the existing corridor.
- Typical height = 100' (max. = 125').
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wire.

QUICK FACTS

Jurisdiction: Bellevue

Segment Length: 3.8 miles

Easement / Property Acquisition

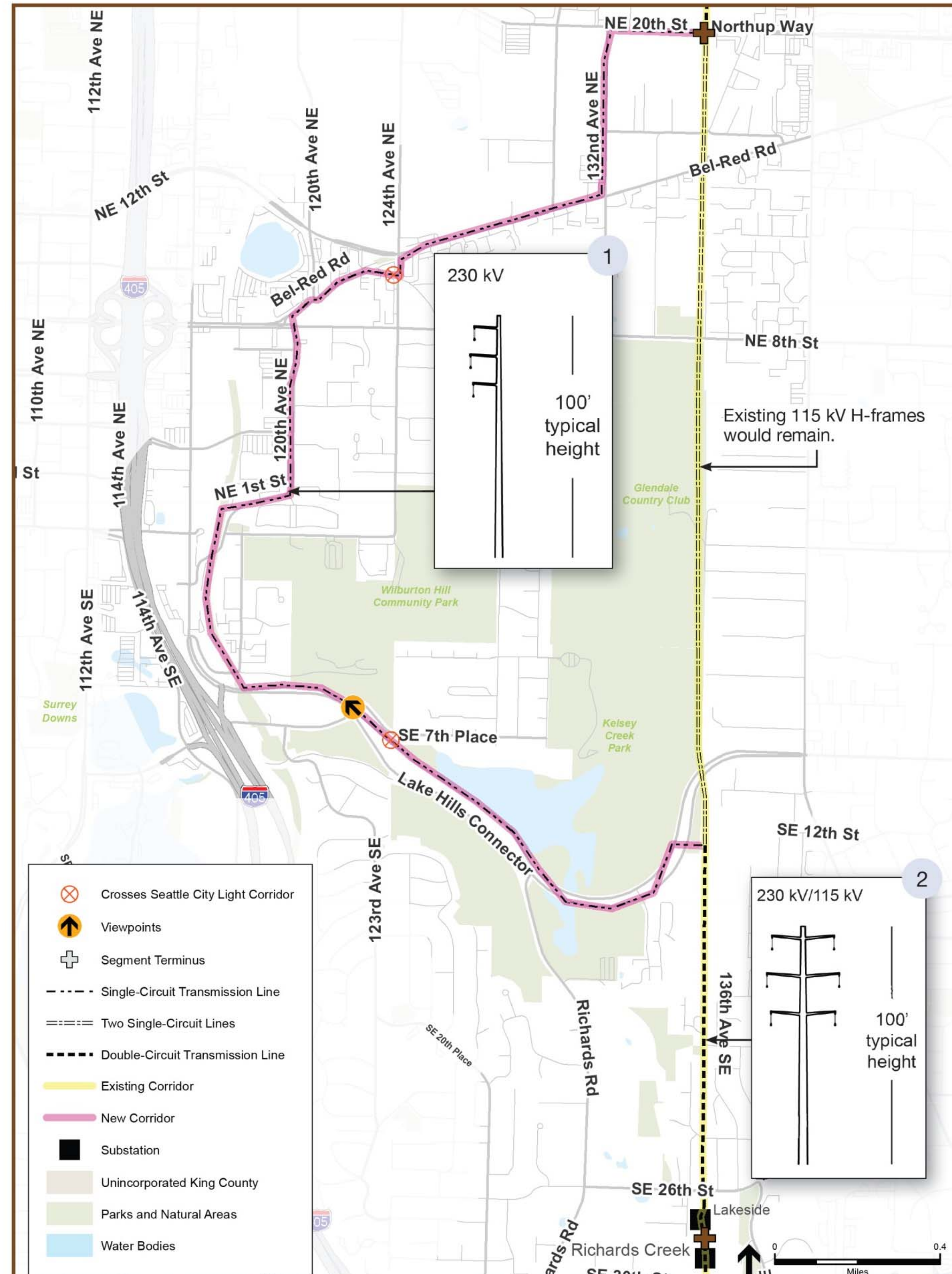
- New easements needed for about 50 properties (about 5 acres) in new corridor.
- No houses condemned or demolished; some accessory structures (e.g., garages and sheds) would need to be moved or demolished.

Olympic Pipeline Info

- Co-located in existing corridor; pipeline buried on either side (east or west). Poles placed in center of corridor.
- Where option departs the existing transmission line corridor, it would not be adjacent to the pipeline.

Lake Hills Connector looking northwest (existing conditions)

Simulation of proposed project (Power Engineers, 2016)



DSD 010267

BELLEVUE CENTRAL SEGMENT

Bypass Option 2

DESCRIPTION

Start: Northup Way/NE 20th St

End: Richards Creek Substation (New)

PROPOSED POLES & LOCATION

1 Double-Circuit Steel Monopole

- *Location:* Existing corridor from Northup Way to Bel-Red Rd/SE 26th St.
- Approximately 7 new double-circuit 230 kV/115 kV steel monopoles installed in the new corridor.
- One circuit energized at 230 kV, the other at 115 kV.
- Typical height = 95-100’ (max. = 125’).
- Typical easement width = 35’ (range = 30 to 55’).
- Clearing for vegetation over 15’ in height = 16’ from outside transmission wire.
- Existing communication and distribution lines would be placed underground.

2 Single-Circuit Steel Monopole

- *Location:* Bel-Red Rd/120th Ave NE/NE 1st St/Lake Hills Connector/Richards Rd.
- Approximately 47 new single-circuit 230 kV steel monopoles installed in the new corridor.
- Typical height = 100’ (max. = 125’).
- Typical easement width = 20’ (range = 20 to 30’).
- Clearing for vegetation over 15’ in height = 16’ from outside transmission wire, 6’ from pole on wire-free side.
- SCL lattice towers raised by 12’ and replaced with monopoles near intersection of Bel-Red Rd and 124th Ave NE.
- SCL towers may need to be raised and replaced with monopoles where SCL line crosses the Lake Hills Connector.

QUICK FACTS

Jurisdiction: Bellevue

Segment Length: 4.5 miles

Easement / Property Acquisition

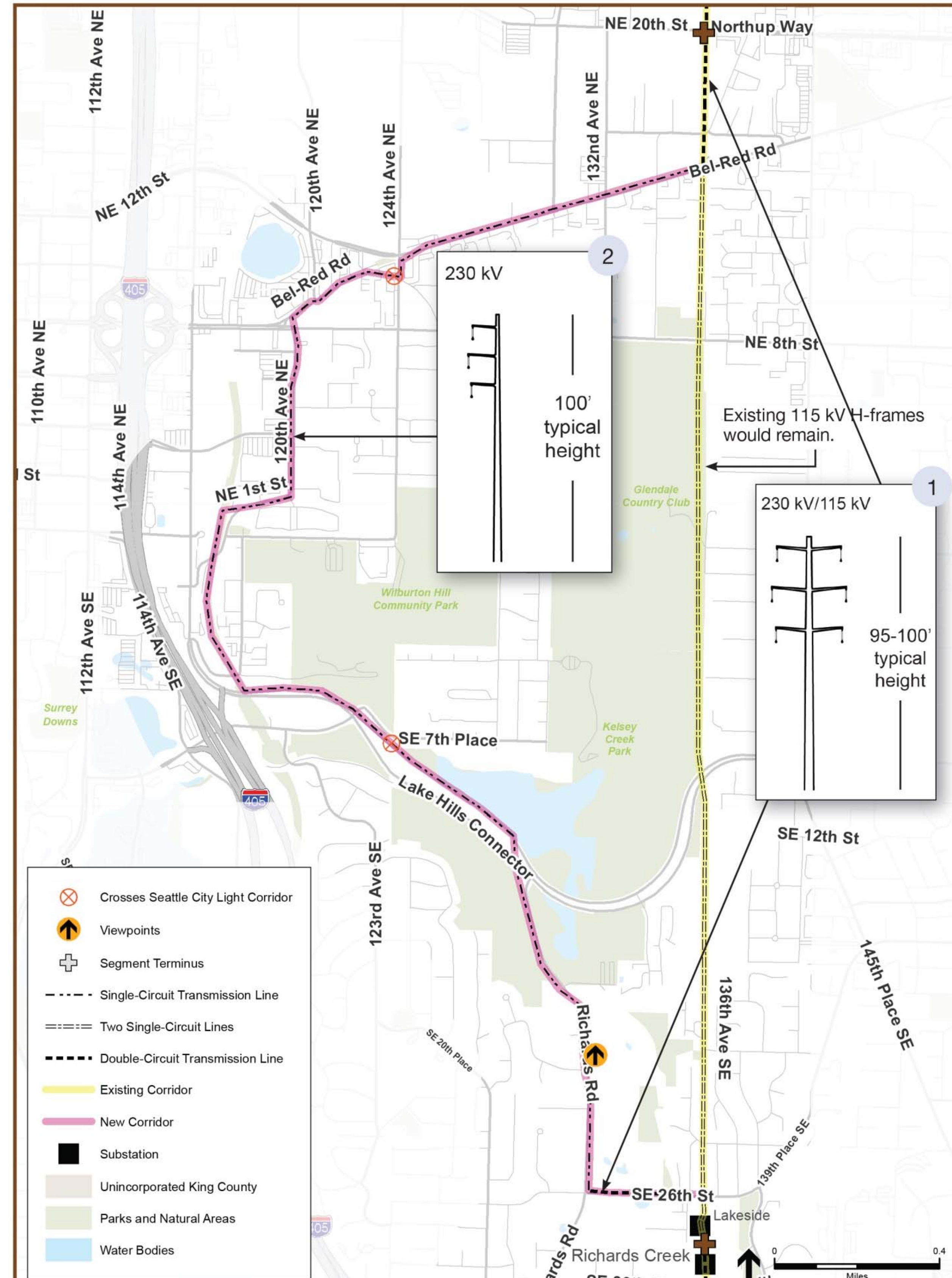
- New easements needed for about 60 properties (about 7 acres) in the new corridor.
- No houses condemned or demolished; some accessory structures (e.g., garages and sheds) would need to be moved or demolished.

Olympic Pipeline Info

- Where option departs the existing transmission line corridor it would not be adjacent to the pipeline.
- Co-located in existing corridor; pipeline buried on either side (east or west). Poles placed in center of corridor.

From Richards Road looking north (existing conditions)

Simulation of proposed project (Power Engineers, 2016)



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BELLEVUE SOUTH SEGMENT

Oak 1 Option

DESCRIPTION

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

PROPOSED POLES & LOCATION

1 Double-Circuit Steel Monopole

- *Location:* SE 30th St/Richards Rd/Factoria Blvd/ Coal Creek Pkwy.
- Approximately 44 new double-circuit 230 kV/115 kV steel monopoles installed in the new corridor.
- On SE 30th St existing single-circuit 115 kV wood poles on the opposite side of the street would remain.
- Two circuits built to 230 kV standards; one energized at 115 kV, one energized at 230 kV.
- Typical height = 80' (max. = 125').
- Typical easement width = 35' (range = 30 to 55').
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

2 Double-Circuit Steel Monopole

- *Location:* Existing corridor from Somerset substation to SE 60th St.
- Approximately 8 wooden H-frames replaced with 4 steel monopoles.
- Two circuits built to 230 kV standards; one energized at 115 kV, one energized at 230 kV.
- Typical height = 100' (max. = 115').
- Same configuration used for all Oak and Willow options.
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

3 Two Single-Circuit Steel Monopoles

- *Location:* Existing corridor from SE 60th St to Newcastle Way.
- Approximately 10 wooden H-frames replaced with 5 steel monopole pairs.
- The circuit on one monopole energized at 115 kV and the other at 230 kV.
- Typical height = 85' (max. = 90').
- Same configuration used for all Oak and Willow options.
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.


From Factoria Blvd SE looking north (existing conditions)


Simulation of proposed project (Power Engineers, 2016)

QUICK FACTS

Jurisdiction: Bellevue
Segment Length: 3.6 Miles

Easement / Property Acquisition

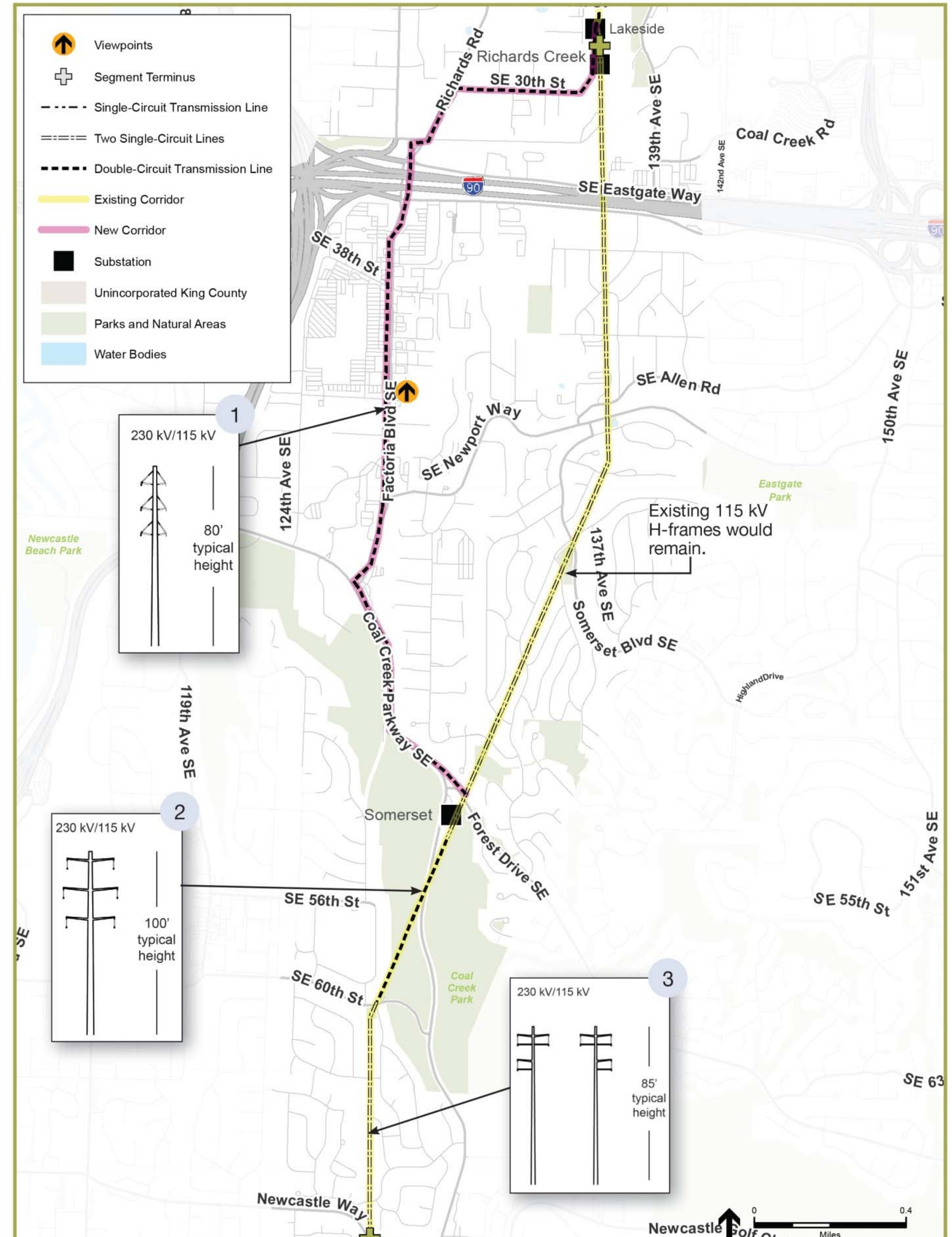
- New easements needed for about 60 properties (about 8 acres) in new corridor.
- No houses condemned or demolished.
- Some accessory structures (e.g., garages and sheds) would need to be moved or demolished.

Existing Distribution & Communication Lines

- Existing lines along Factoria Blvd SE and Coal Creek Pkwy would be placed underground.

Olympic Pipeline Info

- 16" pipeline uses existing corridor (often in the center).
- 20" pipeline uses SE 30th St, Richards Rd, Factoria Blvd SE, and Coal Creek Parkway SE between Richards Creek and Somerset substations. South of Somerset it uses the existing corridor.



BELLEVUE SOUTH SEGMENT

Oak 2 Option

DESCRIPTION

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

PROPOSED POLES & LOCATION

1 Double-Circuit Steel Monopole

- *Location:* SE 30th St/Richards Rd
- Approximately 11 new monopoles installed.
- On SE 30th St existing single-circuit 115 kV wood poles remain.
- Two circuits energized at 115 kV, one built to 230 kV standards.
- Typical height = 80' (max. = 125').
- Typical easement width = 35' (range = 30 to 55').
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

2 Single-Circuit Steel Monopole

- *Location:* Factoria Blvd SE, Coal Creek Parkway SE.
- Approximately 32 monopoles replaced with new monopoles.
- One circuit energized at 115 kV, built to 230 kV standards.
- Typical height = 80' (max. = 125').
- Typical easement width = 20' (range = 20 to 30').
- Clearing for vegetation over 15' in height = 16' from outside transmission wires, 6' from pole on wire-free side.

3 Single-Circuit Wood Monopole

- Existing line relocated from Factoria Blvd SE to 124th Ave SE and SE 38th St.
- No existing PSE poles; approximately 17 new monopoles.
- One circuit energized at 115 kV installed.
- Typical height = 70' (max. = 80').
- Typical easement width = 10' (range = 5 to 25').
- Clearing for vegetation over 15' in height = 16' from outside transmission wires, 6' from pole on wire-free side.

4 Single-Circuit Steel H-Frame

- *Location:* Existing corridor from Richards Creek substation to Somerset substation.
- Approximately 40 H-frames replaced with 23 H-frames energized at 230 kV.
- Typical height = 65' (max. = 90').
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

5 Double-Circuit Steel Monopole

- *Location:* Existing corridor from Somerset substation to SE 60th St.
- Approximately 8 H-frames replaced with 4 monopoles.
- Two circuits built to 230 kV standards; one energized at 115 kV, one energized at 230 kV.
- Typical height = 100' (max. = 115').
- Same configuration used for all Oak and Willow options.
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

6 Two Single-Circuit Steel Monopoles

- *Location:* Existing corridor from SE 60th St to Newcastle Way. Approximately 10 H-frames replaced with 5 monopole pairs.
- The circuit on one monopole energized at 115 kV and the other at 230 kV.
- Typical height = 85' (max. = 90').
- Same configuration used for all Oak and Willow options.
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

QUICK FACTS

Jurisdiction: Bellevue

Segment Length: 6.7 Miles

Easement / Property Acquisition

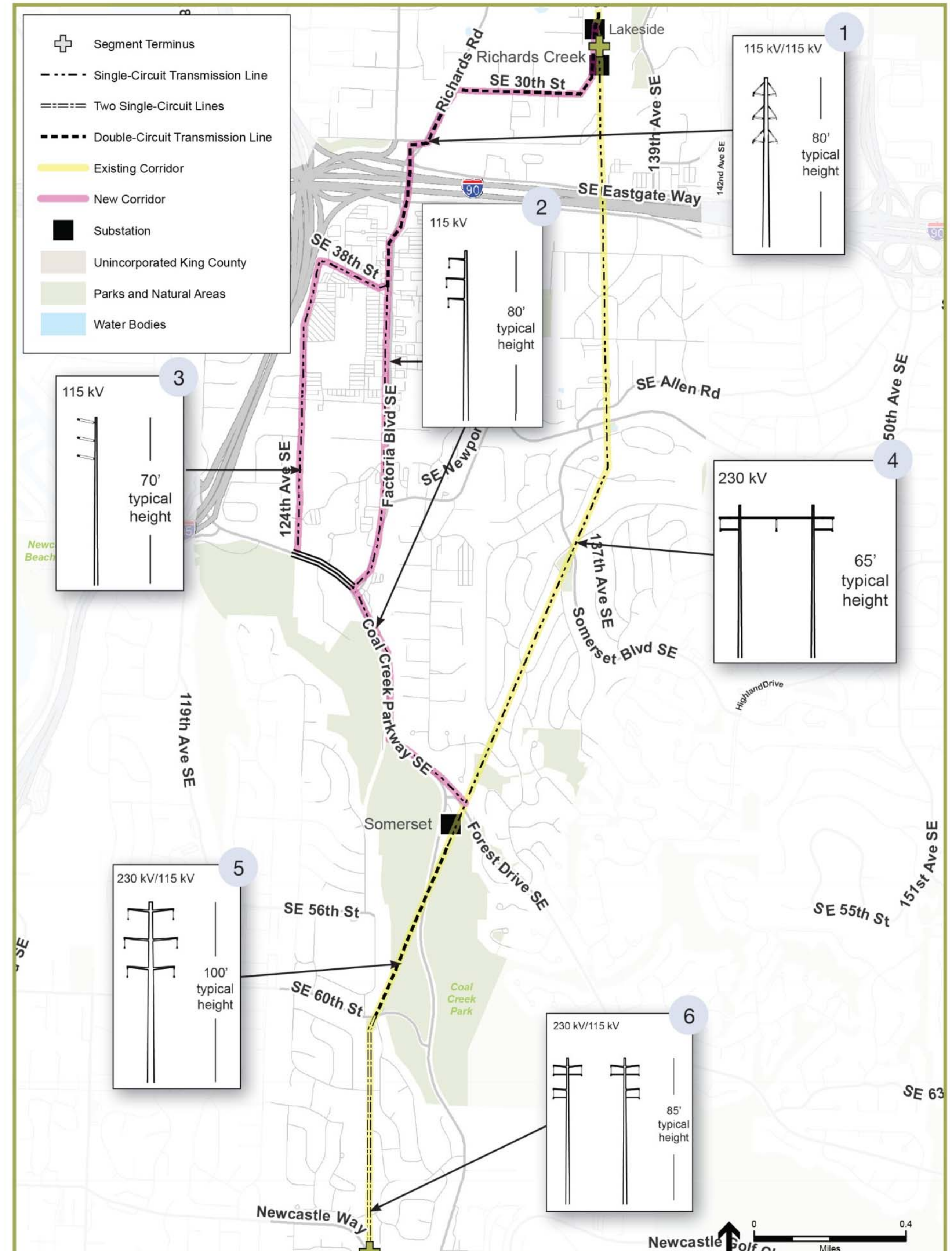
- New easements needed for about 70 properties (about 10 acres) in new corridor.
- No houses condemned or demolished.
- Some accessory structures (e.g., garages and sheds) would need to be moved or demolished.

Existing Distribution & Communication Lines

- Existing lines along Factoria Blvd SE and Coal Creek Pkwy would be placed underground.

Olympic Pipeline Info

- 16" pipeline uses existing corridor.
- 20" pipeline uses SE 30th St, Richards Rd, Factoria Blvd SE, and Coal Creek Parkway SE between Richards Creek and Somerset substations. South of Somerset it uses the existing corridor.



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BELLEVUE SOUTH SEGMENT

Willow 1 Option

DESCRIPTION

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 26 wooden H-frames replaced with approximately 14 double-circuit 230 kV/115 kV steel monopoles.
- One circuit energized at 230 kV, one at 115 kV.
- Typical height = 100' (max. = 115').
- Clearing for vegetation over 15' in height = 16' from outside transmission wire.

2 Single-Circuit Steel Pairs

- *Location:* Existing corridor south of SE 60th St. and between SE Newport Way and Somerset substation.
- Approximately 30 wooden H-frames replaced with approximately 19 pairs of single-circuit 230 kV/115 kV steel monopoles.
- The circuit on one monopole energized at 230 kV, the other at 115 kV.
- Typical height = 85' (max. = 90').
- Clearing for vegetation over 15' in height = 16' from outside transmission wire.

QUICK FACTS

Jurisdiction: Bellevue

Segment Length: 3.3 miles

Easement / Property Acquisition

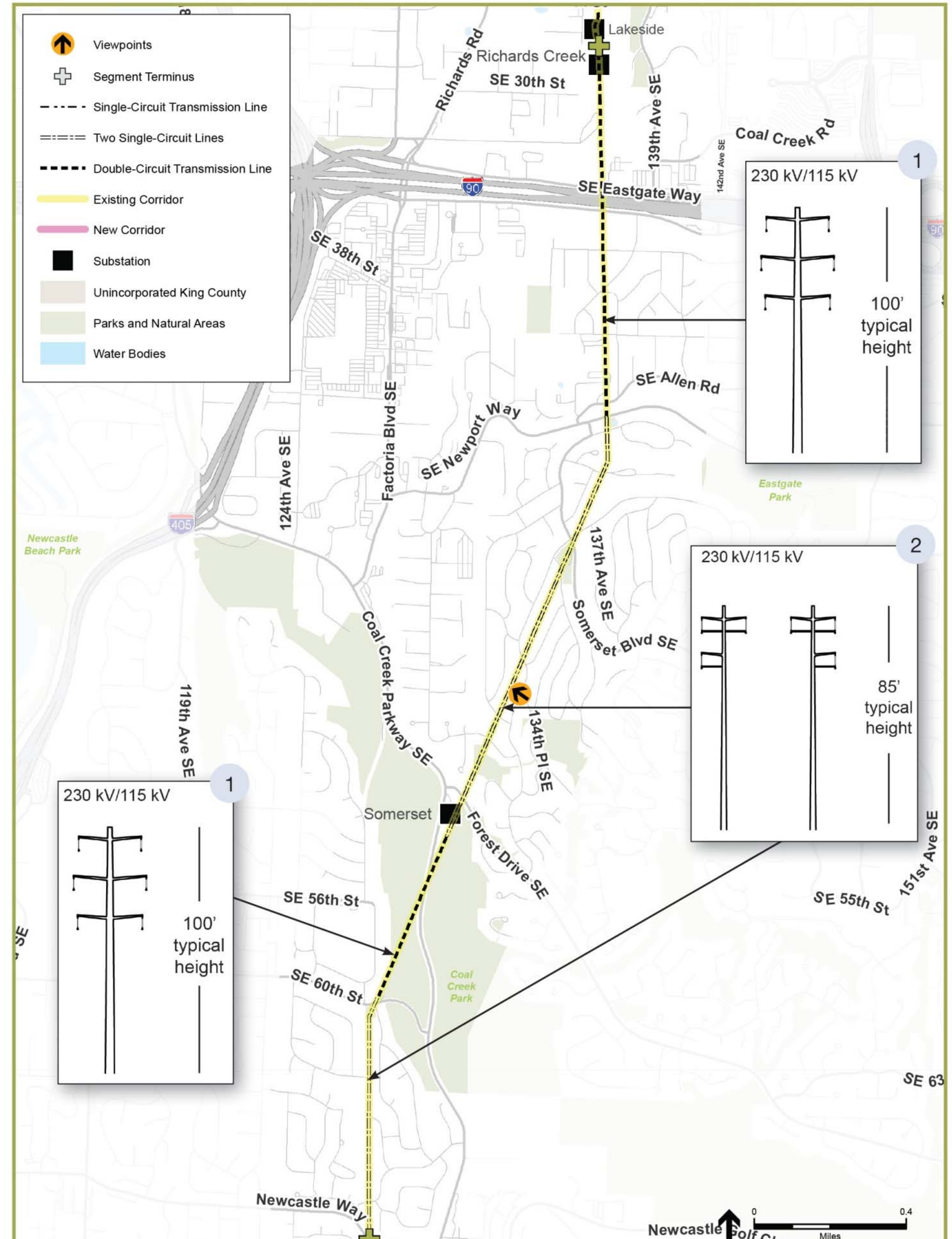
- Entirely in PSE's existing 100-foot, 115 kV corridor; no new easements or property acquisition needed.

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, 2016)



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BELLEVUE SOUTH SEGMENT

Willow 2 Option

Part of PSE's Preferred Alignment

DESCRIPTION

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.
- One circuit energized at 230 kV, the other circuit energized at 115 kV.
- Approximately 20 H-frames replaced with 10 monopoles.
- Typical height = 100' (max. = 125').
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

2 Single-Circuit Steel H-Frame

- *Location:* Existing corridor south of SE Newport Way.
- Approximately 28 H-frames replaced with 14 H-frames.
- 115 kV H-frames replaced with 230 kV H-frames.
- Typical height = 65' (max. = 95').
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

3 Single-Circuit Steel Monopole

- *Location:* SE Newport Way and Coal Creek Parkway SE.
- Approximately 65 poles replaced with 14 monopoles.
- Single-circuit 115 kV lines would be built to 230 kV standards.
- Typical height = 80' (max. = 80').
- Typical easement width = 20' (range = 20 to 30').
- Clearing for vegetation over 15' in height = 16' from outside transmission wires, 6' from pole on wire-free side.

4 Double-Circuit Steel Monopole

- *Location:* Factoria Blvd SE.
- Approximately six new 115 kV monopoles installed.
- 115 kV lines would be built to 230 kV standards.
- Typical height = 80' (max. = 90').
- Typical easement width = 35' (range = 30 to 55').
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

5 Double-Circuit Steel Monopole

- *Location:* Existing corridor from Somerset substation to SE 60th St.
- Approximately 8 H-frames replaced with 4 monopoles.
- Two circuits built to 230 kV standards; one energized at 115 kV, one energized at 230 kV.
- Typical height = 100' (max. = 115').
- Same configuration used for all Oak and Willow options.
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

6 Two Single-Circuit Steel Monopoles

- *Location:* Existing corridor from SE 60th St to Newcastle Way.
- Approximately 10 H-frames replaced with 5 monopole pairs.
- The circuit on one monopole energized at 115 kV and the other at 230 kV.
- Typical height = 85' (max. = 90').
- Same configuration used for all Oak and Willow options.
- Easement width = 100'.
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

QUICK FACTS

Jurisdiction: Bellevue
Segment Length: 5.5 Miles

Easement / Property Acquisition

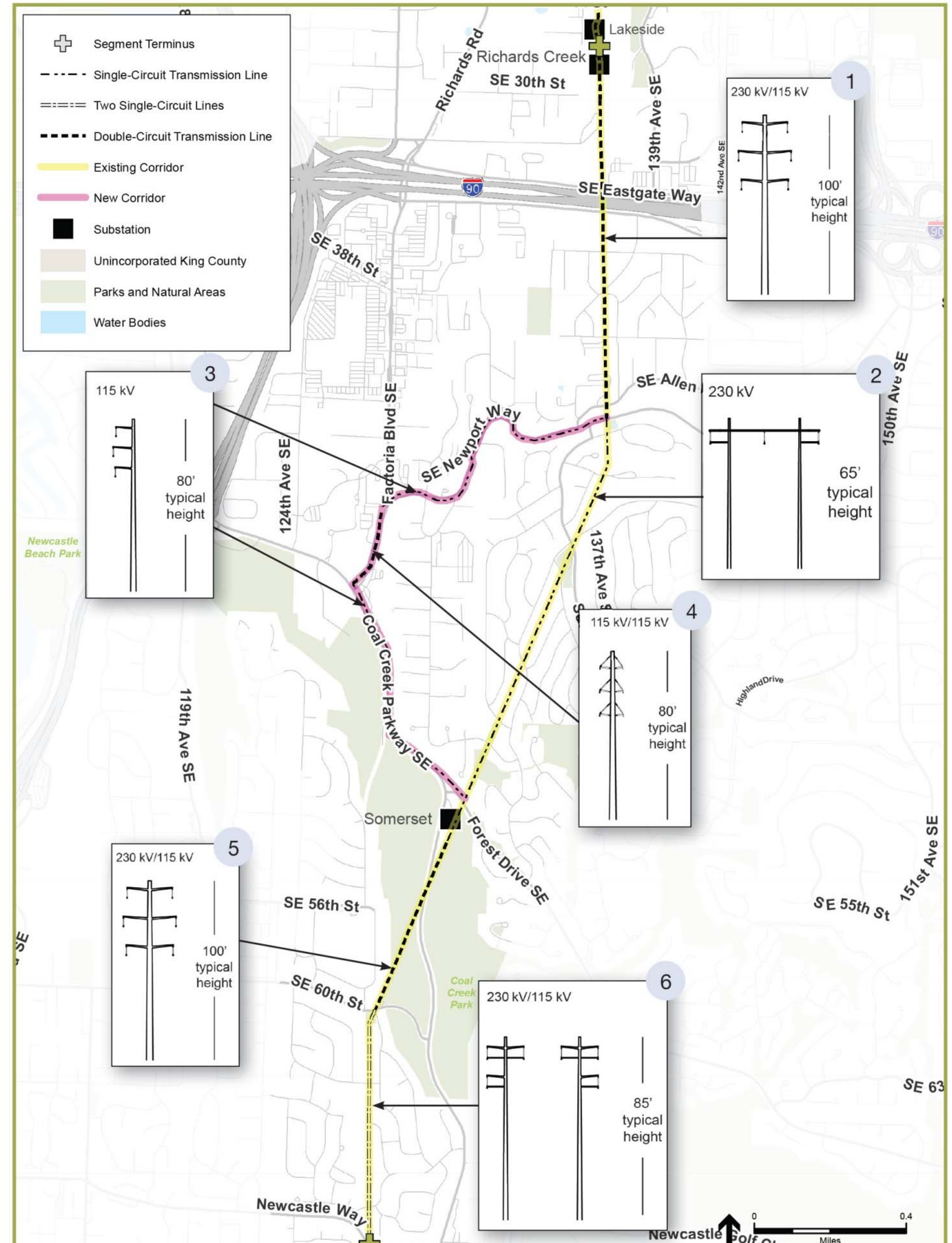
- New easements needed for about 50 properties (about 6 acres) in new corridor.
- No houses condemned or demolished.
- Some accessory structures (e.g., garages and sheds) would need to be moved or demolished.

Existing Distribution & Communication Lines

- Existing lines would be placed underground along Factoria Blvd SE, SE Newport Way, and Coal Creek Parkway.

Olympic Pipeline Info

- 16" pipeline uses existing corridor (generally in the center of the right-of-way).
- 20" pipeline uses Factoria Blvd SE and Coal Creek Parkway SE. South of Somerset uses the existing corridor.



NEWCASTLE SEGMENT

No Options

Part of PSE's Preferred Alignment

DESCRIPTION

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

PROPOSED POLES & LOCATION

- Approximately 26 wooden H-frames (52 poles) replaced with approximately 26 pairs of single-circuit, 230 kV/115 kV steel monopoles that are located near the outer edges of the right-of-way.
- The circuit on one monopole energized at 230 kV, the other energized at 115 kV.
- Height:
  - 100' (typical)
  - 100' (maximum)
- Clearing for vegetation over 15' in height = 16' from outside transmission wires.

QUICK FACTS

Jurisdiction: Newcastle

Segment Length: 1.5 miles

Easement / Property Acquisition

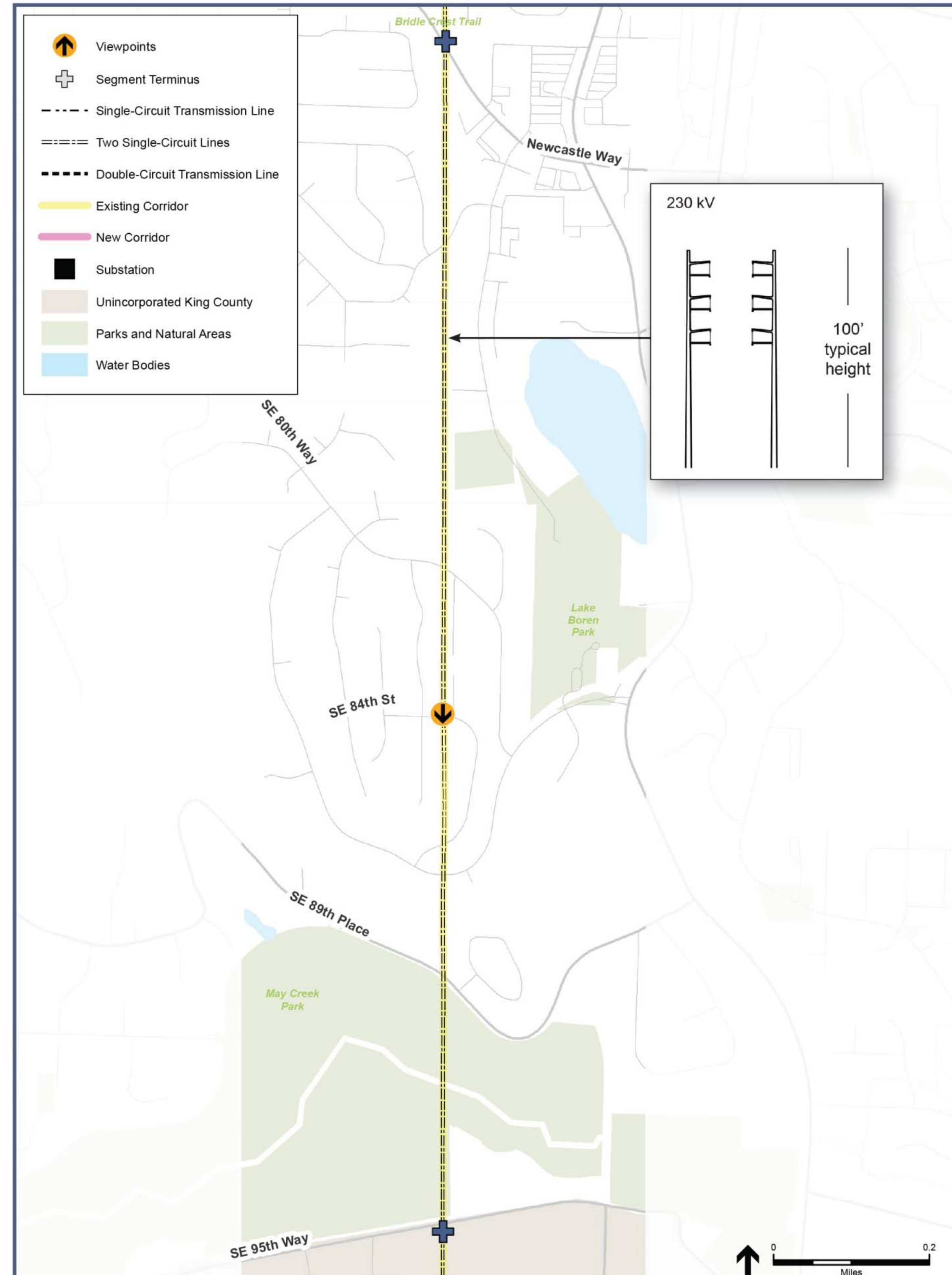
- Entirely in PSE's existing 100-foot, 115 kV corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

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

From SE 84th St looking south (existing conditions)

Simulation of proposed project (Power Engineers, 2016)



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RENTON SEGMENT

No Options

Part of PSE's Preferred Alignment

DESCRIPTION

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 12 wooden H-frames replaced with approximately 6 pairs of single-circuit 230 kV/115 kV steel monopoles.
- The circuit on one monopole energized at 230 kV, the other at 115 kV.
- Typical height = 85' (max. = 125').
- Clearing for vegetation over 15' in height = 16' from outside transmission wire.
- SCL crossing may require wires and structures to be raised, and lattice towers replaced with monopoles.

2 Double-Circuit Steel Monopole

- *Location:* Existing corridor south of Honey Creek Open Space.
- Approximately 69 wooden H-frames replaced with approximately 46 double-circuit 230 kV/ 115 kV steel monopoles.
- One circuit energized at 230 kV, one at 115 kV.
- Typical height = 90' (max. = 125').
- Clearing for vegetation over 15' in height = 16' from outside transmission wire.
- Two poles required at Talbot Hill substation for dead-end structures.
- SCL crossing may require wires and structures to be raised, and lattice towers replaced with monopoles.

QUICK FACTS

Jurisdiction: Renton and a small portion of unincorporated King County.

Segment Length: 4.5 miles

Easement / Property Acquisition

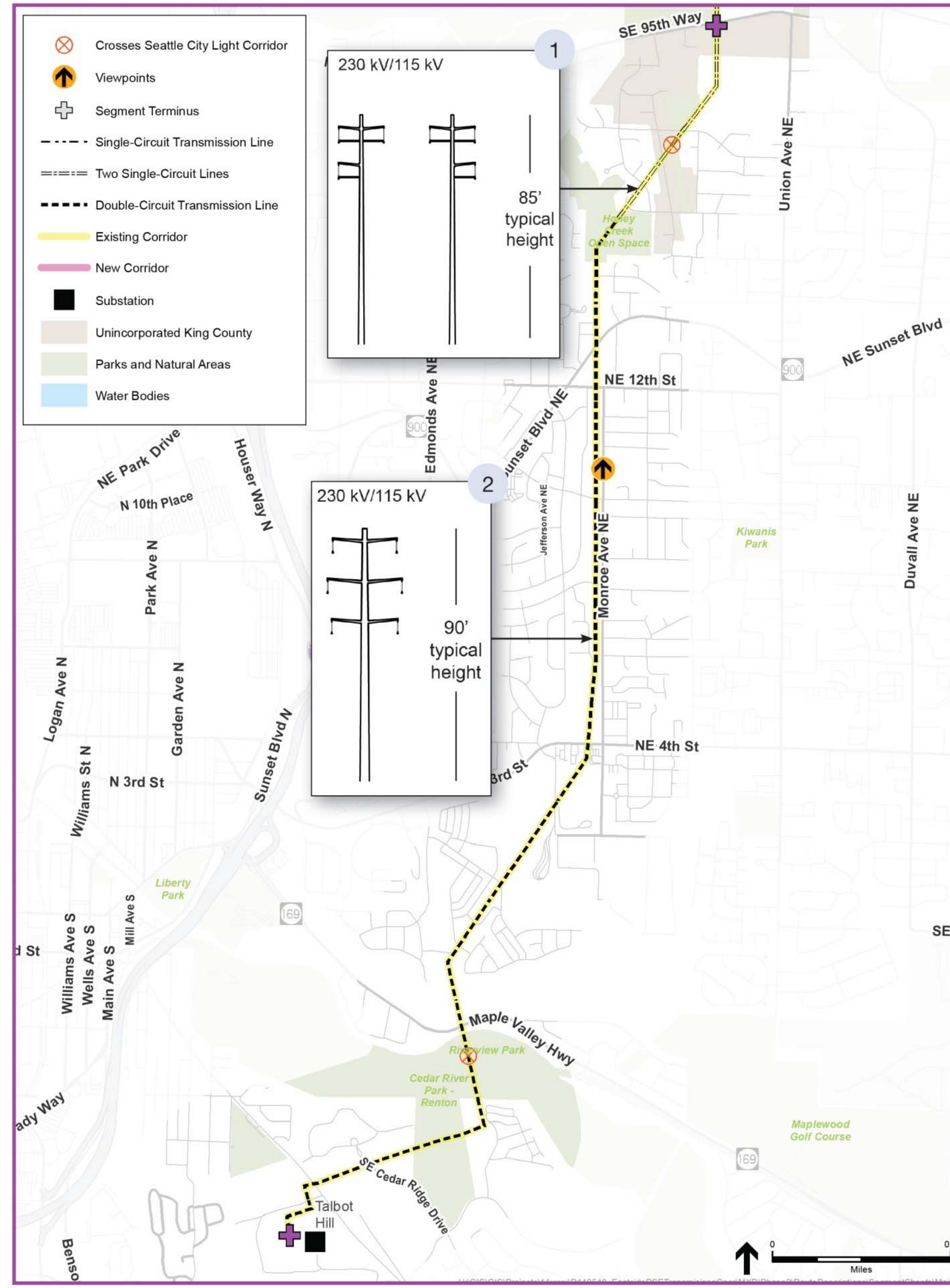
- Entirely in PSE's existing 100-foot, 115 kV corridor; no new easements or property acquisition needed.

Olympic Pipeline Info

- Co-located in existing corridor for 0.2 mile in this segment. Pipelines leave corridor where it crosses SCL line near Honey Creek Open Space. Pipelines buried on one side (east or west) of corridor.
- Poles would be placed in the center of the corridor south of Honey Creek Open Space.


From Monroe Ave NE looking north (existing conditions)


Simulation of proposed project (Power Engineers, 2016)



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2.1.3 Construction

Construction activities associated with the proposed Energize Eastside project are summarized below, both for the No Action Alternative and for Alternative 1. The description of Alternative 1 construction is organized by its two main components (the Richards Creek substation and the 230 kV transmission line), because these differ in associated activities. Construction of the 230 kV transmission line would involve similar activities regardless of segment or option selected; therefore, that discussion is not presented or organized by segment. In addition, the alternatives and associated routes analyzed in this Phase 2 Draft EIS are in the pre-design phase. 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 4.

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, especially in the context of construction, is included in the Phase 2 Draft EIS. Construction-related information associated with the pipeline is noted in general here, but the full analysis is presented in Chapter 4, Section 4.9 (*Environmental Health – Pipeline Safety*).

More details on the construction methods, equipment used, and sequencing for the Energize Eastside project is included in Appendix A, as well as in the Phase 1 Draft EIS (Section 2.3.5, *Construction Summary*; Section 2.3.2.2.3, *Construction*).

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 Alternative 1

The following construction elements would occur in consecutive intervals (except for substation construction): substation construction, vegetation management, access, foundations, and pole/wire installation.

New Richards Creek Substation and Improvements to Other Substations

Construction of a new substation would require clearing and grading to prepare the area for foundations to support the new transformer that converts the bulk power for use in the distribution system. The new transformer would also require supporting equipment (circuit breakers, electrical bus, control house, and connections to the new transmission lines) that would be placed on a concrete pad in accordance with regulatory requirements and industry standards.

Construction related to the transformer would require the delivery of the transformers to the site; grading of the site and creation of a foundation; and placement of the transformer on the foundation. Construction equipment required would include, among other things:

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

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. Construction of the substation could take up to 18 months. The substation and transmission lines could be constructed concurrently.

Access to the substation site is via SE 30th Street. The existing driveway and access road would be reconfigured to improve access. The new reconfigured driveway would be paved and likely 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. 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 PSE's Shuffleton Yard in Renton or other PSE-owned facility.

No night construction work would be needed for the new substation, although the transformer might be delivered to the site at night because of highway restrictions for oversize loads. Extended construction hours may be necessary. Road closures are not typically 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 construction of the control house and electrical assembly work would primarily be smaller vehicles, such as personal vehicles and work trucks. The actual number of vehicles used depends on the contractors' approach to construction and what is necessary to meet contractual schedule obligations. 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.

In addition to the construction of the new Richards Creek substation, some construction would be needed for the planned upgrades to the Lakeside, Talbot Hill, and Sammamish substations, as well as the Somerset substation (depending on route option). In general, all upgrades to the existing substations would occur within the existing footprint of these facilities. Work would include connecting the substation equipment to the new 230 kV line. Periodic single lane closures may be necessary at the Somerset substation site to facilitate delivery of large equipment.

Construction of the 230 kV Transmission Lines

The new transmission lines would occur within PSE's existing 115 kV transmission line corridor, with the exception of the Bellevue Central Segment bypass options and Bellevue South Segment route options, where it could be within or adjacent to existing road rights-of-way. Most of the line 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 right-of-way and along the existing corridor would be similar in nature. Common elements of anticipated construction activities are summarized below.

Coordination with Olympic Pipeline. For portions of the corridor, construction of a 230 kV line poses potential risks of interaction with or disruption to the Olympic Pipeline, necessitating particular attention to these risks. Extensive coordination with the Olympic Pipe Line Company would be required during project design and construction to avoid disruption to the line. For details about construction considerations associated with the presence of the pipeline, see Chapter 4, Section 4.9 (*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 take approximately 12 to 18 months (over two construction seasons) and would be constructed concurrently with construction of the Richards Creek substation. 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 at the end of 2017 or the beginning of 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.

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 within 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 7 days within a period of approximately 2 months. For wood poles and 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 2.1-5.

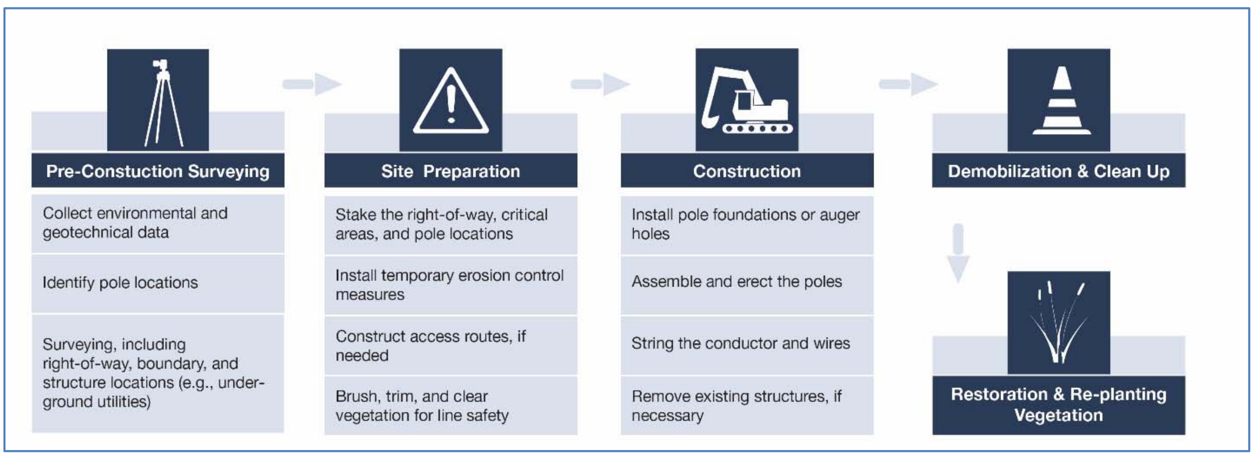


Figure 2.1-5. Construction Sequencing

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

Clearing and Grading. Trees and vegetation would be removed within the managed right-of-way zone (also called the clear zone) 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, 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 3.4 and 4.4, *Plants and Animals*.

Managed Right-of-Way Zone

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 Sections 3.4 and 4.4, *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 areas to minimize impacts to sensitive resources, such as wetlands.

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 of 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 best management practices will be used to control run-off. Access roads will be restored to their previous condition or to NESC vegetation specifications when within the managed right-of-way zone. Where poles would be placed along roadways, PSE could utilize the existing roadway network for construction access. Maps showing preliminary access road locations are provided in Appendix A.

These maps reflect preliminary access routes identified by PSE prior to individual property owner consultation that was ongoing during the preparation of this Draft 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 control 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 is 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.

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

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 to excavate the hole, which typically results in less surface area disturbance than other equipment (such as a backhoe or drill). Conversely, drilled pier foundations can be utilized, 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. Steel poles are set and anchored to the foundations. (Typically, no foundations are used for wooden poles.) Approximately 160 to 180 concrete pole foundations would need to be installed along the 18-mile distance between the Sammamish and Talbot Hill substations; however, the actual number will be determined during final design.

Steel poles would 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. No welding is required, as the ends of the segmented poles are tapered, designed to overlap using slip joints or connected with flange joints.

After installation of the new poles, existing wooden poles and wires would be removed. The old structures would be removed after the new poles are installed and the wires restrung (as described below). 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.

Transmission Line (Wire) Installation. Once the pole is set in place, the transmission line conductor (wire) is installed (Figure 2.1-6). The wire-stringing operation requires equipment at each end of the section being strung, with the establishment of temporary pulling or tensioning sites. An estimated 8 to 10 pulling sites would be needed for the project. Wires are pulled between these pulling sites through pulleys affixed to each pole structure. These pulling sites would be set up at various intervals along the right-of-way, typically 2 to 3 miles apart. Specific pulling sites would be determined close to the time the stringing activity takes place. 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 reasons, the NESC has established minimum wire clearances (i.e., the wire height above the ground). PSE has designed the Energize Eastside wires to typically be 28 feet or more from the ground for 230 kV lines, which meets or exceeds NESC's minimum conductor wire height. Additional clearance would be provided over roadway and highway crossings.

Work Within a New Corridor and Underground Utility Installation. Route options for the Bellevue Central and Bellevue South Segments involve some degree of new corridor, depending on the option. Similarly, the Willow 2, Oak 1, and Oak 2 Options (for the Bellevue South Segment) include some degree of underground utility installation, including electrical distribution and telecommunication lines.

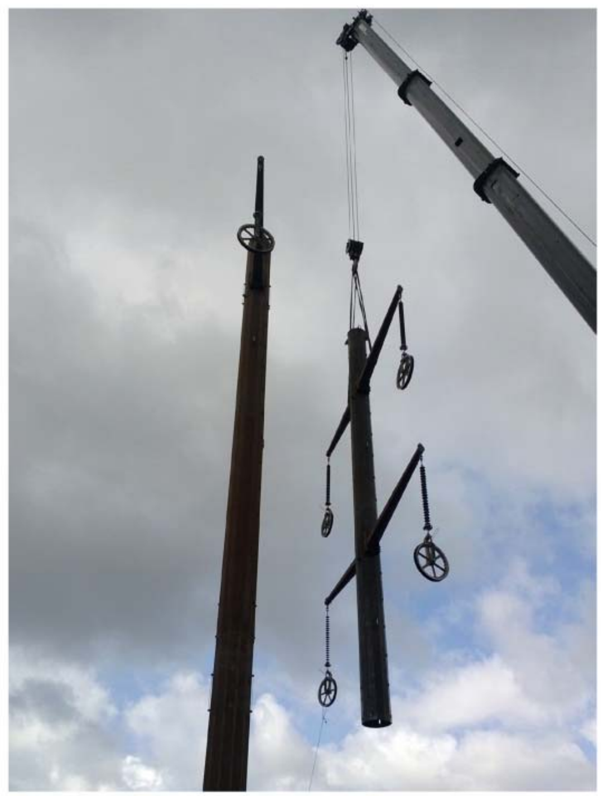
Undergrounding of distribution and communication lines entails establishing the necessary road or lane closures prior to cutting and removing the hard surface. The cables can be installed in either the roadway or sidewalk. Once the hard surface is removed, the trench is excavated to the appropriate depth, typically 3 feet. Trench width depends on the number of cables being placed in the trench. Upon completion of the excavation, the duct bank is installed in the trench. Depending on the length of the section to be undergrounded, the duct bank may be installed in sections over multiple days, at a rate of around 100 to 300 feet per day. Additionally, approximately every 1,500 feet, a subsurface pull or connection vault is installed. The trench is then backfilled and the hard surface restored. When the duct bank is complete, the cables can be pulled through and connected.

I-90 and 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 2.1-6. 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 selected after the proposed route has been decided. 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 are 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. 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 work with the cities to restore staging areas.

Other Activities. Installation of 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

The following alternatives were identified through scoping but are not included for analysis in the Phase 2 Draft EIS for the reasons explained below. Additional information on the full range of alternatives considered to meet PSE's identified capacity needs is included in Chapter 2 of the Phase 1 Draft EIS.

2.2.1 Seattle City Light Transmission Line

Use of the SCL transmission line corridor was evaluated in the Phase 1 Draft EIS, and is described in more detail in the Phase 1 Draft EIS, Section 2.3.2.3. The SCL line is not under PSE's control. SCL has indicated to the City of Bellevue that they expect to need the corridor for their own purposes and are not interested in sharing the corridor with PSE (SCL, 2014). The existing SCL line would have to be rebuilt to provide a feasible solution for the Energize Eastside project, because the current rating of the SCL line is insufficient to meet PSE's needs (Strauch, personal communication, 2015). PSE has estimated that rebuilding the SCL line would provide sufficient capacity for a period of less than 10 years, which does not comply with PSE's electrical criteria (as described in Section 2.2.1 of the Phase 1 Draft EIS) to meet performance criteria for 10 years or more after construction. Neither the City nor PSE can compel SCL to allow the use of this corridor; therefore, this option is not feasible and was not carried forward. Even if compelled use of the corridor were allowed, the negotiations would likely prove lengthy, and would likely preclude completion of the project within the required timeline to meet project objectives.

2.2.2 Underground Transmission Line

The option of placing the new 230 kV transmission lines entirely underground was evaluated in the Phase 1 Draft EIS (as Option C).

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

While PSE has an easement for their overhead lines, placing a transmission line underground would require permission from both the Olympic Pipe Line Company and each property owner to place its lines underground. Gaining such permission would likely require extensive legal action that would delay the project and thus not meet the project objectives regarding timing. A study of potential undergrounding of the transmission lines prepared for PSE by Power Engineers (2014) states that installation adjacent to the pipeline is technically viable, but that the Olympic Pipe Line Company has stated to PSE that they will not consent to other underground facilities being installed longitudinally in their easements. PSE would therefore have to place its transmission lines outside the Olympic Pipeline easement which is, in some places, nearly as wide as the PSE corridor. Even in places were the pipeline easement is substantially narrower than PSE's corridor, PSE generally does not have enough easement area to provide the necessary separation without the pipeline being relocated. As such, an underground line would require a new corridor to avoid colocation with the Olympic Pipeline (Power Engineers, 2014). This would need to be in a street or on other public or private property that PSE would have to obtain rights to use.

Beyond the cost of new right-of-way, underground lines require larger conductors, and are more costly to construct, repair, and maintain (PSE, 2016). Construction costs, not including right-of-way costs, for underground installation of a 230 kV line for the Energize Eastside project were estimated to be approximately $23 million to $28 million per mile (Power Engineers, 2014) as compared to $3 million to $4 million per mile for an overhead line.

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

2.2.3 Underwater Transmission Line in Lake Washington

The option of using a submerged or underwater transmission line in Lake Washington was included in the Phase 1 Draft EIS, and is described in more detail in Section 2.3.2.5 of that document (as Option D). Additional detail about constructing a submarine cable in Lake Washington is included in the *Eastside 230 kV Project Lake Washington Submarine Cable Alternative Feasibility Report* (Power Engineers, 2015). As described in the Phase 1 Draft EIS (Chapter 10, Land Use and Housing), a submerged line would be prohibited by shoreline regulations in two of the communities north of the proposed Richards Creek substation (Beaux Arts Village SMP Table 6.1 and Hunts Point SMP Table 6.1), because new utility corridors are prohibited in the aquatic environments of these communities. Therefore, a submerged line connecting the Sammamish substation to the Richards Creek substation would not be allowed. South of the Richards Creek substation, the City of Renton shoreline regulations (RMC 4-10-095) prohibit utilities in some shoreline environments, but it appears technically feasible to avoid prohibited environments if this option were chosen. However, this option would also require the construction of approximately 5 miles of new transmission corridors from the Talbot Hill substation to Lake Washington, and from Lake Washington to the Richards Creek substation, in order to avoid impacts to 8 miles along the existing corridor. As described in the Phase 1 Draft EIS, development of new corridors is expected to have higher environmental impacts than use of existing corridors, including permanent displacement of existing uses, vegetation removal, visual impacts, and construction duration. As such, this alternative was not seen as a reasonable alternative to using the existing corridor as proposed by PSE. For these reasons, an underwater line in Lake Washington was not carried forward.

2.2.4 New 115 kV Transmission Line

Alternative 3 in the Phase 1 Draft EIS included a system of new 115 kV transmission lines and new transformers at three substations in the Eastside area. This alternative would have required up to 60 miles of new transmission corridor. As described in the Phase 1 Draft EIS, PSE's basis for the need of this additional 115 kV infrastructure in lieu of the 230 kV system was independently reviewed (Stantec, 2015) and considered to be consistent with standard engineering for transmission line systems. Although 115 kV transmission line corridors can be narrower than 230 kV line corridors, the Phase 1 Draft EIS found that creating up to 60 miles of new 115 kV transmission corridor would have cumulatively higher environmental impacts (and higher costs) than 230 kV transmission lines using the existing transmission line corridor for most of the alignment as proposed by PSE.

For example, the Phase 1 Draft EIS estimated that Alternative 3 could result in clearing up to 114 acres of forested land under a worst-case scenario, as compared to 44 acres of forested land under the Phase 1 Draft EIS Alternative 1, which relies on PSE's existing corridor (Chapter 4 Phase 1 Draft EIS). New corridors for Alternative 3 would require the acquisition of up to 291 acres of right-of-way, with higher potential displacement of existing uses than under Alternative 1 (Chapter 10 Phase 1 Draft EIS), while the alternatives studied in this Phase 2 Draft EIS would not require displacement of any uses. Uses along both the existing corridor and the likely corridor for a 115 kV system upgrade are predominantly residential, which in some case can be accommodated without displacement. However, acquisition of up to 60 miles of right-of-way for new 115 kV lines would likely result in some displacement. Delays due to the legal steps required for such acquisition, which could include condemnation, would not meet the project objectives for timeliness to meet reliability requirements. For these reasons, this alternative was not carried forward.

2.2.5 Seattle Public Utilities Water Line Corridor

During the scoping process for the Phase 2 Draft EIS, the possibility of using an existing Seattle Public Utilities (SPU) water main corridor as an optional route through the City of Newcastle was proposed and examined. The Partner Cities asked PSE to examine how such a route would connect to their transmission lines to the north and south, and tasked the EIS Consultant Team and the City of Newcastle with inquiring with SPU regarding the feasibility of using this corridor. SPU considered the proposal for sharing this corridor, but determined that it would likely place too much of a constraint on their future needs (Wells, 2016). In particular, SPU found that the corridor was too narrow to allow placement of the transmission line and still retain the ability to build a replacement for the water main, which they eventually will need to do. Because SPU determined that the project is incompatible with SPU's existing use, co-location is not feasible. Compelled acquisition is also not possible within existing legal authorities, and could not in any event be accomplished within project timeline needs. As such, this corridor is not available to PSE for this project and was not carried forward as an alternative.

2.2.6 Other Routes and Options

During the scoping process for the Phase 2 Draft EIS, commenters suggested the possibility of using other routes farther east to provide transmission capacity. Many of these comments focused on the idea that the deficiency had to do with providing capacity for energy flowing to Canada. This is a misconception. Due to the interconnected nature of the transmission grid, and the flow of electricity through the grid, minor energy flows through the Eastside to Canada are inevitable, but they are not the source of the problem PSE has identified. PSE has indicated that the deficiency is within the Eastside. Bulk transmission (230 kV) is needed to connect to a new transformer (such as the proposed Richards Creek substation) to service growing Eastside demand. Creating additional capacity outside of the Eastside area specifically to attempt to draw Canadian flows through the system, even if 100 percent effective, would not correct the deficiency within the Eastside for the long term. A project built farther east of the service area would not meet the project's objectives. At best, it would offer a short-term solution that would not meet PSE's performance criteria for serving 10 years or more after construction (electrical criterion #1 - see the Phase 1 Draft EIS, Section 2.2) (Gentile et al., 2014). The project need and objectives are explained in full in Chapter 2 of the Phase 1 Draft EIS and Chapter 1 of this Phase 2 Draft EIS.

Chapter 2 of the Phase 1 Draft EIS also addressed a number of routes and options that were considered for Phase 1 but not carried forward.

2.2.7 Alternative 2 and "Alternative 2B"

Alternative 2 from the Phase 1 Draft EIS includes a number of technologies other than new transmission lines with the intent of addressing the transmission deficiency PSE has identified for the Eastside. Alternative 2 was designed to address the projected deficiency in transmission capacity on the Eastside by reducing the growth in peak period demand through energy efficiency, storing and releasing energy when needed to address peak demand, and providing reliable additional peak period energy sources in the area where the transmission capacity is deficient. As described in Chapter 2 of the Phase 1 Draft EIS, in order to assess potential impacts from a combination of these technologies capable of meeting the transmission capacity deficiency, a number of assumptions were made about the potential contribution each technology could make. The basis for these assumptions is described in detail in Section 2.3.3 of the Phase 1 Draft EIS, and it is recognized that a different combination could also theoretically achieve the same result.

Numerous comments were received during the scoping process for the Phase 2 Draft EIS that referred to a variation on Alternative 2 from the Phase 1 Draft EIS. This was referred to as "Alternative 2B." Alternative 2B was developed by EQL, a consultant hired by the Coalition of Eastside Neighborhoods for Sensible Energy (CENSE), and submitted during the Phase 1 Draft EIS public comment period. Alternative 2B would use the same or similar technologies as those evaluated for Alternative 2 but in different quantities. Part of the argument provided for Alternative 2B is the assertion by EQL that PSE has overstated the need and thereby made the use of these alternatives to transmission lines appear infeasible. As described in Chapter 2 of the Phase 1 Draft EIS, the EIS Consultant Team reviewed the methods used for developing the load forecast and assessing transmission capacity (Gentile et al., 2015), and found them to be in line with industry practice (Stantec, 2015).

Both Alternative 2 and Alternative 2B represent options that PSE could pursue. However, PSE has determined that these solutions either do not meet the project objectives, or they offer a short-term solution that would not meet PSE's performance criterion for serving 10 years or more after construction (electrical criterion #1- see Chapter 1 Phase 1 Draft EIS). Specifically, PSE determined that it did not have the ability to require its customers to install energy efficiency measures or peak period generation facilities, so it could not count on these measures being adopted in time and at sufficient scale to address a significant portion of the transmission deficiency (Gentile et al., 2014). To ensure a timely solution, PSE would need to build its own peak generation facilities and/or battery storage facilities. PSE found that transmission-level battery storage technology was not sufficiently developed at this time to address the full need for the Eastside (Strategen, 2015), although it could be a partial solution. Therefore, peak generation facilities would be needed. These would likely be gas-fired and would need to be near substation sites, most of which are in residential areas, where the generators could have significant adverse noise and air impacts. To avoid such impacts, larger scale facilities would be needed in industrial areas, which would lead to impacts such as the need for significant water supply, major new gas pipelines, and other issues (Gentile et al., 2014). The lack of reliability of some measures, the potential impacts of peak generation facilities, and the potential delays due to permitting for such facilities were cited by PSE as reasons that these options did not meet their objectives.

Alternative 2B would not eliminate either the uncertainty or the impacts of these technologies. Additional conservation and energy efficiency are projected to be achieved by higher incentives and other methods of promotion, but would remain voluntary, as would implementation of a network of privately owned peak power supplies that could be used during high demand periods. Reducing the target capacity for these technologies on the basis that PSE has overstated future demand would not address the deficiency PSE has identified. For these reasons, the resource technology alternative was not carried forward.

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. 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 their estimates of load projection, which are considered optimistic. Under the No Action Alternative, the Phase 2 Draft EIS assumes that PSE would continue to achieve 100 percent of the company's conservation goals as outlined in its 2015 Integrated Resource Plan (PSE, 2015), 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.

The disadvantages of delaying the project are that the risks of power outages (described in Chapter 1 of the Phase 1 Draft EIS) that would be 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 their 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 therefore 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 that would place the Partner Cities at an economic disadvantage to other jurisdictions in the region. Declining reliability of the electrical power supply on the Eastside would be inconsistent with local planning policies.

3

Long-term (Operation) Impacts and Potential Mitigation

CHAPTER 3. 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 4, *Short-term (Construction) Impacts*.

3.1 LAND USE AND HOUSING

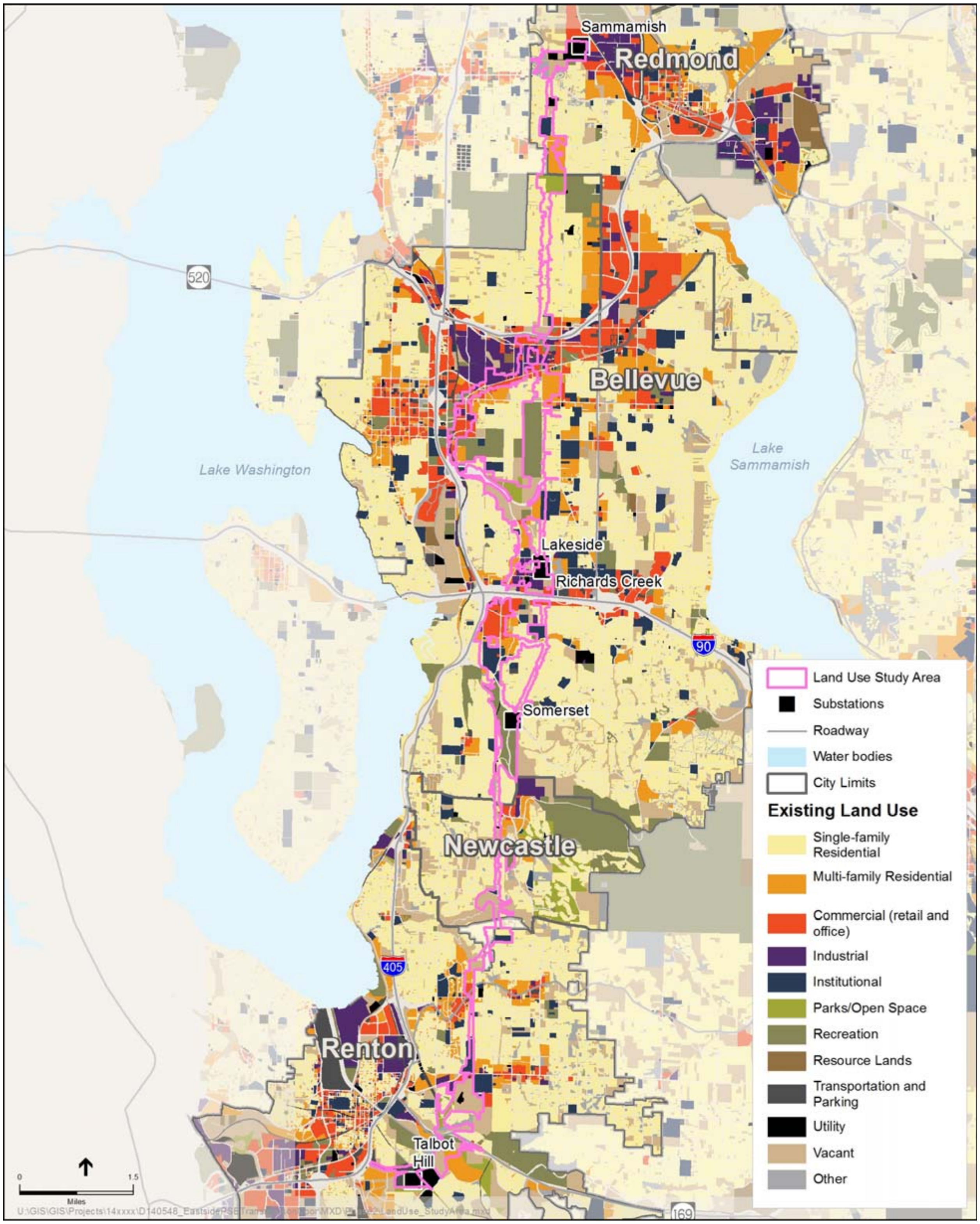
This section provides a project-level analysis of potential impacts to land use, Shorelines of the State (shorelines), and housing. The study area for the land use and housing analysis contains parcels that are included in or abutting PSE's right-of-way surrounding the proposed route of all segments and options, as well as parcels in close proximity to the right-of-way (see Figure 3.1-1). This study area was selected because properties in close proximity to the right-of-way would have the greatest potential to be impacted by potential easement acquisition and associated structure removal and a change to a utility land use or intensification of the existing utility land use. For a more detailed description of the methodology used to determine the study area for the land use analysis, please see Appendix B.

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.

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

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



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

Figure 3.1-1. Study Area for Land Use and Housing

Areas adjacent to or close to the study area that are zoned or planned for higher intensity uses such as commercial or industrial are also identified. This section describes 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. 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*.

3.1.1 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.

Comprehensive plans were analyzed at the program-level and were included as Appendix E in the Phase 1 Draft EIS. The only previously identified comprehensive plan that was updated following the publication of the Phase 1 Draft EIS is the Newcastle Comprehensive Plan (City of Newcastle, 2016a), which was adopted in March 15, 2016. The Newcastle Comprehensive Plan includes a new Utilities Element with policies that address collocation, undergrounding distribution lines, limiting vegetation disturbance, and promoting energy conservation efforts.

Subarea plans provide more detailed policies for a specific geographic area within the jurisdiction of a given comprehensive plan. Goals and policies of subarea plans that relate to electrical utility infrastructure in the context of development are typically similar to those of the applicable comprehensive plans, as outlined in Section 10.2.1 of the Phase 1 Draft EIS. Specific subarea policies relating to the project are included in Appendix B in this Phase 2 Draft EIS. If applicable, project inconsistencies with these subarea plans are described in Section 3.1.3.

The City of Bellevue and the City of Renton have Shorelines of the State within their boundaries that the project transmission lines would cross, Kelsey Creek and Cedar River (south of the Maple Valley Highway), respectively. Each adopted Shoreline Master Program (SMP) includes policies for uses and conservation of the ecological functions of their identified shorelines. Specific SMP policies relating to the project are included in Appendix B. If applicable, project inconsistencies are described in Section 3.1.3.

Zoning districts were evaluated to determine if an electrical utility line or electric utility equipment would be considered an allowed, conditionally allowed, or prohibited use, which is summarized in Appendix B. If applicable, inconsistencies are described in Section 3.1.3.

The City of Newcastle provides for a required setback of 5 feet for all buildings and structures from utility property or easement lines delineating the boundary of regional utility corridors (Newcastle Municipal Code [NMC] 18.12.130). The City of Newcastle applies this setback requirement to electrical transmission towers, since they meet the NMC definition of "structure." In Newcastle, the easement for the Olympic Pipeline is generally centered within the PSE easement and varies in width, but is typically 50 feet. For the purpose of regulating electrical transmission towers, the pipeline easement is considered as a regional utility corridor for application of this setback standard. All electrical transmission towers would be required to be set back 5 feet outside of the boundaries of the Olympic Pipeline easement.

3.1.1.1 PSE Guidelines

To adhere to NESC standards, PSE has policy guidelines that govern development in proximity to 230 kV lines (Strauch, 2016). Development must be designed consistent with the following guidelines:

- Structures (e.g., mixed-use buildings, houses, sheds, pools, etc.) in the vicinity of the proposed transmission line route must allow adequate access and working space for operation and maintenance of PSE infrastructure.
- The appropriate minimum width for the transmission line right-of-way or easement must meet (or exceed) the NESC standards, which factor in considerations such as the distances that a wire could swing during high-wind conditions.

3.1.2 Land Use and Housing in the Study Area

The 18-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 3.1-1 for a map of existing land uses. Based on a linear-feet breakdown of the study area, the most common existing land uses include:

- Residential (single-family and multi-family) (38 percent)
- Vacant land (16 percent)
- Commercial (11 percent)

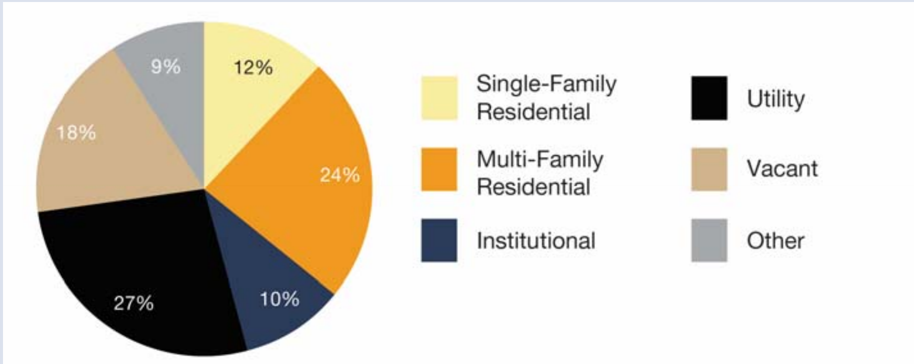
The most common zoning category is single-family residential (60 percent of zoning districts and 58 percent of linear feet). These data were derived from each City's zoning designations and grouped into broad zoning categories.

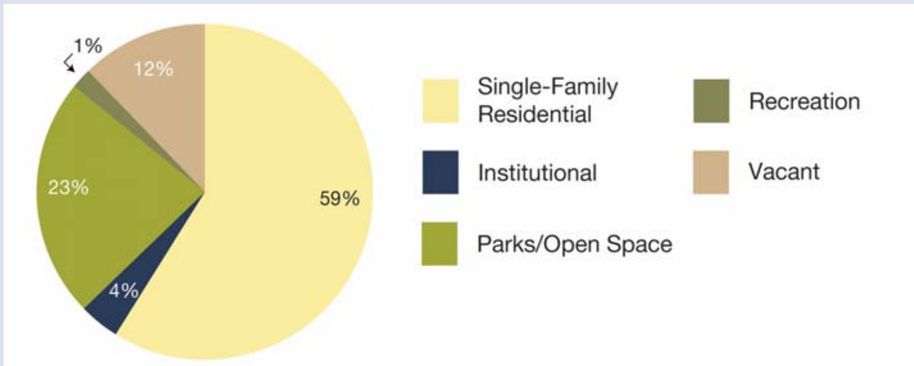
There are 783 single-family and 3,440 multi-family residences in the study area. Residences include single-family houses and individual units contained within one or more multi-family buildings.

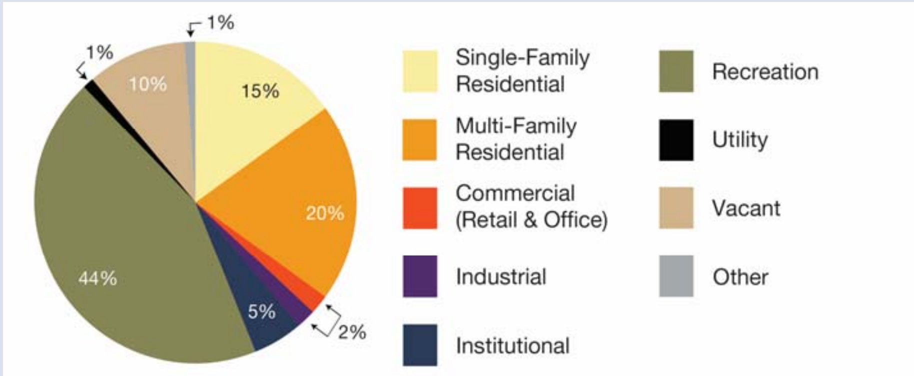
Table 3.1-1 presents the existing land uses, neighborhood character, zoning, future land uses (comprehensive plan land use designations), and housing information for the parcels within the study area, broken down by segment and option.

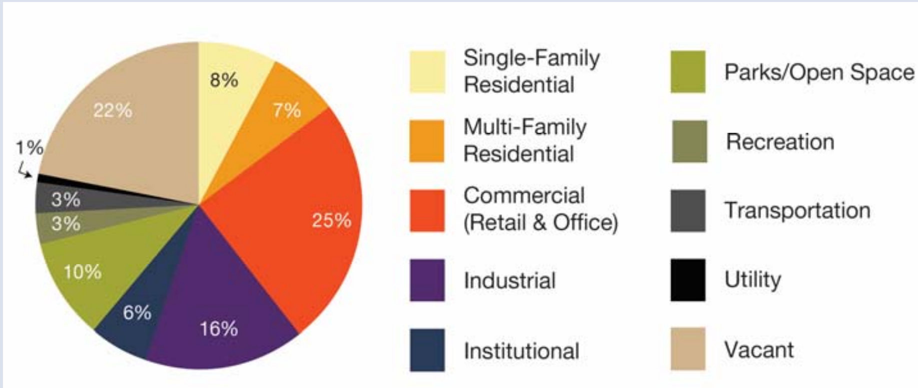
Table 3.1-1. Land Uses, Zoning, Shoreline, and Housing Characteristics by Segment and Option

Segment / Option	Land Use and Housing Characteristics
Richards Creek Substation	
Existing Land Uses	Existing land use in the study area is utility, associated with PSE's property. Land uses surrounding the substation site include a mix of industrial, institutional, single-family residential, vacant lands, and utility (PSE's Lakeside substation). A private school (Chestnut Hill Academy) is about 325 feet north of the substation site, adjacent to (and just east of) the Lakeside substation.
Neighborhood Character	The Richards Creek substation would be in an industrial neighborhood characterized by large warehouse and manufacturing buildings with large paved parking lots and driveways, and outdoor storage lots. To the east, there is a large, contiguous forested area surrounding the proposed substation that has wetlands and streams; to the south there is a transfer station; and just north of the forested area is a sports field for the Chestnut Hill Academy.
Zoning Districts	The proposed substation would be in the Light Industrial zoning district in Bellevue.
Future Land Uses	The Bellevue Comprehensive Plan designates this area as Light Industrial. This indicates that the neighborhood will continue to have industrial and manufacturing land uses into the foreseeable future.
Housing	There are no single-family or multi-family residences immediately adjacent to the proposed substation site.

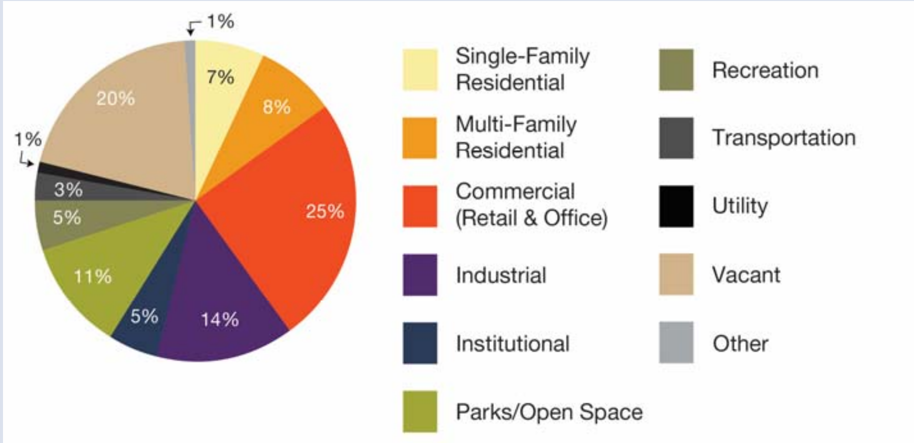
Segment / Option	Land Use and Housing Characteristics
Redmond Segment	
Existing Land Uses	Existing land uses mostly include a mix of utility and multi-family residential (see the chart below for the percentage of the total study area within the Redmond Segment that each land use represents). Approximately 100 parcels are immediately adjacent to the existing corridor. Unique land uses within the study area include Willows Creek Neighborhood Park and Rose Hill Middle School. 
Neighborhood Character	The Redmond Segment begins at the Sammamish substation, which is adjacent to large warehouse properties and forested land. The segment goes through two major residential neighborhoods: Willows/Rose Hill and Grass Lawn. The Willows/Rose Hill neighborhood is predominately a single-family neighborhood with a variety in home types, styles, and lot sizes and an abundance of trees. The Grass Lawn neighborhood is mostly single-family residential with a section of multi-family residential, including the Sixty-01 Condominium Complex, a gated residential community with a lake, mature landscaping, and streams. The Rose Hill Middle School is adjacent to the segment with play fields immediately adjacent to the corridor.
Zoning Districts	The existing corridor is located in six different zoning districts in the City of Redmond, including single-family residential, multi-family residential, industrial, and commercial districts.
Future Land Uses	The Redmond Comprehensive Plan land use designations along the segment are mostly single-family and multi-family residential, as well as parks/open space. The neighborhoods along this segment will continue to have commercial and industrial land uses near the Sammamish substation, and residential or open space land uses south of the substation into the foreseeable future. The policies specific to the Willows/Rose Hill and Grass Lawn neighborhoods indicate intent to preserve the current residential character while providing for compatible infill growth.
Housing	There are 75 single-family and 552 multi-family residences within this portion of the study area.

Segment / Option	Land Use and Housing Characteristics
Bellevue North Segment	
Existing Land Uses	Existing land uses include mostly single-family residential homes (see the chart below for the percentage of the total study area in the Bellevue North Segment that each land use represents). Approximately 118 parcels are adjacent to the existing corridor. Unique land uses include Westminster Chapel and Viewpoint Park. 
Neighborhood Character	The segment goes through the residential neighborhoods of Bridle Trails and Bel-Red. Bridle Trails is predominantly a single-family residential area, with large lots and mature evergreen trees. The portion of the Bellevue North Segment that goes through Bel-Red is just south of SR 520 and characterized by a large commercial property (misclassified as recreational land by King County Assessor information).
Zoning Districts	The existing corridor is located in four different zoning districts in the City of Bellevue, including single-family residential and commercial districts.
Future Land Uses	The Bridle Trails Subarea Plan land use designations within the segment study area include Single-Family Residential. A small portion of the segment goes through the Bel-Red Subarea Plan boundaries and has a future land use designation as General Commercial. Therefore, future land use in the study area is expected to mostly stay the same.
Housing	There are 102 single-family and no multi-family residences within this portion of the study area.

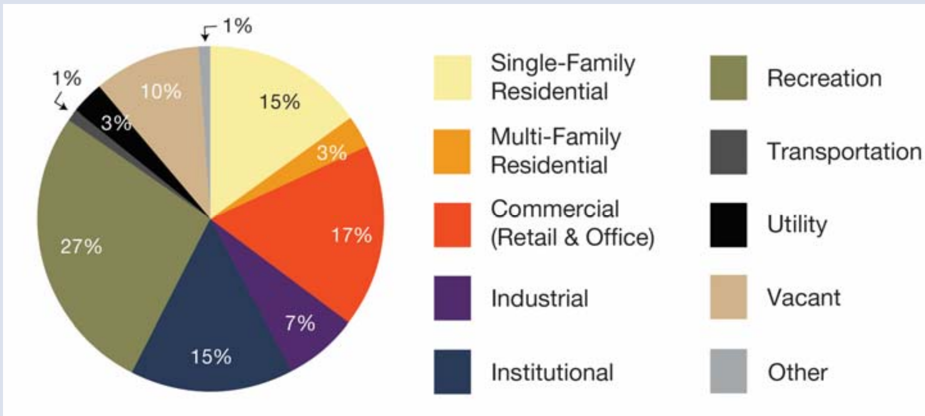
Segment / Option	Land Use and Housing Characteristics
Bellevue Central Segment, Existing Corridor Option	
Existing Land Uses	Existing land uses include mostly recreation (see the chart below for the percentage of the total study area within the Existing Corridor Option that each land use represents). Approximately 135 parcels are immediately adjacent to the existing corridor. Unique land uses include Glendale Country Club and Skyridge Park. 
Neighborhood Character	The option route follows the existing corridor, which starts in the Bel-Red neighborhood just south of SR 520, and is characterized by large manufacturing and commercial spaces. The Bellevue Central Segment runs along the Wilburton (covered by the Wilburton/NE 8th Street Subarea Plan) and Crossroads neighborhood boundaries and the Woodridge and Lake Hills neighborhoods. The border between Wilburton and Crossroads neighborhoods is characterized by a mix of single-family and a multi-family development, with the exception of the Glendale Country Club, which is immediately adjacent to the option. The border of Woodridge and Lake Hills is mostly single-family housing and open spaces, and is covered by the Richards Valley Subarea Plan, the Eastgate Subarea Plan, and the SE Bellevue Subarea Plan. Several parks (including Kelsey Creek Park) are along the Existing Corridor Option.
Zoning Districts	The existing corridor is located in 13 different zoning districts in the City of Bellevue, including single-family residential, multi-family residential, commercial, industrial, and mixed-use districts.
Future Land Uses	The Bellevue Comprehensive Plan land use designations for this option include a mix of Single-Family and Multi-Family designations along the existing corridor. This indicates that the neighborhoods along this option will continue to have residential land uses into the foreseeable future. The policies specific to the Wilburton/Crossroads and Woodridge/Lake Hills neighborhoods indicate the intent to preserve the current residential character without limiting the potential for growth.
Housing	There are 92 single-family and 1,318 multi-family residences within this portion of the study area.

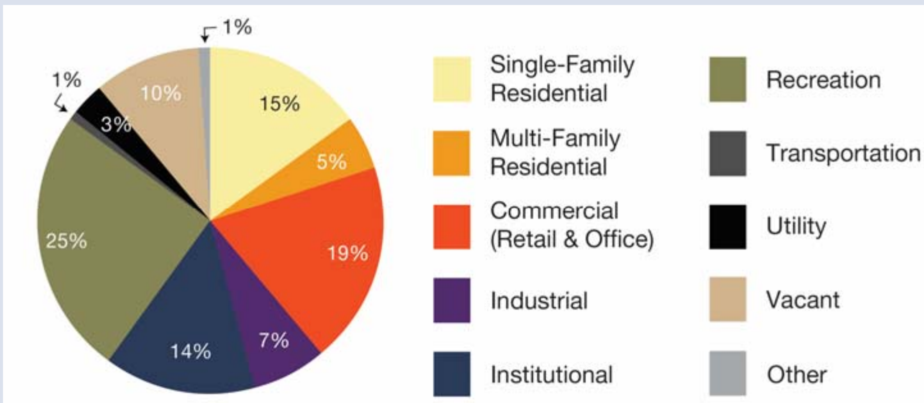
Segment / Option	Land Use and Housing Characteristics
Bellevue Central Segment, Bypass Option 1	
Existing Land Uses	Existing land uses include mostly commercial, industrial, and vacant lands (see the chart below for the percentage of the total study area within Bypass Option 1 that each land use represents). Approximately 199 parcels are immediately adjacent to the corridor (existing and new). Unique land uses include large blocks of commercial and manufacturing along Northup Way, 132nd Ave NE, the International School and Bel-Red Road, Bannerwood Park, and Skyridge Park. 
Neighborhood Character	Bypass Option 1 goes through the neighborhoods of Bel-Red, Wilburton, Woodridge, and Lake Hills. In Bel-Red, the Bypass Option 1 corridor is characterized by large industrial and commercial spaces. In Wilburton (covered by the Wilburton/NE 8th Street Subarea Plan), Bypass Option 1 follows major street corridors that are lined with office parks and commercial spaces. In Woodridge, Bypass Option 1 follows the Lake Hills Connector road, which is lined with vacant or open space areas (classified as vacant lands by King County Assessor parcel information), as well as the existing corridor, which is lined by single-family residences. The Lakeside substation is in an area characterized by industrial utilities. This option also traverses areas covered by the Richards Valley Subarea Plan, the Eastgate Subarea Plan, and the SE Bellevue Subarea Plan. Several parks (including Kelsey Creek Park), government buildings, and a school (International School) lie along Bypass Option 1.
Zoning Districts/Shoreline Environment Designation	Bypass Option 1 (the existing and new corridors) would be located in a total of 21 different zoning districts in the City of Bellevue, including commercial, industrial, mixed-use, multi-family residential, and single-family residential districts. Lower Kelsey Creek is a Shoreline of the State and is regulated by Bellevue's SMP. Lower Kelsey Creek includes the creek waters, underlying lands, and territory between 200 feet on either side of the top of the banks, plus associated floodways, floodplains, marshes, bogs, swamps, and river deltas. The shoreline environment designation in the study area is Urban Conservancy – Open Space Designation.

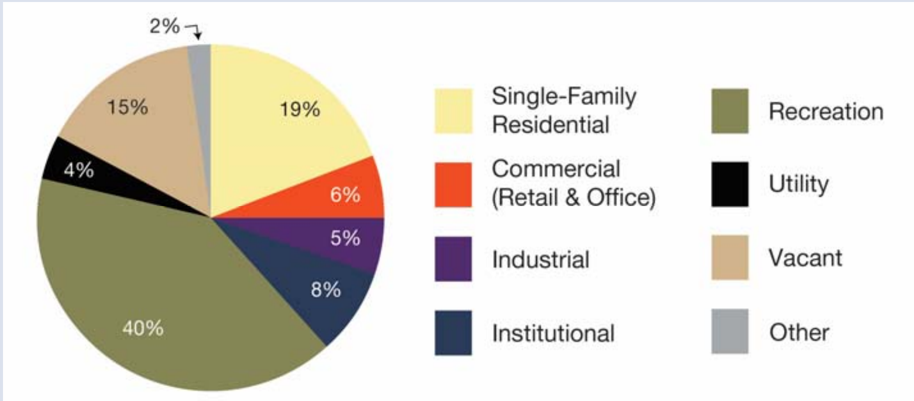
Segment / Option	Land Use and Housing Characteristics
Future Land Uses	Within this portion of the study area, the future land use is anticipated to be mixed-use and commercial for the northern portion of the option, and transitioning into multi-family and single-family residential along the Lake Hills Connector. This option is also covered by several subarea plans. The Bel-Red Subarea Plan designates commercial development as a future land use; the Wilburton Subarea Plan designates commercial and multi-family for future development; the Woodridge and Lake Hills Subarea Plans would continue to develop with single-family residential. Bellevue intends for the Bel-Red Subarea to focus on nodal development, which means that the planned Sound Transit's East Link light rail stations (anticipated to open in 2023) would be nodes around which development would be focused. The nodes would feature higher density buildings, with taller buildings toward the center of the nodes allowed with a variance process in exchange for various public amenities. Additionally, the Bel-Red Subarea Plan establishes policies to generate new jobs and new housing units; restore streams and ecological functions; construct new amenities such as parks, trails, and bike paths; and promote economic development. The Wilburton-Grand Connection planning initiative is an ongoing two-part project to improve non-motorized connectivity, as well as a re-visioning of the Wilburton Commercial Area. 1. The Grand Connection will improve pedestrian and cyclist connectivity from Meydenbauer Bay to the Eastside Rail Corridor, including a crossing over I-405 that will reconnect Downtown Bellevue and the Wilburton Commercial Area. Ultimately it will interface with the Eastside Rail Corridor, providing a comprehensive north-south and east-west non-motorized network. 2. The Wilburton Commercial Area planning initiative will identify land use, urban design, transportation, and environmental opportunities, including design guidelines addressing. changes to floor area ratio, height, permitted uses, and design character.
Future Land Uses	The Richards Valley Subarea Plan plans for future development that would not compromise the existing natural features of dense vegetation and wooded vistas. It includes policies for utilizing common corridors (places where utility infrastructure already exists) for new utilities and for placing them alongside transportation rights-of-way. The policies of each of these subarea plans support development that would accommodate continued residential and commercial growth in the foreseeable future.
Housing	There are 54 single-family and 292 multi-family residences within this option.

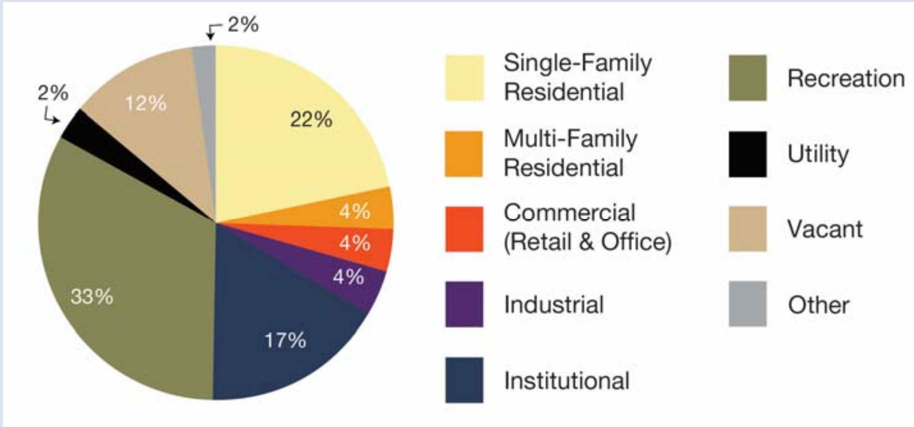
Segment / Option	Land Use and Housing Characteristics
Bellevue Central Segment, Bypass Option 2	
Existing Land Uses	Similar to Bypass Option 1, existing land uses include mostly vacant, commercial, and industrial lands (see the chart below for the percentage of the total study area in Bypass Option 2 that each land use represents). Approximately 169 parcels are immediately adjacent to the corridor (existing and new). Unique land uses include large blocks of commercial and manufacturing along 132nd Ave NE and Bel-Red Road, Bannerwood Park, Skyridge Park, and Bellevue Foursquare Church. 
Neighborhood Character	Bypass Option 2 goes through the neighborhoods of Bel-Red, Wilburton, and Woodridge. Bel-Red is characterized by large industrial and commercial spaces. Wilburton (covered by the Wilburton/NE 8th Street Subarea Plan), is characterized by major roads lined with industrial parks and commercial spaces. In Woodridge, single-family homes and open space characterize the land along the corridor, including Richards Road, which is predominantly single-family residences. The Lakeside substation is in an area characterized by industrial utilities. This option also traverses areas covered by the Richards Valley Subarea Plan, the Eastgate Subarea Plan, and the SE Bellevue Subarea Plan. Several parks (including Kelsey Creek Park), government buildings, and schools (International School and the Asian Pacific Language School) are along Bypass Option 2.
Zoning Districts/Shoreline Environment Designation	Bypass Option 2 (the existing and new corridors) would be located in 19 different zoning districts in the City of Bellevue, including commercial, industrial, mixed-use, multi-family residential, and single-family residential districts. Lower Kelsey Creek is a Shoreline of the State and is regulated by Bellevue's SMP. Lower Kelsey Creek includes the creek waters, underlying lands, and territory between 200 feet on either side of the top of the banks, plus associated floodways, floodplains, marshes, bogs, swamps, and river deltas. Similar to Bypass Option 1, the shoreline environment designation in the study area is Urban Conservancy – Open Space Designation.

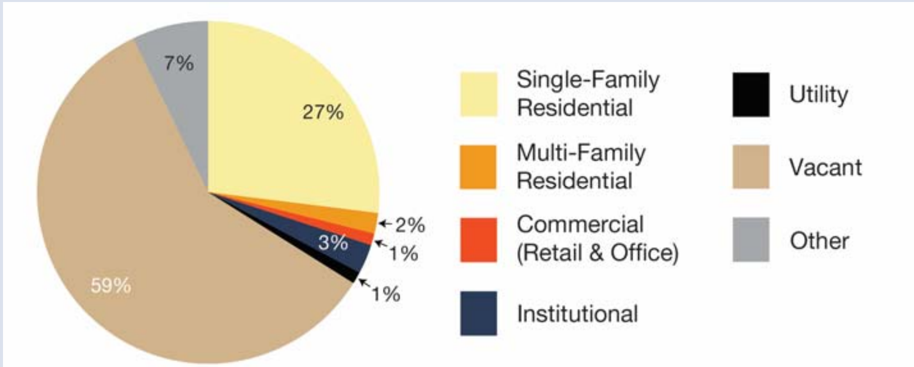
Segment / Option	Land Use and Housing Characteristics
Future Land Uses	Within this portion of the study area, the future land use is anticipated to be mixed-use and commercial for the northern portion of the option, and transitioning into multi-family and single-family residential along the Lake Hills Connector. The main difference between Bypass Option 1 and Bypass Option 2 is that this option travels down Richards Road and then follows SE 26th Street to connect with the existing corridor. The future land use on Richards Road is anticipated to be multi-family residential, with industrial development planned along the south side of SE 26th Street. This option is also covered by several subarea plans. The Bel-Red Subarea Plan designates commercial development as a future land use; the Wilburton Subarea Plan designates commercial and multi-family for future development; the Woodridge and Lake Hills Subarea Plans would continue to develop with single-family residential. Bellevue intends for the Bel-Red Subarea to focus on nodal development, which means that the planned Sound Transit's East Link light rail stations (anticipated to open in 2023) would be nodes around which development would be focused. The nodes would feature higher density buildings, with taller buildings toward the center of the nodes allowed with a variance process in exchange for various public amenities. Additionally, the Bel-Red Subarea Plan establishes policies to generate new jobs and new housing units; restore streams and ecological functions; construct new amenities such as parks, trails, and bike paths; and promote economic development. The Wilburton-Grand Connection planning initiative is an ongoing two-part project to improve non-motorized connectivity, as well as a re-visioning of the Wilburton Commercial Area. 1. The Grand Connection will improve pedestrian and cyclist connectivity from Meydenbauer Bay to the Eastside Rail Corridor, including a crossing over I-405 that will reconnect Downtown Bellevue and the Wilburton Commercial Area. Ultimately it will interface with the Eastside Rail Corridor, providing a comprehensive north-south and east-west non-motorized network. 2. The Wilburton Commercial Area planning initiative will identify land use, urban design, transportation, and environmental opportunities, including design guidelines addressing, changes to floor area ratio, height, permitted uses, and design character. The Richards Valley Subarea Plan plans for future development that would not compromise the existing natural features of dense vegetation and wooded vistas. It includes policies for utilizing common corridors (places where utility infrastructure already exists) for new utilities and for placing them alongside transportation rights-of-way. The policies of each of these subarea plans support development that would accommodate continued residential and commercial growth in the foreseeable future.
Housing	There are 26 single-family and 530 multi-family residences within this option.

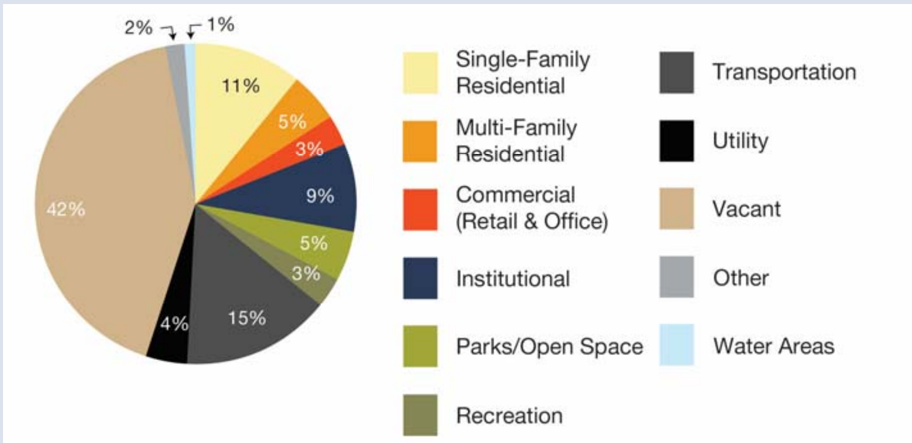
Segment / Option	Land Use and Housing Characteristics
Bellevue South Segment, Oak 1 Option	
Existing Land Uses	Existing land uses mostly include recreation, commercial, and single-family residential homes (see the chart below for the percentage of the total study area in the Oak 1 Option that each land use represents). Approximately 318 parcels are immediately adjacent to the corridor (existing and new). Unique land uses include Sunset Park, King County Solid Waste Division Factoria Transfer Station, the I-90 crossing, Coal Creek Park, Tyee Middle School, Forest Hill Neighborhood Park, a large industrial/commercial area on Factoria Blvd SE, KidsQuest Children's Museum, Bellevue Fire Station 4, St. Margaret's Episcopal Church, Newport High School, Newport Covenant Church, and the Factoria Police Station. 
Neighborhood Character	The option goes through the neighborhoods of Eastgate, Factoria, northwest Somerset, and Newport Hills. The Eastgate Subarea is characterized by the I-90 business corridor with commercial offices, high-tech industries, and commercial shopping centers. Factoria is characterized by single-family residential developments and small commercial spaces. The northwest Somerset area is a single-family residential development on a hilltop. The Newport Hills Subarea is made up of single-family and multi-family neighborhoods with a core commercial district in the center of the community. Several parks (including Sunset Park and Coal Creek Park), government buildings, and schools (Newport High School and Tyee Middle School) are along the Oak 1 Option.
Zoning Districts	The corridor (existing and new) would be located in a total of 17 different zoning districts in the City of Bellevue, including commercial, industrial, mixed-use, multi-family residential, and single-family residential districts.
Future Land Uses	The subarea plan policies of each of the subareas within the Oak 1 Option support growth in similar land use patterns as those that currently exist.
Housing	There are 212 single-family and 287 multi-family residences within this option.

Segment / Option	Land Use and Housing Characteristics
Bellevue South Segment, Oak 2 Option	
Existing Land Uses	Existing land uses are mostly recreation, commercial, single-family residential, and institutional (see the chart below for the percentage of the total study area in the Oak 1 Option that each land use represents). Approximately 352 parcels are immediately adjacent to the corridor (existing and new). Unique land uses include Sunset Park, the I-90 crossing, large industrial/commercial areas on Factoria Blvd SE and Richards Road/SE 30th Street, King County Solid Waste Division Factoria Transfer Station, KidsQuest Children's Museum, Bellevue Fire Station 4, St. Margaret's Episcopal Church, Newport High School, Newport Covenant Church, Coal Creek Park, Tyee Middle School, Forest Hill Neighborhood Park, Factoria Police Station, KinderCare, and a Church of Jesus Christ of Latter-day Saints. 
Neighborhood Character	The option goes through the residential neighborhoods of Eastgate, Factoria, Somerset, and Newport. The Oak 2 Option is similar in neighborhood character to the Oak 1 Option in Eastgate, Factoria, Somerset, and Newport. The Oak 2 Option would branch out from SE 38th Street and follow 123th Ave SE south until it meets Coal Creek Pkwy SE/ 124th Ave SE in Factoria, which is characterized by a large commercial center on the east and I-405 on the west. Single-family and multi-family developments and Newport High School are at the south of 124th Ave SE as it meets Coal Creek Pkwy SE. Several parks (including Sunset Park and Coal Creek Park), government buildings, and schools (Newport High School and Tyee Middle School) are along the Oak 2 Option.
Zoning Districts	The corridor (existing and new) would be located in a total of 18 different zoning districts in Bellevue, including commercial, industrial, mixed-use, multi-family residential, and single-family residential districts.
Future Land Uses	Similar to the Oak 1 Option, the subarea plan policies of each of the subareas within the proposed Oak 2 Option support growth in similar land use patters as those that currently exist.
Housing	There are 229 single-family and 463 multi-family residences within this option.

Segment / Option	Land Use and Housing Characteristics
Bellevue South Segment, Willow 1 Option	
Existing Land Uses	Existing land uses are predominantly recreation, single-family residential, and vacant lands (see the chart below for the percentage of the total study area in the Willow 1 Option that each land use represents). Approximately 212 parcels are immediately adjacent to the existing corridor. Unique land uses include Tyee Middle School, Forest Hill, King County Solid Waste Division, the I-90 crossing, Somerset Recreation Club, and Sunset Park. 
Neighborhood Character	The option goes through the neighborhoods of Eastgate, Somerset, and Newport Hills. The Eastgate Subarea is characterized by the I-90 business corridor with commercial offices, high-tech industries, and commercial shopping centers. Outside of the commercial center of Eastgate is single-family housing. The Somerset Subarea is a community of hilltop single-family homes. The Newport Hills Subarea is made up of single-family and multi-family neighborhoods with a core commercial district in the center of the community. Several parks (including Sunset Park and Coal Creek Park), a government building, and a school (Tyee Middle School) are along the Willow 1 Option.
Zoning Districts	The existing corridor is located in nine different zoning districts in the City of Bellevue including commercial, industrial, multi-family residential, and single-family residential districts.
Future Land Uses	The Bellevue Comprehensive Plan designates community business and light industrial in Eastgate, while the Somerset and Newport Hills communities would remain as single-family developments, with a commercial center in Newport Hills. The subarea plan policies of Eastgate, Somerset, and Newport Hills support growth in similar land use patterns as those that currently exist.
Housing	There are 180 single-family and 10 multi-family residences within this option.

Segment / Option	Land Use and Housing Characteristics
Bellevue South Segment, Willow 2 Option	
Existing Land Uses	Existing land uses mostly include recreation, single-family residential homes, and institutional (see the chart below for the percentage of the total study area in the Willow 2 Option that each land use represents). Approximately 309 parcels are immediately adjacent to the corridor (existing and new). Unique land uses include Newport Children's School, Holy Cross Lutheran Church, Newport Covenant Church, King County Solid Waste Division Factoria Transfer Station, Sunset Park, and the I-90 crossing. 
Neighborhood Character	The Willow 2 Option would go through the same neighborhoods of Eastgate, Somerset, and Newport Hills as in the Willow 1 Option. However, at SE Newport Way, the option route would also follow SE Newport Way on the border of Factoria, heading south at Coal Creek Parkway SE. The Factoria/Somerset border is characterized by single-family residential developments and small commercial spaces. Several parks (including Sunset Park and Coal Creek Park), government buildings, and schools (Newport Children's School, and Tyee Middle School) are along the Willow 2 Option.
Zoning Districts	The corridor (existing and new) would be located in a total of 13 different zoning districts in Bellevue including commercial, industrial, multi-family residential, and single-family residential districts.
Future Land Uses	The Bellevue Comprehensive Plan designates community business and light industrial in Eastgate. The Somerset Factoria and Newport Hills communities would remain as mostly single-family developments, with a commercial center in Newport Hills. The subarea plan policies of Eastgate, Somerset, Factoria, and Newport Hills support growth in similar land use patterns as those that currently exist.
Housing	There are 257 single-family and 221 multi-family residences within this option.

Segment / Option	Land Use and Housing Characteristics
Newcastle Segment	
Existing Land Uses	Existing land uses are predominantly vacant (some of which are associated with May Creek Park). Non-vacant land uses are mostly comprised of single-family residential (see the chart below for the percentage of the total study area in the Newcastle Segment that each land use represents). Approximately 112 parcels are immediately adjacent to the existing corridor. Unique land uses include Newcastle City Hall, Seattle Revival Center, and May Creek Park (on the Newcastle/Renton border). 
Neighborhood Character	The segment goes through the residential neighborhoods of Del Mar Village, Newport Woods, Eden's Grove, Donegal, and Olympus. A portion of the segment also goes through the Community Business Center –Lake Boren Corridor, and is within the Community Business Center overlay. Del Mar Village is an apartment complex near a commercial center. Donegal and Olympus are single-family residential developments. A government building and a park (May Creek Natural Area) are along the segment.
Zoning Districts	The existing corridor is located in six zoning districts in Newcastle, including single-family residential, commercial, and recreation/open space.
Future Land Uses	The Newcastle Comprehensive Plan land use designations within this portion of the study area include Single-Family Residential and Multi-Family Residential. This indicates that the neighborhoods will continue to have residential land uses along the existing corridor into the foreseeable future. The policies specific to the Newcastle Comprehensive Plan indicate intent to preserve the current residential character while providing for concentrated growth where necessary.
Housing	There are 89 single-family and 71 multi-family residences within this segment.

Segment / Option	Land Use and Housing Characteristics
Renton Segment	
Existing Land Uses	Vacant land is the single largest land use category present (largely because this category includes large parcels associated with the bed and floodway of the Cedar River) by transportation (see the chart below for the percentage of the total study area in the Renton Segment that each land use represents). Approximately 185 parcels are immediately adjacent to the existing corridor. Unique land uses include Sierra Heights Elementary School, Renton Seventh-day Adventist Church, Church of Jesus Christ of Latter-day Saints, Renton Technical College, North Highlands Neighborhood Center, and a large commercial area along NE Sunset Blvd. 
Neighborhood Character	The segment goes through the residential neighborhoods of Honey Creek Ridge, Shadow Hawk, Liberty Ridge, Glencoe, and Sunset (Renton Highlands). Honey Creek Ridge, Shadow Hawk, Liberty Ridge, and Glencoe are predominantly single-family and multi-family planned-developments with designated park spaces. Sunset (Renton Highlands) is one of Renton's older developed areas and is comprised of commercial and residential uses; it is currently being redeveloped with new multi-family, parks, library, and commercial land uses. Several parks (May Creek Greenway, Honey Creek Greenway, and the Cedar River Natural Zone) and two schools (Sierra Heights Elementary School and Renton Technical College) are along the segment.
Zoning Districts/Shoreline Environment Designation	The existing corridor would be located in 11 different zoning districts in Renton and unincorporated King County, including single-family residential, multi-family residential, industrial, recreation/open space, and mixed-use districts. The Cedar River is a Shoreline of the State and is regulated by Renton's SMP. The shoreline environment designation in the study area is Urban Conservancy and Shoreline High Intensity.
Future Land Uses	The Renton Comprehensive Plan land use designations within this portion of the study area include Residential High and Residential Medium, which are developments that are higher in density than single-family lots. The comprehensive plan has policies that support infill development and a mix of land uses, which will encourage a higher density than current conditions.
Housing	There are 125 single-family and 295 multi-family residences within this segment.

Segment / Option	Land Use and Housing Characteristics
Sources: City of Bellevue, 1993 (including Bel-Red, Wilburton, Crossroads, Bridle Trails, Eastgate, Factoria, Newport Hills); City of Bellevue, 2008a; City of Bellevue, 2008b; City of Bellevue, 2008c; City of Bellevue, 2013; City of Bellevue, 2015; City of Bellevue, 2016b; City of Newcastle, 2000; City of Newcastle, 2016a; City of Redmond, 2003a; City of Redmond, 2011; City of Renton, 2009; City of Renton, 2014; City of Renton, 2016; Google Earth (Pro), 2016; King County, 2016; Liberty Ridge, 2016; and Shadow Hawk, ND.	

3.1.3 Long-term (Operation) Impacts Considered

3.1.3.1 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, 2016). This section verifies that those findings apply to the alternatives considered as part of Phase 2.

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. However, PSE would allow these transmitters to be replaced on the new poles, so no impacts are expected.

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.

3.1.3.2 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.

3.1.4 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 Growth Management Act 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.

3.1.5 Long-term Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

3.1.5.1 Impacts Common to all Components

The majority of the project would utilize PSE's existing 115 kV transmission line corridor. For some of the route options (Bypass Option 1, Bypass Option 2, Willow 2, Oak 1, and Oak 2), the line would run along existing roadways. As described in Chapter 2, for the options that include diverging from the existing corridor, PSE prefers to place 230 kV lines in easements rather than on public right-of-way, because within public right-of-way, PSE can be required to move the lines to accommodate road expansion. If it is not possible to obtain an easement for a pole, PSE generally places the pole along the outermost part of the road right-of-way and acquires an easement on the adjacent private property to ensure that the necessary electrical clearances are met, typically 30 feet in width. No new property would be acquired for Alternative 1, although additional easements would need to be negotiated and acquired.

For the segments and options that utilize the existing corridor, PSE plans to remove and replace a majority of the 115 kV H-frame structures. Along the existing corridor, this planned pole replacement would not change the existing or future land uses, zoning designation, neighborhood character, or housing stock since it is already in use as a transmission line corridor and does not require additional easements or property acquisitions. Section 3.2 of this Phase 2 Draft EIS addresses potential impacts to scenic views and the aesthetic environment that may result from replacing the existing poles with taller pole types.

For the route options that deviate from the existing corridor (Bypass Option 1, Bypass Option 2, Willow 2, Oak 1, and Oak 2), the land on which PSE would potentially seek to acquire new easements constitutes a small portion of the total land in the study area and would not result in significant changes to the existing or future land uses or housing stock. The option routes follow existing transportation and utility corridors. In areas where PSE would seek to obtain easements, the land would remain with its current use, and utility facilities are permitted as an allowed or conditionally allowed use in all the applicable zoning districts. 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. The easement areas would not significantly impact future development, although the easement would permanently encumber the associated property (see Section 3.6 for a discussion on the impacts to recreational resources) and could limit the scale of

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future development. Easements would include limitations such as the right of PSE to keep the area clear of vegetation that would present a hazard to the operation of the transmission lines. Additionally, for properties that require the acquisition of a new easement, 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 are considered 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. The project 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. 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 siting of buildings close to the street in areas that would need an easement for the transmission lines.

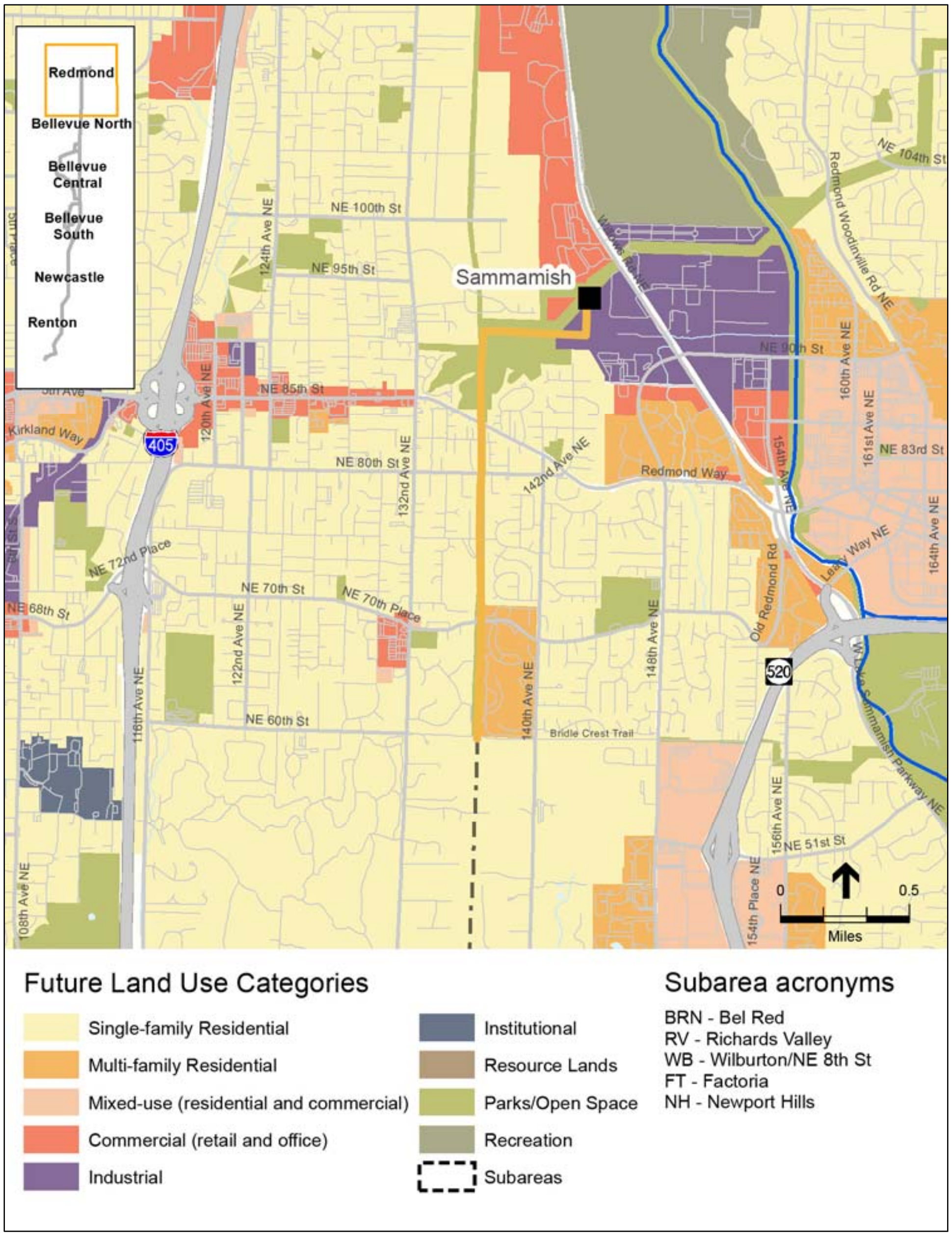
Land use is closely tied to several other environmental resources, such as scenic views and aesthetic environment as well as recreation. While the project would result in significant impacts to these resources within certain route options, the impacts are not anticipated to change the land use of the study area. For a detailed analysis of impacts related to scenic views and the aesthetic environment, please refer to Section 3.2. For a detailed analysis of the impacts to recreation resources, please see Section 3.6.

3.1.5.2 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 Richards Creek substation is consistent with future land uses of light industrial proposed for the parcel, and the Bellevue City Code (BCC 20.20) allows development of "utility facilities" under a Conditional Use Permit. The Richards Creek substation would not cause any housing impacts because no housing sites are on or adjacent to the proposed substation site.

3.1.5.3 Redmond Segment

Potential types of new uses and development along the Redmond Segment are regulated by the City of Redmond Zoning Code 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.

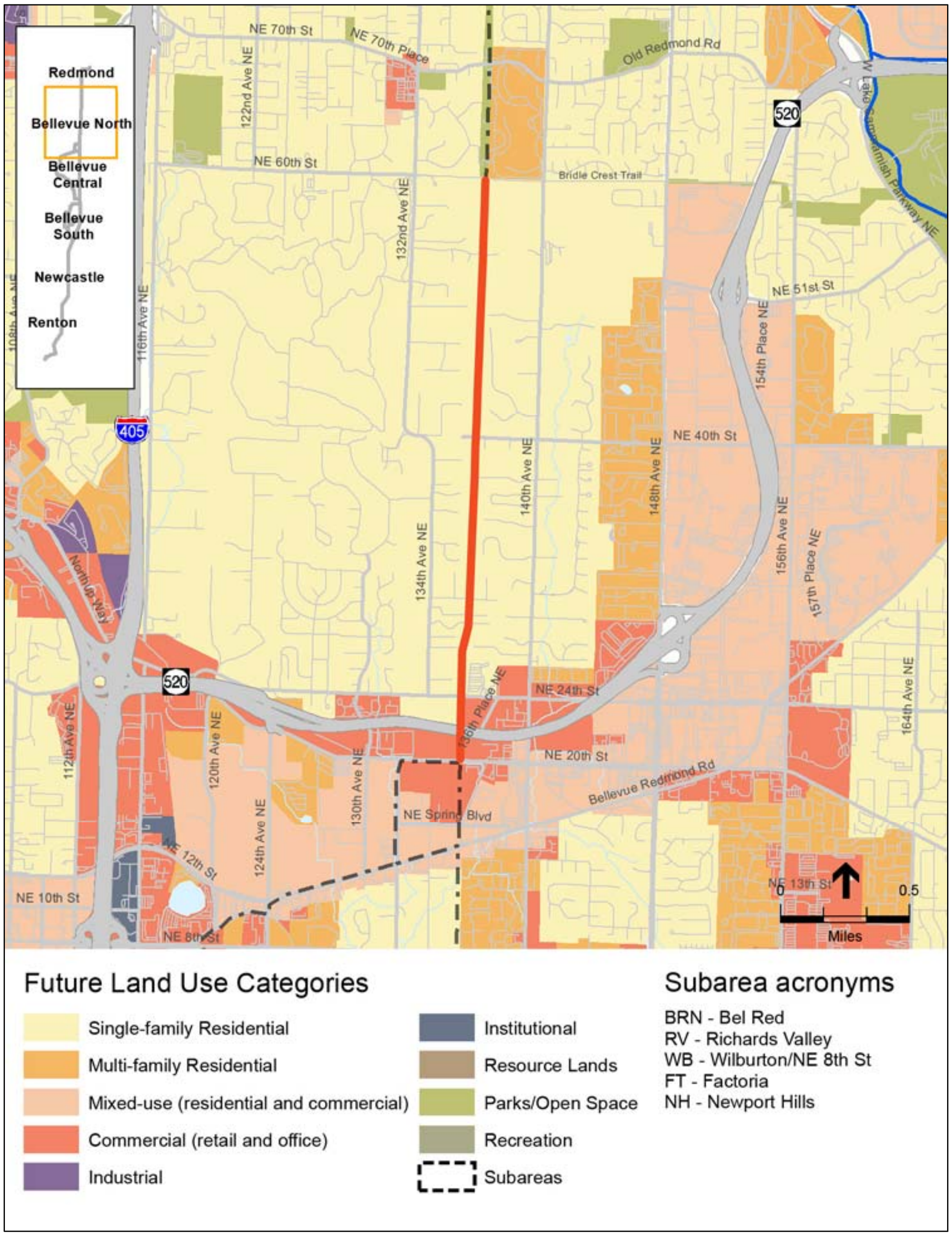


- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Redmond Comprehensive Plan and the Grass Lawn and Willows Rose Hill Subarea policies. Zoning districts in the study area allow electrical utility facilities as a permitted or a conditional use. However, the City would require PSE to obtain an Essential Public Facilities permit rather than a zoning Conditional Use Permit. See Section 10.2.1 of the Phase 1 Draft EIS for more information about Essential Public Facilities.

- **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 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.

3.1.5.4 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 are considered 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.

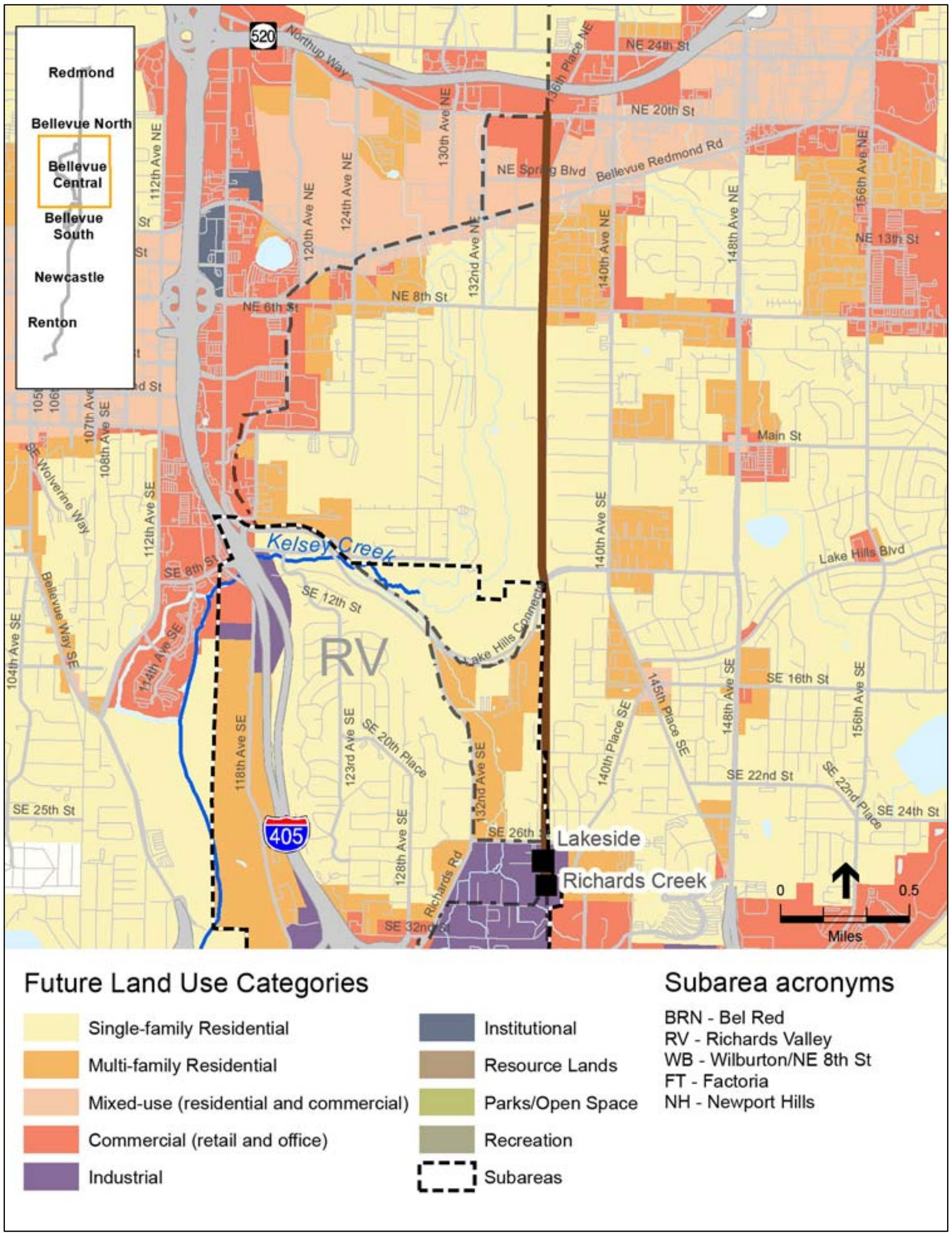


- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Bellevue Comprehensive Plan and Bridle Trails and Bel-Red Subarea policies. Zoning districts in the study area allow electrical utility facilities as a conditional use.

- **Existing Land Use Pattern and Neighborhood Character:** The project would not impact the existing land use pattern of single-family residential. 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.

3.1.5.5 Bellevue Central Segment, Existing Corridor Option

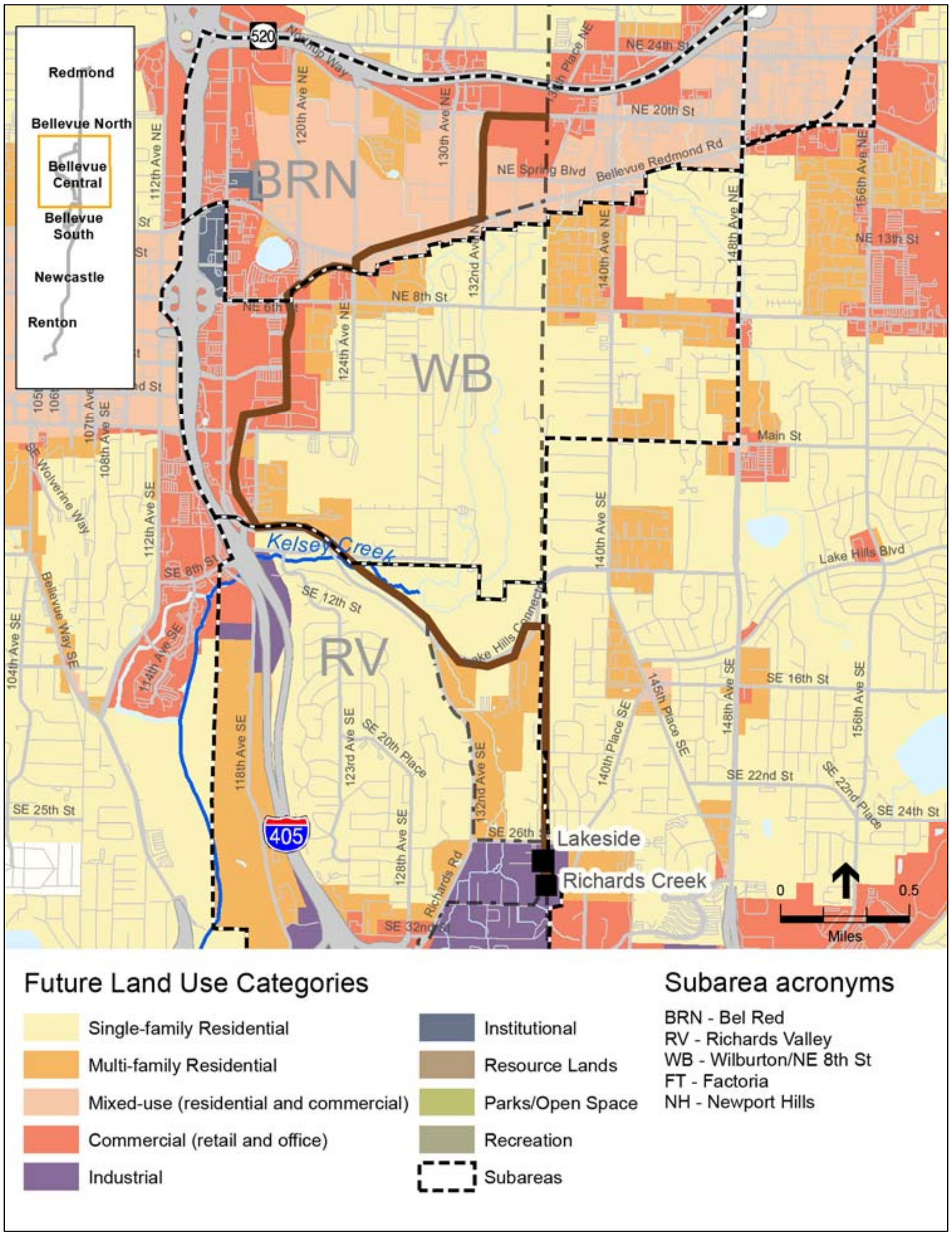
Potential types of new uses and development along the Bellevue Central Segment, Existing Corridor Option, are regulated by the City of Bellevue City Code (BCC, Title 20). The East Bellevue Community Council (EBCC) has approval-disapproval authority over certain land use actions within a portion of this option. PSE selected two route options (Bypass Option 1 and Bypass Option 2) to examine in the Phase 2 Draft EIS that would not be within EBCC jurisdiction, in case the EBCC denies permit approval. The potential impacts to land use and housing for the Bellevue Central Segment (Existing Corridor Option) of the project are considered 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. 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 option.

3.1.5.6 *Bellevue Central Segment, Bypass Option 1*

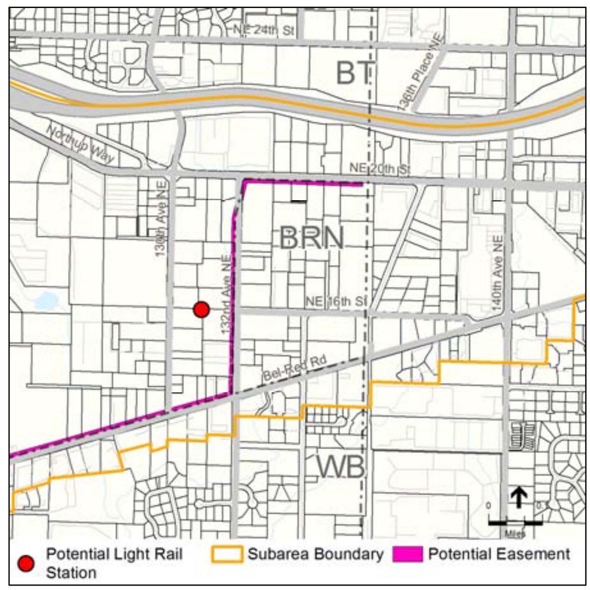
Potential types of new uses and development along the Bellevue Central Segment, Bypass Option 1, are regulated by the City of Bellevue City Code (BCC, Title 20). The potential impacts to land use and housing for Bypass Option 1 would be less-than-significant because it is consistent with city and subarea 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 Bel-Red, SE Bellevue, Wilburton/NE 8th Street, and Eastgate Subarea policies. The Bellevue Comprehensive Plan's Utilities Vision includes a policy to encourage consolidation of existing facilities and a policy to discourage locating aerial facilities in corridors where none currently exist. The new corridor for this option would potentially conflict with these two policies, though the impacts would be less-than-significant because the design of the overall project does rely on the existing transmission corridor whenever possible. 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 commercial uses to the north and west, and open space and single-family residential to the south. In the portion of the option using the existing corridor, new easements would not be required on adjoining properties. The transmission lines would also use a new corridor, which would require new easements. New easements are not anticipated to affect adjacent land uses since they would be negotiated with the property owner and would not interfere with the current use of adjacent properties.

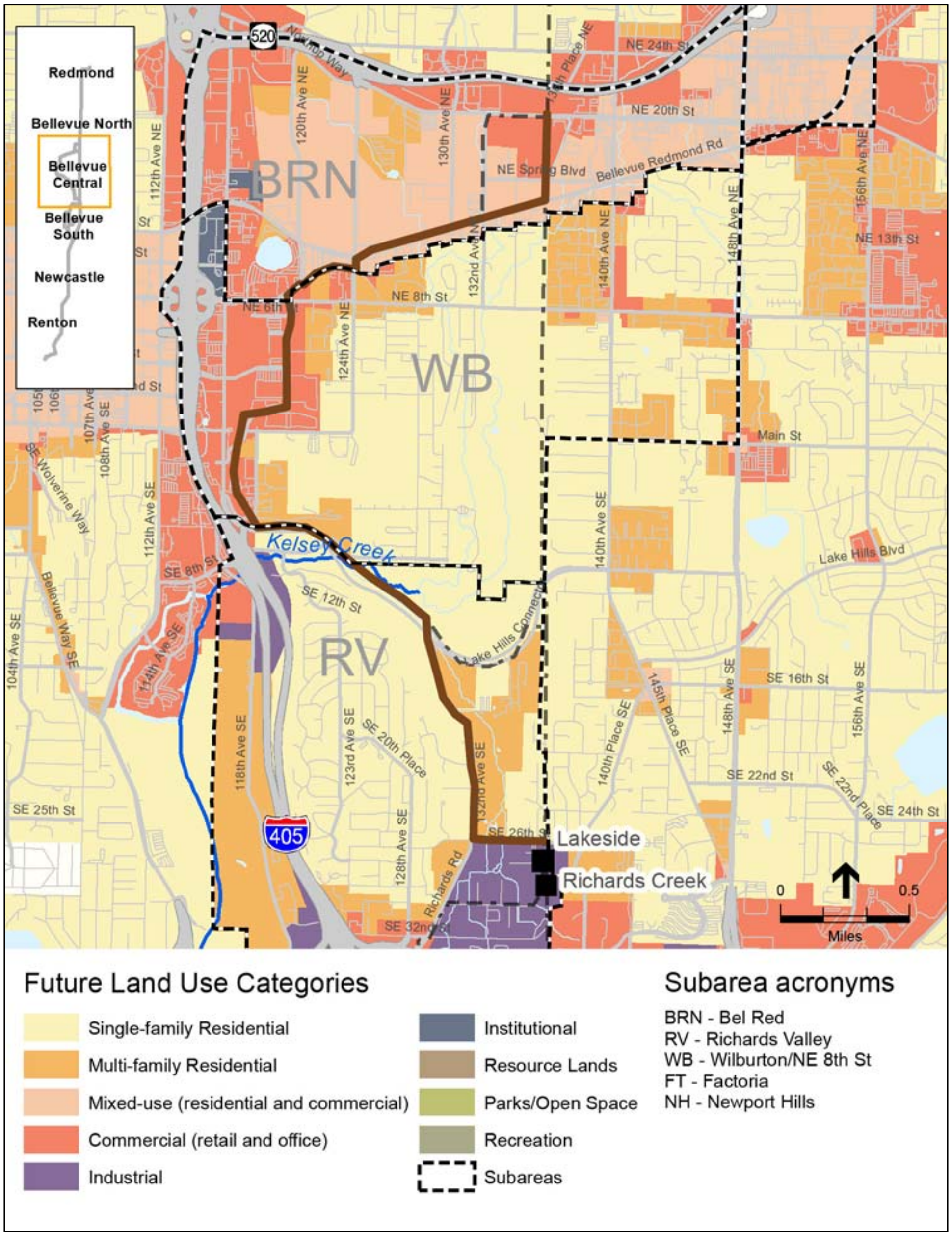
- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be mixed use, commercial, single-family residential, and multi-family residential. In the new corridor, new buildings on parcels encumbered by an easement would have to limit building in the easement section to adhere to the NESC safety standards, which could limit development opportunities on these parcels. Future land use in the Bel-Red Subarea focuses on development nodes around future light rail stations, with the tallest buildings planned near the center of the nodes. The closest node would be a potential transit station at 130th Avenue NE and NE 16th Street, approximately one block from the Bypass Option 1 alignment. Additionally, the Wilburton/NE 8th Street Subarea Plan allows "flexibility for commercial buildings to be sited near frontage property lines," which could be an impact on parcels with an easement. If a parcel in this subarea is encumbered by an easement, potential new buildings would only be able to build up to the negotiated easement area and not the frontage property lines as the subarea plan encourages. This impact would be less-than-significant because the majority of parcels within the subarea would not be encumbered by new easements. Above is a map of a portion of the proposed easement areas (in pink) for the north section of the option, which shows how much of the affected parcels would be encumbered by an easement.



- **Shorelines:** All new or expanding electrical utility facilities proposed in the Shoreline Overlay District would need Shoreline Conditional Use Permit approval (LUC 20.25E.110 and 20.25E.180), completion of an alternative siting analysis (LUC 20.20.255.D), and compliance with decision criteria and design standards (LUC 20.20.255). This option would make one crossing of Kelsey Creek (a Shoreline of the State). This would be a less-than-significant impact because the project would adhere to the Conditional Use Permit processes.

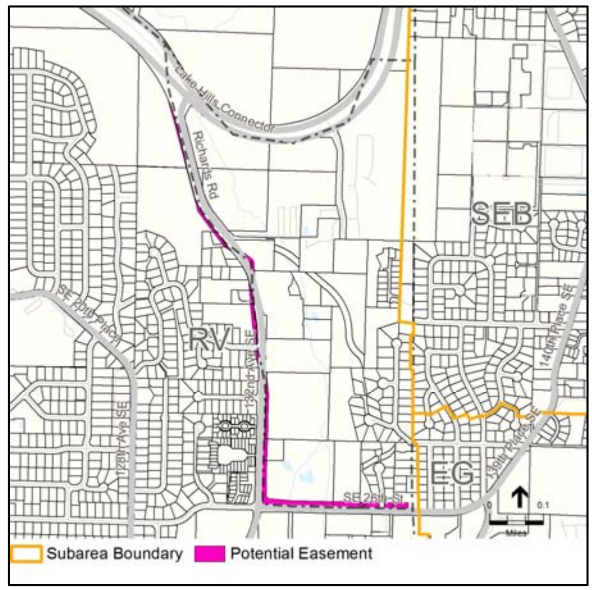
3.1.5.7 Bellevue Central Segment, Bypass Option 2

Potential types of new uses and development along the proposed Bellevue Central Segment, Bypass Option 2, are regulated by the City of Bellevue City Code (BCC, Title 20). The potential impacts to land use and housing for Bypass Option 2 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 Bel-Red, SE Bellevue, Wilburton/NE 8th Street, and Eastgate Subarea policies. The Bellevue Comprehensive Plan's Utilities Vision includes a policy to encourage consolidation of existing facilities and a policy to discourage locating aerial facilities in corridors where none currently exist. The new corridor for this option would potentially conflict with these two policies, although the impacts would be less-than-significant because the design of the overall project does rely on the existing transmission corridor whenever possible. 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 commercial uses to the north and west, or single-family and multi-family residential along Richards Road. In the portion of the option using the existing corridor, new easements would not be required on adjoining properties. The transmission lines would use a new corridor, which would require new easements. New easements are not anticipated to affect adjacent land uses since they would be negotiated with the property owner and would not interfere with the current use of the properties.



- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be mostly commercial, mixed-use, single-family residential, and multi-family residential. In the new corridor, new buildings on parcels encumbered by an easement would have to limit building in the easement section to adhere to the NESC safety standards, which could limit development opportunities on these parcels. Future land use in the Bel-Red Subarea focuses on development nodes around future light rail stations, with the tallest building height near the center of the nodes. The closest node would be a potential transit station at 130th Avenue NE and NE 16th Street, approximately three blocks from the Bypass Option 1 alignment. Additionally, the Wilburton/NE 8th Street Subarea Plan allows “flexibility for commercial buildings to be sited near frontage property lines,” which could be an impact on parcels with an easement. If a parcel in this subarea is encumbered by an easement, potential new buildings would only be able to build up to the negotiated easement area and not the frontage property lines as the subarea plan encourages. This impact would be less-than-significant because the majority of parcels within the subarea would not be encumbered by new easements. Above is a map of a portion of the proposed easement areas (in pink) for the south section of the option that shows how much of the affected parcels would be encumbered by an easement.

- **Shorelines:** All new or expanding electrical utility facilities proposed in the Shoreline Overlay District would need Shoreline Conditional Use Permit approval (LUC 20.25E.110 and 20.25E.180), completion of an alternative siting analysis (LUC 20.20.255.D), and compliance with decision criteria and design standards (LUC 20.20.255). This option would make one crossing of Kelsey Creek (a Shoreline of the State). This would be a less-than-significant impact because the project would adhere to the Conditional Use Permit processes.

3.1.5.8 Comparison of Bellevue Central Options

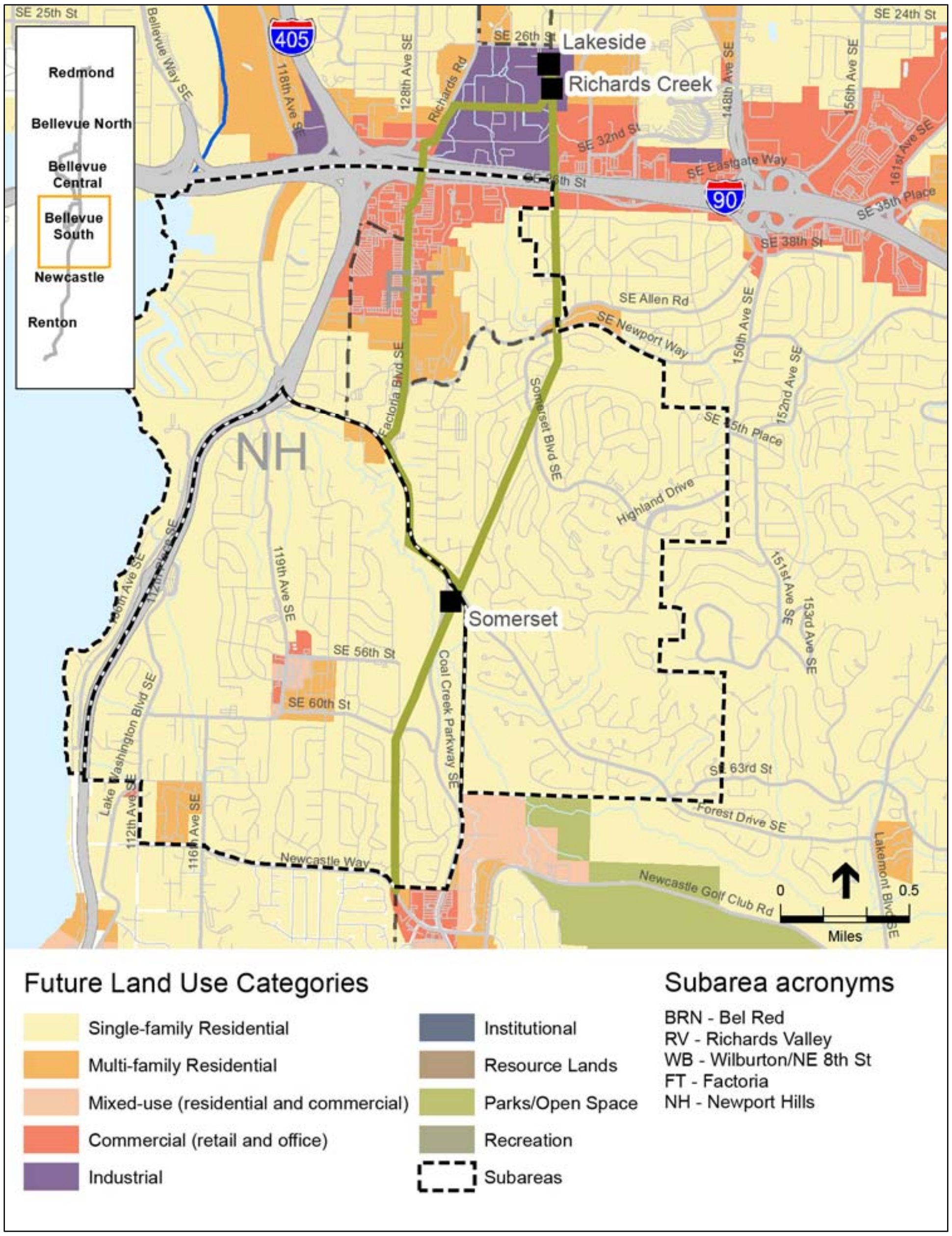
In the Bellevue Central Segment, all three options would meet the requirements of comprehensive plans, subarea plans, and zoning district land use regulations. However, two of the three options (Bypass Option 1 and Bypass Option 2) would require new easements. These easements would be negotiated with property owners along the option routes. Utility easements would likely interfere with subarea policies that allow for or encourage building close to the street edge. Option 2 uses more of the existing corridor in the Bel-Red Subarea; therefore, easements would affect fewer properties. Both of the options that include new easements would traverse recreation areas, where the project would cause significant impacts (see Section 3.6, *Recreation*). The potential impacts to land use and housing are compared below by option (Table 3.1-2).

Table 3.1-2. Comparison of Bellevue Central Options

Segment / Option	Potential for Inconsistency with Plans, Policies, and Regulations	New Easements Proposed for New Corridor	Presence of Shoreline of the State
Existing Corridor Option	No	No	No
Bypass Option 1	Yes	Yes	Yes
Bypass Option 2	Yes	Yes	Yes

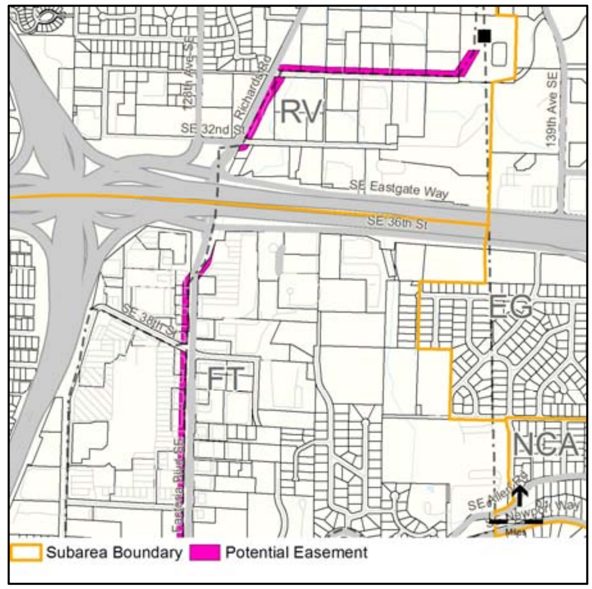
3.1.5.9 *Bellevue South Segment, Oak 1 Option*

Potential types of new uses and development along the Bellevue South Segment, Oak 1 Option, are regulated by the City of Bellevue City Code (BCC, Title 20). The potential impacts to land use and housing for the Oak 1 Option 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. The impacts are summarized below.



- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with 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.

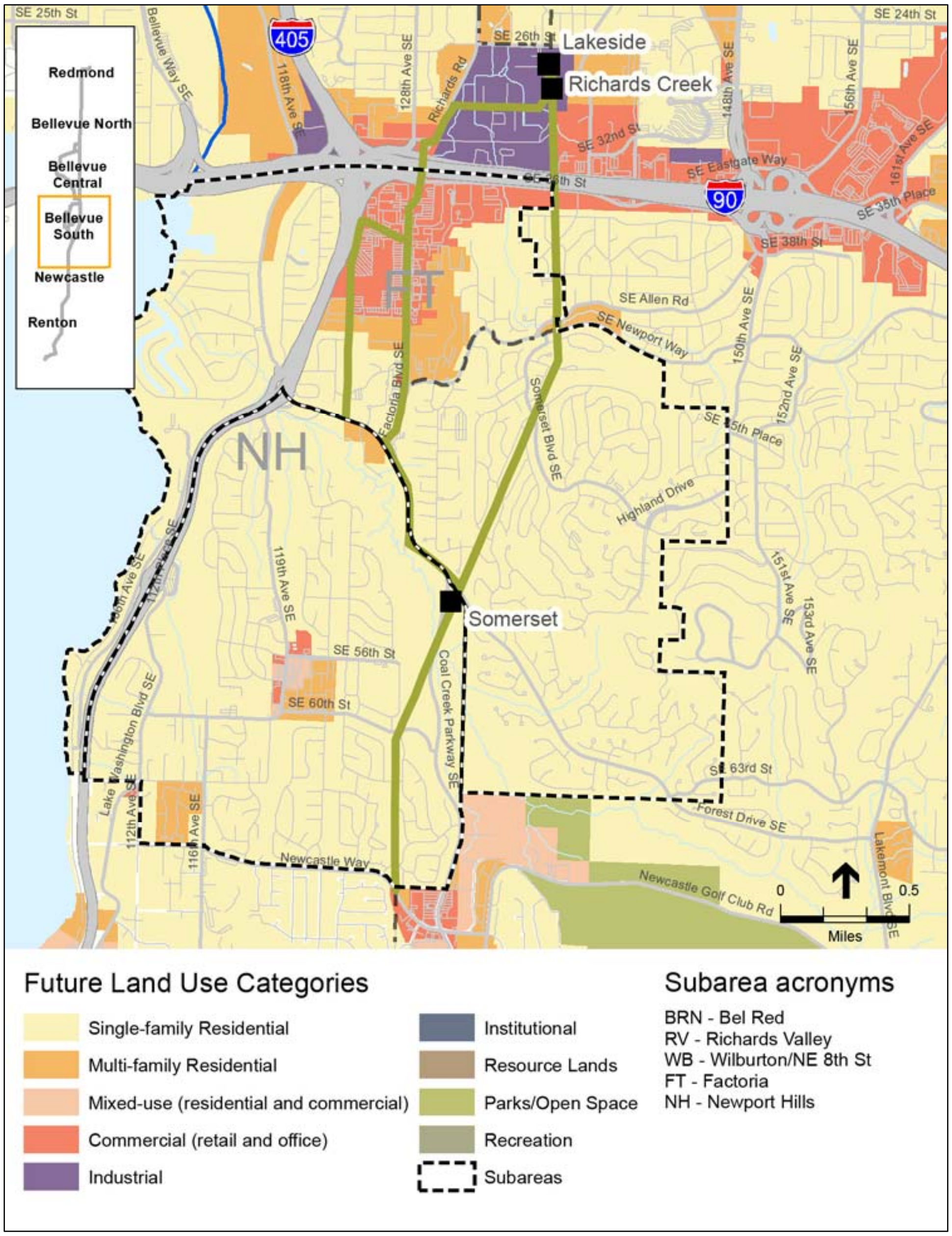
- **Existing Land Use Pattern and Neighborhood Character:** The project would not impact the existing land use pattern of recreation, commercial, or single-family residential. In the portion of the option using the existing corridor, new easements would not be required on adjoining properties. The transmission lines would also use a new corridor, which would require new easements. New easements are not anticipated to affect existing adjacent land uses since they would be negotiated with the property owner and would not interfere with the current use of the properties.
- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be mostly single-family residential, industrial, and commercial. In the new corridor, new buildings on parcels encumbered by an easement would have to limit building in the easement section to adhere to the NESC safety standards, which could limit development opportunities on these parcels. Both the Factoria and Newport Hills Subarea Plans include policies allowing or encouraging buildings to abut or come close to the street edge. If a parcel in these subareas is encumbered by an easement, potential new buildings would only be able to build up to the negotiated easement area and not the frontage property lines as the subarea plans encourage. This impact would be less-than-significant because the majority of parcels within the subareas would not be encumbered by new easements. Above is a map of a portion of the proposed easement areas (in pink) for the north section of the option that shows how much of the affected parcels would be encumbered by an easement.



- **Shorelines:** There are no designated shorelines in this option.

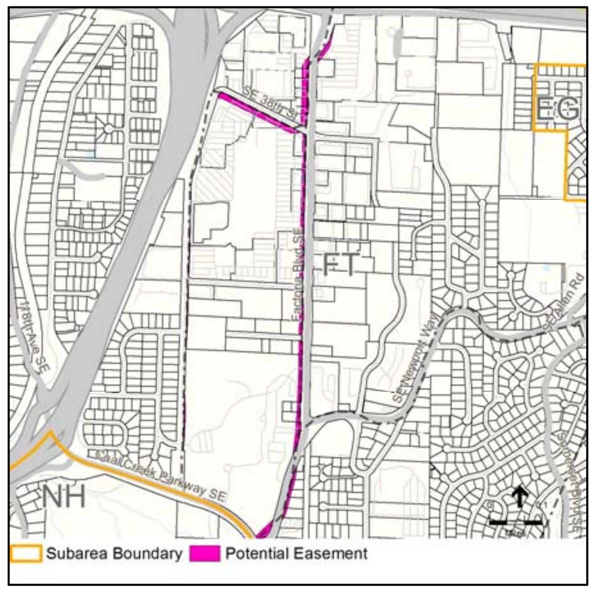
3.1.5.10 Bellevue South Segment, Oak 2 Option

Potential types of new uses and development along the Bellevue South Segment, Oak 2 Option, are regulated by the City of Bellevue City Code (BCC, Title 20). The potential impacts to land use and housing for the Oak 2 Option 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. The impacts are summarized below.



- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with Richards Valley, Factoria, Eastgate, and Newport Hills Subarea policies. The Bellevue Comprehensive Plan's Utilities Vision includes a policy to encourage consolidation of existing facilities and a policy to discourage locating aerial facilities in corridors where none currently exist. The new corridor for this option along SE 38th Street (the only location where there are no existing aerial facilities) would potentially conflict with these two policies, although the impacts would be less-than-significant because the design of the overall project relies on the existing transmission corridor whenever possible. 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 recreation, multi-family residential, or institutional. In the portion of the option using the existing corridor, new easements would not be required on adjoining properties. The transmission lines would also use a new corridor, which would require new easements. New easements are not anticipated to affect existing adjacent land uses since they would be negotiated with the property owner and would not interfere with the current use of the properties.
- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be single-family residential, industrial, and commercial. In the new corridor, new buildings on parcels encumbered by an easement would have to limit building in the easement section to adhere to the NESC safety standards, which could limit development opportunities on these parcels. Both the Factoria and Newport Hills Subarea Plans include policies allowing or encouraging buildings to abut or come close to the street edge. If a parcel in these subareas is encumbered by an easement, potential new buildings would only be able to build up to the negotiated easement area and not the frontage property lines as the subarea plans encourage. This impact would be less-than-significant because the majority of parcels within the subareas would not be encumbered by new easements. Above is a map of a portion of the proposed easement areas (in pink) for the north section of the option that shows how much of the affected parcels would be encumbered by an easement.

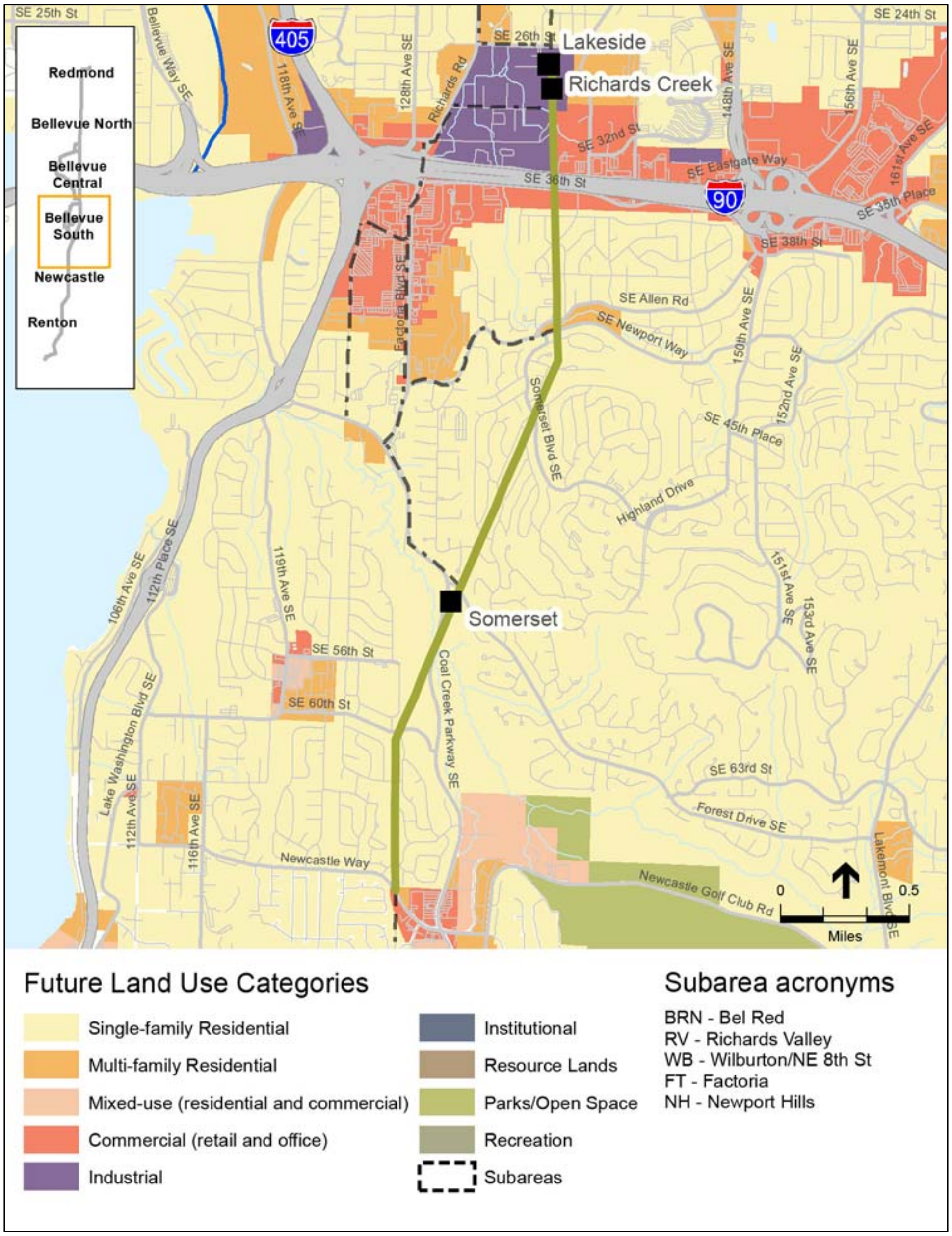


- **Shorelines:** There are no designated shorelines in this option.

DSD 010324

3.1.5.11 Bellevue South Segment, Willow 1 Option

Potential types of new uses and development along the Bellevue South Segment, Willow 1 Option, are regulated by the City of Bellevue City Code (BCC, Title 20). The potential impacts to land use and housing for the Willow 1 Option 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.

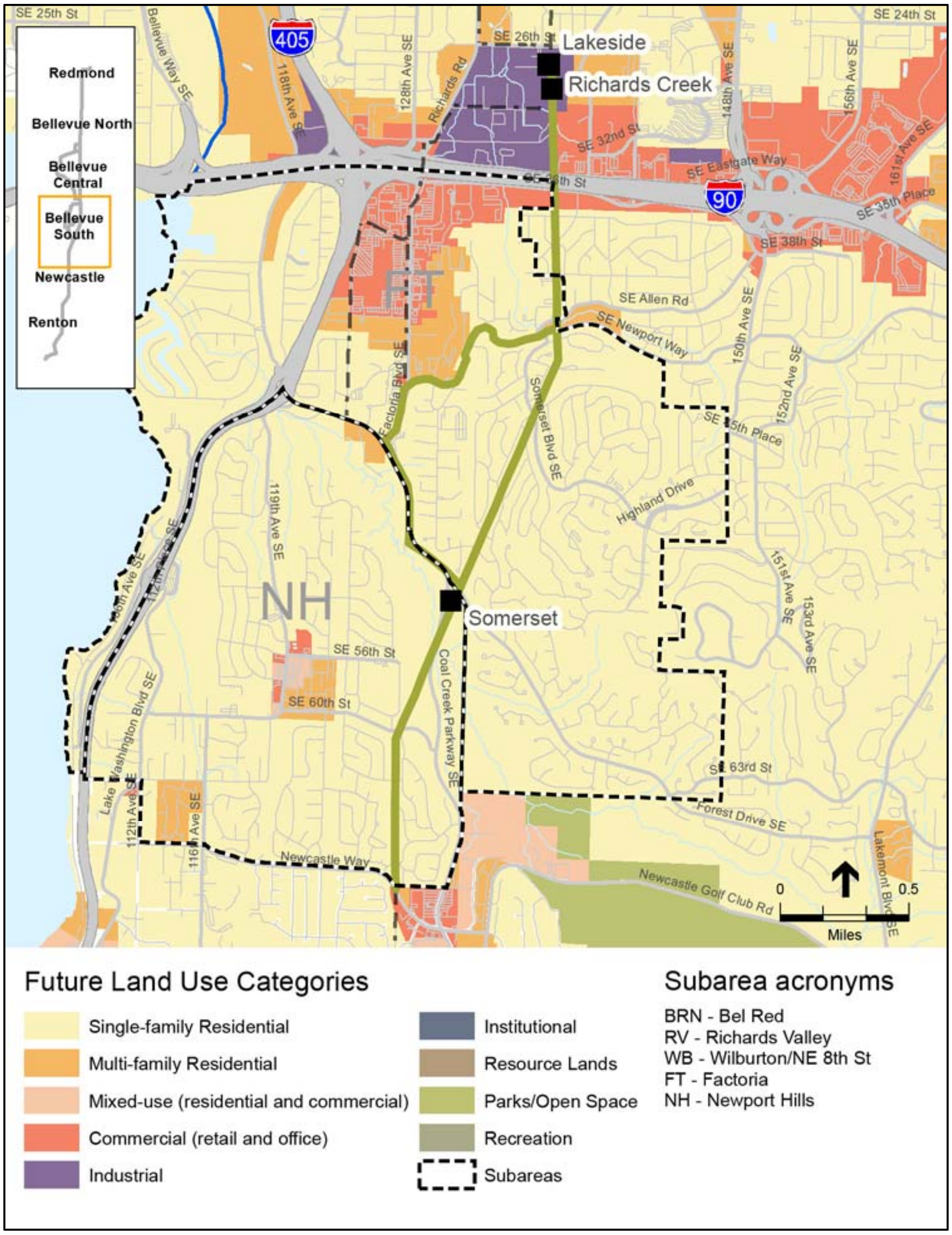


- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Bellevue Comprehensive Plan and the Richards Valley, Factoria, Eastgate, and Newport Hills Subarea policies. The Factoria Subarea Plan includes a policy of minimizing disruptive effects of utility construction 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 option 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 option.

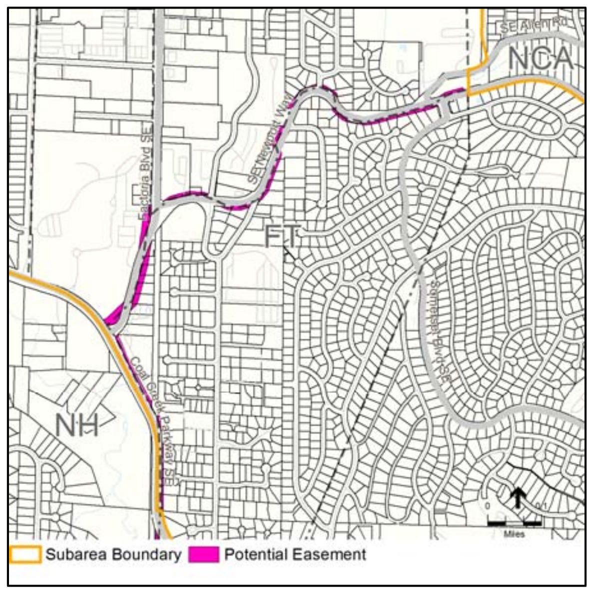
3.1.5.12 Bellevue South Segment, Willow 2 Option (PSE's Preferred Alignment)

Potential types of new uses and development along the Bellevue South Segment, Willow 2 Option, are regulated by the City of Bellevue City Code (BCC, Title 20). The potential impacts to land use and housing for the Willow 2 Option 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 Richards Valley, Factoria, Eastgate, and Newport Hills Subarea policies. The Bellevue Comprehensive Plan's Utilities Vision includes a policy to encourage consolidation of existing facilities and a policy to discourage locating aerial facilities in corridors where none currently exist. The new corridor for this option along SE Newport Way (the only location where there are no existing aerial facilities) would potentially conflict with these two policies, although the impacts would be less-than-significant because the design of the overall project relies on the existing transmission corridor whenever possible. 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, institutional, or recreation. In the portion of the option using the existing corridor, new easements would not be required on adjoining properties. The transmission lines would also use a new corridor, which would require new easements. New easements are not anticipated to affect existing adjacent land uses since they would be negotiated with the property owner and would not interfere with the current use of the properties.



- **Future Land Use Pattern:** The project would not impact future land uses, which are anticipated to be single-family residential, multi-family residential, industrial, and commercial. In the new corridor, new buildings on parcels encumbered by an easement would have to limit building in the easement section to adhere to the NESC safety standards, which could limit development opportunities on these parcels. Both the Factoria and Newport Hills Subarea Plans include policies allowing or encouraging buildings to abut or come close to the street edge. If a parcel in these subareas is encumbered by an easement, potential new buildings would only be able to build up to the negotiated easement area and not the frontage property lines as the subarea plans encourage. This impact would be less-than-significant because the majority of parcels within the subareas would not be encumbered by new easements. Above is a map of a portion of the proposed easement areas (in pink) for the option that shows how much of the affected parcels would be encumbered by an easement.

- **Shorelines:** There are no designated shorelines in this option.

DSD 010328

3.1.5.13 Comparison of Bellevue South Options

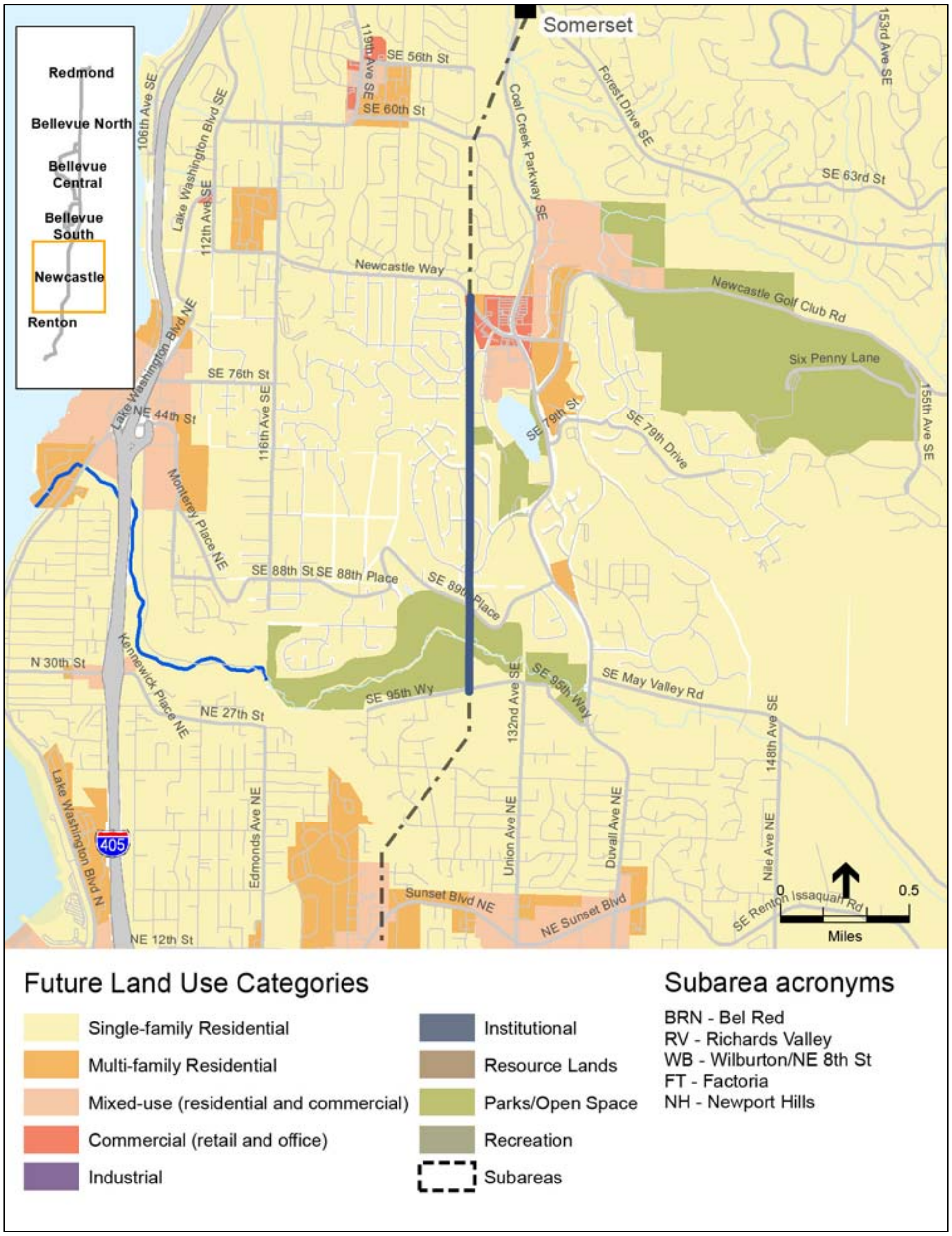
In the Bellevue South Segment, all but the Willow 1 Option would involve a new corridor, which would require new easements along the route. These easements would be negotiated with property owners along the option, but, like the Bellevue Central Segment options, would include areas that have policies that allow for or encourage development close to the parcel frontage. The Willow 1 Option follows the existing corridor, but the remaining options include new routes that would pass through recreation areas and cause significant impacts (see Section 3.6, *Recreation*). The potential impacts to land use and housing are compared below by option (Table 3.1-3).

Table 3.1-3. Comparison of Bellevue South Options

Segment / Option	Potential for Inconsistency with Plans, Policies, and Regulations	New Easements Proposed for New Corridor	Presence of Shoreline of the State
Oak 1 Option	No	Yes	No
Oak 2 Option	Yes	Yes	No
Willow 1 Option	No	No	No
Willow 2 Option	Yes	Yes	No

3.1.5.14 Newcastle Segment

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 potential impacts to land use and housing for the Newcastle Segment 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.

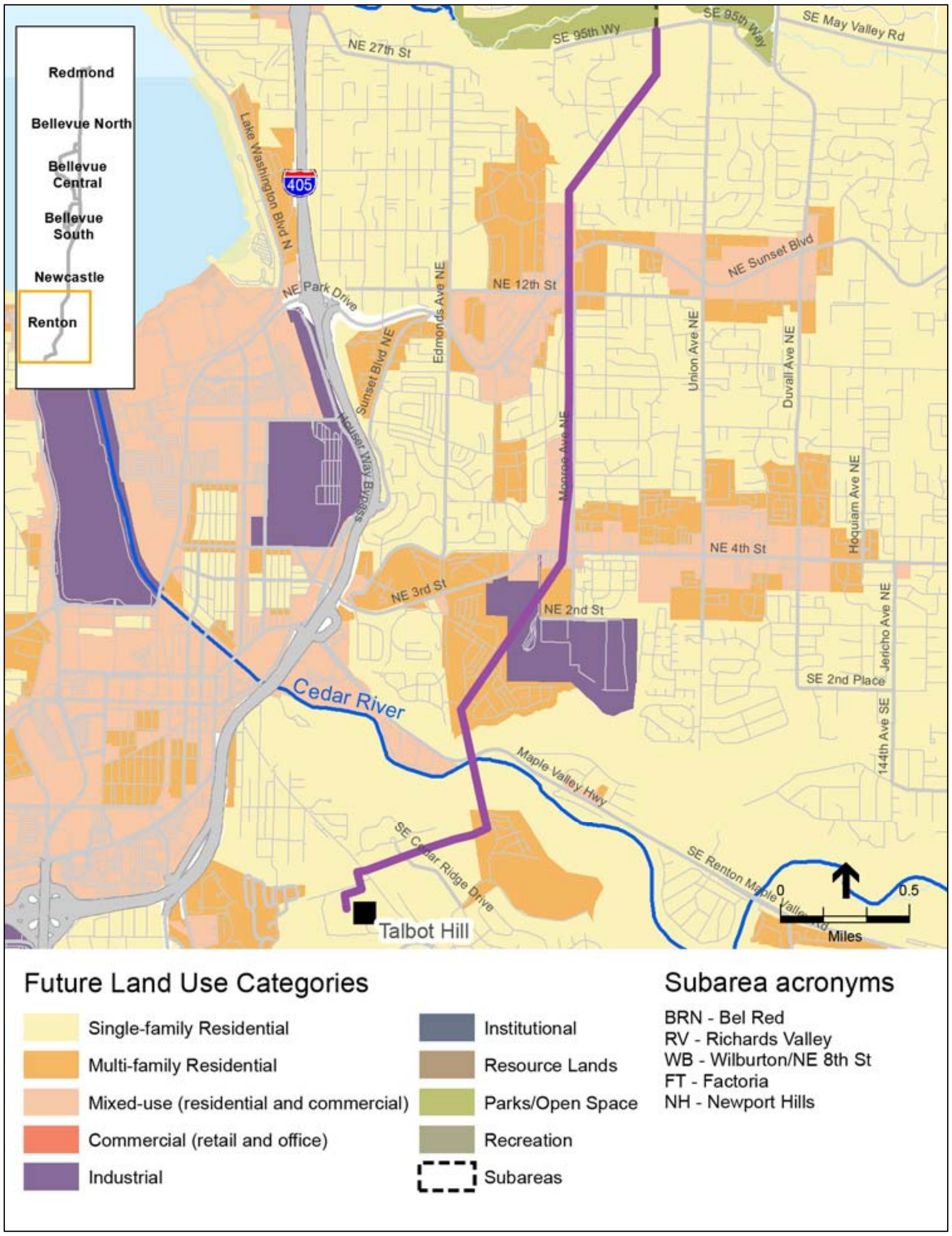


- **Consistency with Plans, Policies, and Regulations:** The project would be consistent with the Newcastle Comprehensive Plan. Zoning districts in the study area allow electrical utility facilities as a conditional use. The placement of the poles is consistent with the required setback of 5 feet from the Olympic Pipeline easement.

- **Existing Land Use Pattern and Neighborhood Character:** The project would not impact the existing land use pattern of 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 single-family and multi-family residential. Future land use designations were developed based on the assumption that the transmission 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 segment.

3.1.5.15 Renton Segment

Potential types of new uses and development along the Renton Segment are regulated by the City of Renton's development regulations (RMC Title IV) and the Renton 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. 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 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-family residential, mixed-use, and commercial. 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. Any new major utilities in these shoreline environment designations would be allowable through the approval of a Shoreline Conditional Use Permit. The project would include replacing existing transmission lines and would not involve the placement of poles outside of the existing corridor or change the height of the wires. The current H-frame structures would be replaced by monopoles with a smaller footprint and would not be placed within any buffer area. These changes are considered a "new use" under RMC 4-3-090E and therefore require a Shoreline Conditional Use Permit. This would be a less-than-significant impact because the project would adhere to the Shoreline Conditional Use Permit process.

3.1.6 Mitigation Measures

Mitigation measures are implemented to lessen 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). Such measures can be suggested by the applicant or mandated through regulations. They 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 applied during construction is often used to address short-term, construction-related impacts.

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 3.2. For an expanded discussion on mitigation measures related to critical areas compliance, see Section 3.3. Because several of the options would go through or require easements on property that is used for recreation, there are impacts associated with these options. Please refer to Section 3.6 to view the mitigation measures related to recreation.

3.1.6.1 Regulatory Requirements

All of the segments and options would need to meet the regulations of the zoning districts that they traverse (where either the project would be constructed or an easement would be required). 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 appealable, and would provide some mitigation for project-related impacts to land use. Mitigation requiring specific design features would be developed during the design stage (prior to construction). The applicable regulations are presented in Appendix B. The setback requirement from the Olympic Pipeline easement in Newcastle is described in Section 3.1.1, *Relevant Plans, Policies, and Regulations*.

Conditional Use Permit review processes vary by jurisdiction, but often include 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 appealable within the regulation of the specific jurisdiction. Such measures could include those listed under potential mitigation measures below.

In Newcastle, PSE could apply for a variance from the setback requirement, which could enable the use of shorter poles in that segment, as discussed in Section 3.2, *Scenic Views and the Aesthetic Environment*. Similar to the conditional use review process, variance approval requires a determination that granting the variance would not harm adjacent land uses.

3.1.6.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on review of the comprehensive plan and subarea plan policies. Through its subarea planning policies, the City of Bellevue encourages development of multi-story buildings built up to or near the parcel frontage or street edge in Central and South Bellevue (see Appendix B), which PSE considered during its planning process for the project. The following mitigation measures could be used to reduce potential impacts associated with easements that could prevent construction that conforms to this desired development pattern.

Prior to Construction

- Select the route that requires the least number of properties where easements would restrict future development in areas with policies encouraging building up to or close to the street edge.
- Construct taller transmission lines so that wires would clear the tops of buildings sufficiently to meet NESC standards if such development were to occur in the future.
- Design transmission lines to extend as far as possible over the street right-of-way to minimize the amount of easement and clearance needed adjacent to the right-of-way.
- 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. Where undergrounding of distribution lines is required, PSE would do so along with telecommunication lines.

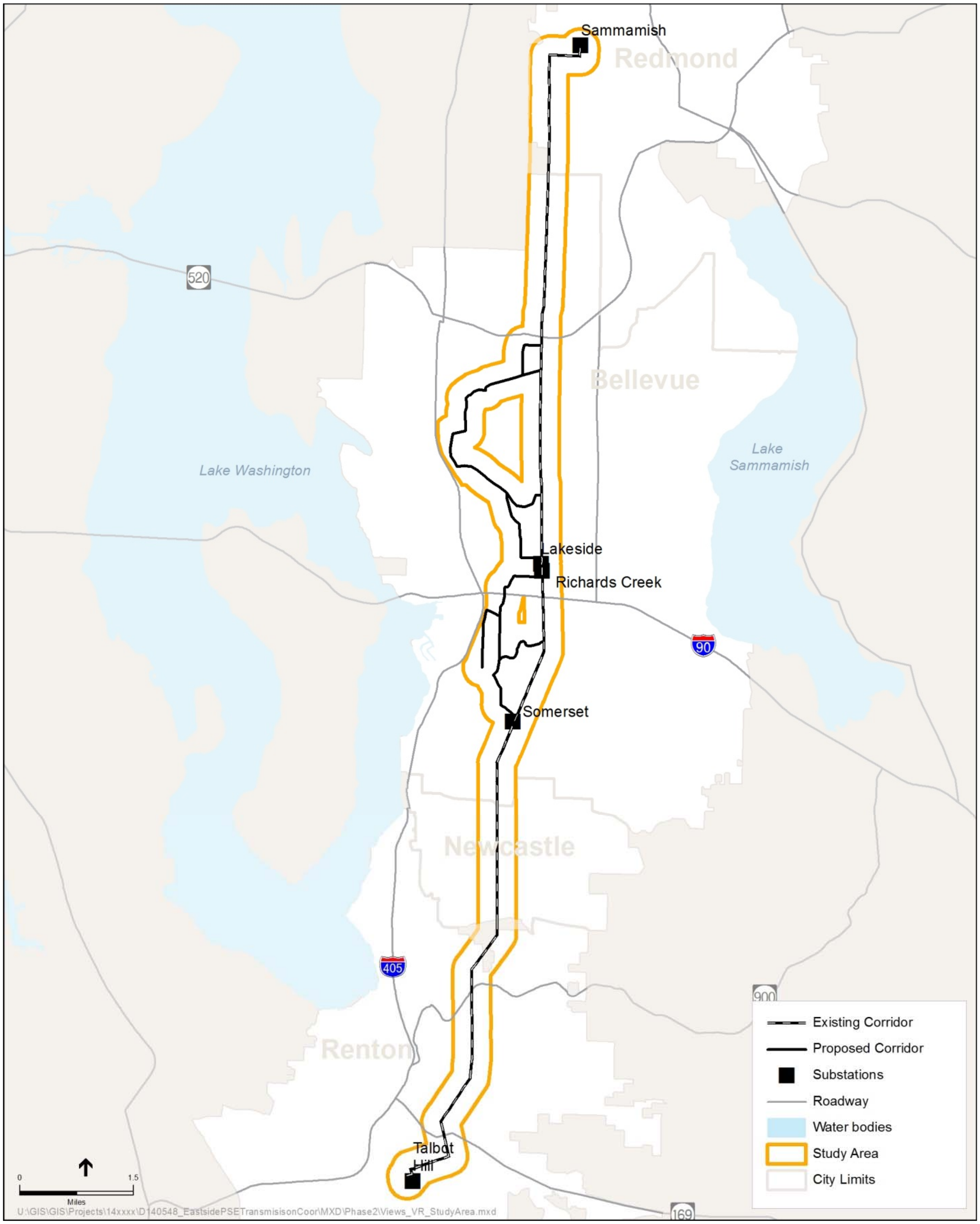
3.2 SCENIC VIEWS AND THE AESTHETIC ENVIRONMENT

Impacts to views and visual resources were evaluated at a programmatic level in the Phase 1 Draft EIS. The Phase 1 Draft EIS provides a high-level assessment of impacts to visual character; changes to views, viewpoints, and visual resources; and light, glare, and exhaust impacts. This section addresses impacts to *scenic views* and the *aesthetic environment.* Scenic views are views of visual resources that are considered special attributes of the study area and region (Figure 3.2-1). Visual resources associated with the study area were identified in the Phase 1 Draft EIS based on study area plans, regulatory codes, and scoping comments. These include scenic views of the Olympics, the Cascades, Mount Rainier, Cougar Mountain, Lake Washington, Lake Sammamish, and the downtown Bellevue and downtown Seattle skylines. The aesthetic environment is what influences human perception of the world. It is comprised of the natural environment (e.g., topography, vegetation, water bodies) and built environment (e.g., buildings, utility infrastructure). Topics of the Phase 1 analysis that were determined to have no significant impacts (such as light, glare and exhaust) were not carried forward to this Phase 2 assessment.

Methods for Studying the Affected Environment

The affected environment is described by four characteristics: visual character, affected population, visual quality, and visual resources. These characteristics were used to assess impacts to the aesthetic environment and scenic views. Changes to the visual character and visual quality of the study area were assessed to identify impacts to the aesthetic environment. The potential for the project to obstruct views of visual resources located outside of the study area was assessed to identify impacts to scenic views. The affected population was considered for both the assessment of the aesthetic environment and the assessment of scenic views.

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. Because the value of scenic views and the aesthetic environment is subjective, based on the viewer, it is difficult to quantify or estimate impacts. In particular, little guidance exists supporting a standard methodology for assessing visual impacts associated with transmission line projects. A number of methodologies were reviewed to inform the methodology used for this project. For this project, the assessment of impacts to scenic views and the aesthetic environment was generally based on methods described in the Federal Highway Administration (FHWA) *Guidelines for Visual Impact Assessment* (FHWA, 2015). The FHWA guidelines were developed for linear infrastructure projects and provide a useful framework. FHWA guidelines describe methods to assess impacts, but do not specify thresholds for determining significant impacts. Similarly, state and local regulations do not provide guidance for determining significance. Therefore, significance was determined based on criteria similar to those described in *The State Clean Energy Program Guide: A Visual Impact Assessment Process for Wind Energy Projects* (Vissering et al., 2011), which was developed for large electrical facilities.



Source: King County, 2015; Ecology, 2014.

Figure 3.2-1. Scenic Views and Aesthetic Environment Study Area

Under the FHWA guidance, the study area for the visual impact assessment (referred to in the FHWA guidance as the "area of visual extent") was determined based on the physical constraints of the environment (e.g., topography) and the physiological limits of human sight.

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, including all segments and options, excluding areas west of Interstate 405 (I-405) (Figure 3.2-1). I-405 and all areas west of I-405 were excluded because the freeway provides such a wide separation that the project would not visually impact the neighborhoods west of the freeway, views seen from those neighborhoods, or views of drivers on I-405. This study area focuses on areas where the project transmission line would be within the foreground view where viewers are most likely to experience the scale of the project and observe details and materials. While the project would be visible at greater distances, significant visual impacts are not probable given the project's scale relative to its largely mixed urban context.

3.2.1 Relevant Plans, Policies, and Regulations

The Phase 1 Draft EIS provided an overview of the planning policies and regulations pertinent to the protection of views and visual resources (see Section 12.2 in the Phase 1 Draft EIS). For this 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). It is likely that local covenants exist throughout the study area that provide aesthetic standards specific to their respective communities. For the purpose of this Phase 2 Draft EIS, 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 recognize private covenants.

Visual Quality

High – Area is relatively undisturbed by development. Development that does exist has urban design that is considered aesthetically pleasing (per local planning documents). There is minimal utility presence. Utilities that are present are small-scale and have consistent height and form that blend with the surrounding aesthetic environment.

Medium – Development blends with the natural environment and does not disrupt the natural harmony of the area. Development has consistent building height and form and is not inconsistent with set design standards. There is moderate utility presence that generally blends with the surrounding aesthetic environment.

Low – Built environment takes precedence over natural environment. Development has inconsistent height and form and does not meet set design standards. There is high utility presence, and utility infrastructure is the prominent feature in the viewshed.

3.2.2 Scenic Views and the Aesthetic Environment in the Study Area

The affected environment is described according to four characteristics, as defined below and summarized by project component (i.e., substation, and transmission line segment and option) in Table 3.2-1:

1. **Visual Character:** Visual character is the aggregate of the visible attributes of a scene or object, including natural (topography, water bodies, vegetation) and built (building height and form, types of infrastructure) features. The visual character is described based on the identification of major natural and built features through a review of maps, aerial photography, Google Street View, and field observation.
2. **Affected Population**: The affected population includes viewers from residences, roadways, commercial areas, and public places such as parks and trails. The affected population was identified by reviewing existing and planned land uses within the study area, as described in Section 3.1, *Land Use and Housing*.
3. **Visual Quality:** Visual quality of the aesthetic environment refers to how well the aesthetic environment meets viewer preferences for the natural and built environments. Visual quality was assessed based on the visual character of the segment and option routes, stated preferences expressed in public comments during the EIS process, and professional judgement. Appendix C provides a detailed description of what was considered a high, medium, or low visual quality for each element of the aesthetic environment. Visual quality in the segments is not homogenous, and ranges from low quality in some areas to high quality in others. These characteristics are described below for each segment.
4. **Visual Resources:** Visual resources include scenic views of the Olympics, the Cascades, Cougar Mountain, Mount Rainier, Lake Washington, Lake Sammamish, and the downtown Bellevue and downtown Seattle skylines.

Table 3.2-1. Overview of the Affected Environment by Project Component (Substation, Transmission Line Segment, and Option)

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Richards Creek Substation			
Natural Environment: • Located on a plateau with the topography sloping downhill to the west • Dense stands of evergreen trees along the east and west flanks **Built Environment:** • Industrial warehouses • Lakeside substation • Elementary school • A range of commercial building types; see Figure 3.2-2 • Two- to three-story apartment/condo buildings	• Utility workers • Industrial workers • Chestnut Hill Academy students and faculty	Overall, visual quality is low in the vicinity of the Richards Creek substation site because the built environment dominates the natural environment (except for the undeveloped wooded area to the east) and building form lacks consistency, the built environment consists of an industrial area with different building forms and configurations and large parking lots, and a high presence of utility infrastructure that varies in form (Lakeside substation and 115 kV transmission lines).	N/A

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Redmond Segment			
Natural Environment: • Topography generally slopes downhill to the east and north • Swan Lake at Sixty-01 Condominium • 500-foot-wide cleared corridor heads west from Sammamish substation • Dense stands of trees abut the utility corridor **Built Environment:** • Single-story and two-story single-family homes • Three-story condominium complexes • Middle school • A range of commercial building types; see Figure 3.2-2 • Industrial parks and warehouses • Two single-circuit 115 kV on H-frame poles (~60 ft in height) • Sammamish substation	• Golfers • Park and trail users • Shoppers • Retail workers • Industrial workers • Rose Hill Middle School students and faculty • Residents • Utility workers	Visual quality is low where the built environment disrupts the natural environment, which occurs near the Sammamish substation and a 500-foot long cleared corridor connecting the Sammamish substation to the transmission line corridor. The built environment near the Sammamish substation (warehouses, commercial buildings, utilities) also has low visual quality because of inconsistent height and form. Visual quality is high in the residential neighborhoods away from the existing transmission line and lower immediately adjacent to the corridor. Residential neighborhoods are primarily single-family residential and have consistent building height and form. Utilities are present, including a 115 kV transmission line, but the configuration has consistent height and form, except where the transmission line leaves the Sammamish substation.	Occasional scenic views of the Cascades

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Bellevue North Segment			
Natural Environment: • Topography generally slopes downhill to the south and to the east. • Tall tree stands abut the utility corridor **Built Environment:** • Single-story and two-story single-family homes • Religious facilities • A range of commercial building types, see Figure 3.2-2 • Industrial parks and warehouses • Two single-circuit 115 kV on H-frame poles (~55 ft in height)	• Residents • Religious followers • Park and trail users • Drivers on SR 520 • Retail employees • Shoppers • Utility workers	Visual quality is generally high in the residential neighborhoods away from the existing transmission line and generally low immediately adjacent to the corridor. Residential neighborhoods are primarily single-family and have consistent building height and form. Visual quality is lowest south of SR 520 where commercial developments and industrial parks have inconsistent height and form, and large paved parking lots. Utilities are present, including a 115 kV transmission line, but configuration has consistent height and form.	Occasional scenic views of the Cascades. Views of the Olympics from Northup Way. Views of Mount Rainier at key locations along SR 520.

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Bellevue Central Segment, Existing Corridor Option			
Natural Environment: • North portion of the option slopes downhill slightly to the east and more steeply to the west. South of Bel-Red Rd, topography slopes downhill to the west • Sharp depression west of the Glendale Country Club • Vegetated along much of the corridor where commercial and industrial uses are not present **Built Environment:** • A range of commercial building types, see Figure 3.2-2 • Single-story and two-story single-family homes • Two- to three-story apartment/condominium buildings • Elementary School • Industrial warehouses • Two single-circuit 115 kV on H-frame poles (~55 ft in height)	• Residents • Golfers • Park and trail users • Industrial workers • Shoppers • Retail workers • Office workers • Utility workers • Chestnut Hill Academy students and faculty • Utility workers	Areas with higher visual quality include Kelsey Creek Park and the Glendale Golf Course where the natural environment is undisturbed by the built environment, and residential areas away from the existing corridor, which have consistent building height and form. Areas with low visual quality are generally areas abutting the transmission line, the industrial area surrounding the Lakeside substation, and the commercial and industrial development north of Bel-Red Rd. The area north of Bel-Red Rd is planned to have high visual quality in the future, as redevelopment complies with Bel-Red Corridor Plan design guidelines. Utilities are present, including a 115 kV transmission line, and the configuration has consistent height and form along the option, except where it intersects with the Lakeside substation.	Sporadic scenic views of downtown Seattle and the Olympics from east of the existing corridor.

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Bellevue Central Segment, Bypass Option 1			
Natural Environment: • North portion of the option slopes downhill slightly to the east and more steeply to the west. South of Bel-Red Rd, topography slopes downhill to the west from the Bellevue Botanical Gardens • Rise in topography at Woodridge Hill • Vegetated along much of the corridor where commercial and industrial uses are not present • Kelsey Creek **Built Environment:** • Single-story and two-story single-family homes • Two- to three-story apartment/condo buildings • A range of commercial building types; see Figure 3.2-2 • Industrial warehouses • 124th Ave NE: SCL 230 kV line • Eastside Rail Corridor	• Residents • Visitors and employees of the Botanical Gardens • Park and trail users (including Eastside Rail Corridor) • Industrial workers • Shoppers • Retail workers	Areas with generally high visual quality include the Botanical Gardens and areas abutting the Lake Hills Connector where the natural environment is less disturbed by the built environment, and residential areas away from the existing transmission corridor, which have consistent building height and form. Areas with lower visual quality are present in areas abutting the transmission line, the industrial area surrounding the Lakeside substation, and the commercial and industrial development north of Bel-Red Rd. The area north of Bel-Red Rd is anticipated to have high visual quality in the future, as redevelopment complies with Bel-Red Corridor Plan design guidelines. Utilities are present, including a 115 kV transmission line, and the configuration has consistent height and form along the option where it occurs, except where it intersects with the Lakeside substation.	Scenic views from Woodridge include views of Lake Washington, downtown Bellevue, and Seattle.

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Bellevue Central Segment, Bypass Option 2			
Natural Environment: • North portion of the option slopes downhill slightly to the east and more steeply to the west. South of Bel-Red Rd, topography slopes downhill to the west from the Bellevue Botanical Gardens • Rise in topography at Woodridge Hill • Vegetated along much of the corridor where commercial and industrial uses are not present • Kelsey Creek • Richards Creek • Wetlands east of Richards Rd. **Built Environment:** • A range of commercial building types; see Figure 3.2-2 • Single-story and two-story single-family homes • Two- to three-story apartment/condo buildings Industrial warehouses • SE 26th St: one single-circuit 115 kV on wood poles (~65 ft in height) • Eastside Rail Corridor • 124th Ave NE: SCL 230 kV line	• Residents • Visitors and employees of the Botanical Gardens • Park and trail users (including Eastside Rail Corridor) • Industrial workers • Shoppers • Retail workers • Utility workers	Areas with generally high visual quality include the Botanical Gardens, areas abutting the Lake Hills Connector, and wetlands to the east and vegetation to the west along Richards Rd where the natural environment is less disturbed by the built environment, as well as residential areas away from the existing transmission corridor, which have consistent building height and form. Areas with generally low visual quality are present in areas abutting the transmission line, the industrial area surrounding the Lakeside substation, and the commercial and industrial development north of Bel-Red Rd. The area north of Bel-Red Rd is anticipated to have high visual quality in the future, as redevelopment complies with Bel-Red Corridor Plan design guidelines. Utilities are present, including a 115 kV transmission line, and the configuration has consistent height and form along the option where it occurs, except where it intersects with the Lakeside substation.	Scenic views from Woodridge include views of Lake Washington, downtown Bellevue, and Seattle.

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Bellevue South Segment, Oak 1 Option			
Natural Environment: • Topography slopes downhill to the south and the west; there is a southward incline associated with the Coal Creek ravine • Rise in topography associated with the Somerset neighborhood • Dense vegetation at Coal Creek ravine • Coal Creek, Sunset Creek **Built Environment:** • Single-story and two-story single-family homes • Two- to three-story apartment/condo buildings • Religious facilities • Middle school, high school • Corridor: Two single-circuit 115 kV on H-frame poles (~60 ft in height) • SE 30th St: Two single-circuit 115 kV on wood poles; one 12.5 kV on a wood pole (~60–65 ft in height) • Factoria Blvd SE/Coal Creek Pkwy: One single-circuit 115 kV on wood poles (~65–75 ft in height)	• Industrial workers • Drivers on I-90 • Residents • Religious followers • Newport High School students and faculty • Park and trail users • Utility workers	Areas with generally high visual quality include the Coal Creek Natural Area where the natural environment is less disturbed by the built environment, and residential areas away from the existing transmission line, which have consistent building height and form. Areas with generally low visual quality are located along Factoria Blvd where the mixture of uses results in a variety of building forms and heights, and I-90. Utilities are present, including a 115 kV transmission line and a 12.5 kV distribution line, and configuration has different heights and forms depending on the location along the route.	Views of downtown Seattle from certain locations on I-90. Scenic views from Somerset include views of the Olympics, Lake Washington, and the Bellevue and Seattle skylines. There are also scenic views of downtown Seattle and the Olympics from multi-family residential housing off of Factoria Blvd SE.

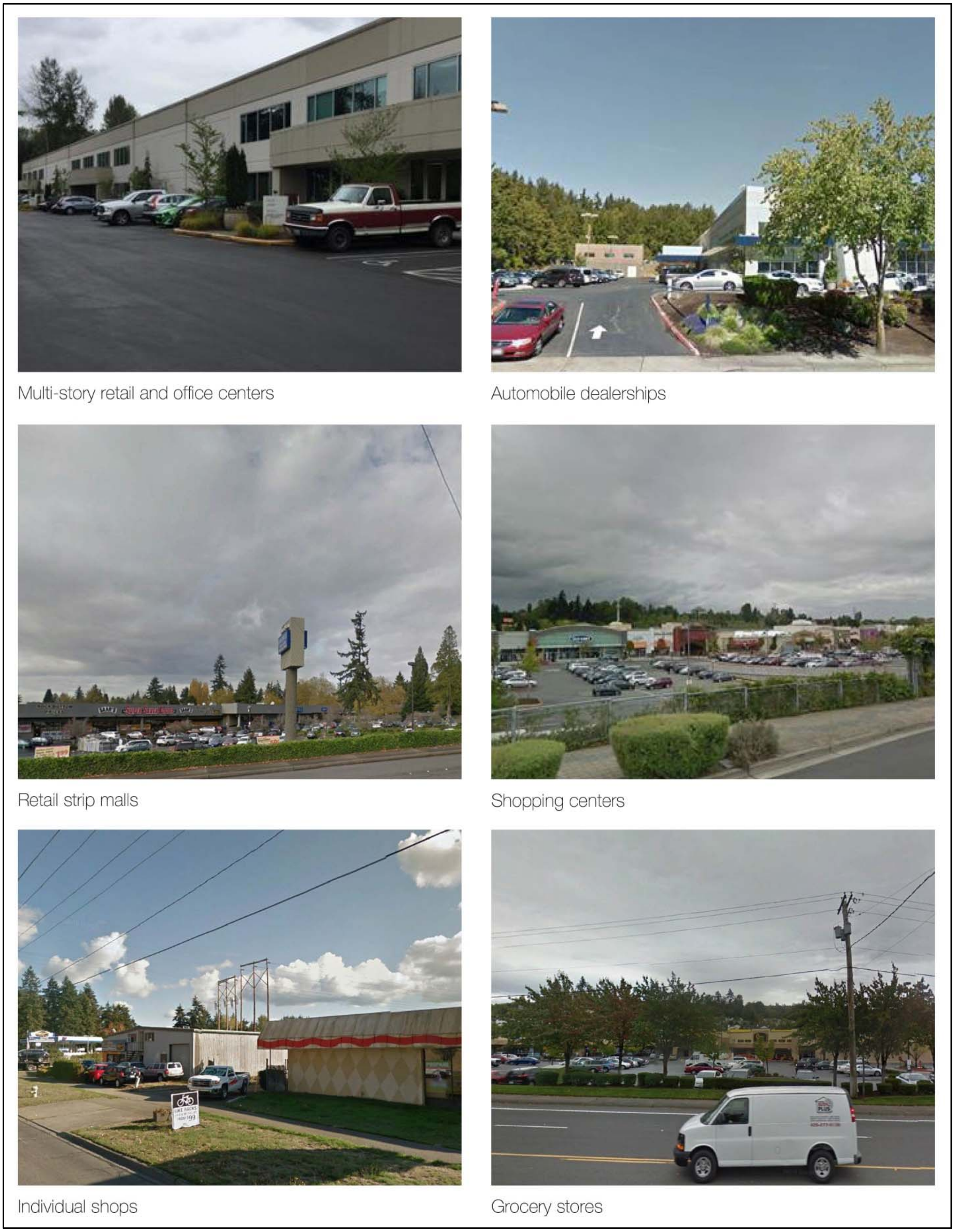
Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Bellevue South Segment, Oak 2 Option			
Natural Environment: • Topography slopes downhill to the south and the west; There is a southward incline associated with the Coal Creek ravine • Rise in topography associated with the Somerset neighborhood • Dense vegetation at Coal Creek ravine • Coal Creek • Sunset Creek **Built Environment:** • Single-story and two-story single-family homes • Two- to three-story apartment/condo buildings • Religious facilities • Middle school • High school • Corridor: Two single-circuit 115 kV on H-frame poles (~60 ft in height) • SE 30th St: Two single-circuit 115 kV on wood poles; one 12.5 kV on a wood pole (~60–65 ft in height) • Factoria Blvd SE/Coal Creek Pkwy: One single-circuit 115 kV	• Drivers on I-90 • Residents • Religious followers • Newport High School students and faculty • Park and trail users • Tyee Middle School students and faculty • Utility workers	Areas with generally high visual quality include the Coal Creek Natural Area (where the natural environment is less disturbed by the built environment) and residential areas away from the existing transmission line that have consistent building height and form. Areas with generally low visual quality are located along Factoria Blvd where the mixture of uses results in a variety of building forms and heights, and I-90. Utilities are present, including a double-circuit 230 kV lattice tower, 115 kV transmission line, and a 12.5 kV distribution line. The utility configurations have different heights and forms depending on the location.	Views of downtown Seattle from certain locations on I-90. Scenic views from Somerset include views of the Olympics, Lake Washington, and the Bellevue and Seattle skylines. There are also scenic views of downtown Seattle and the Olympics from multi-family residential housing off of Factoria Blvd SE.

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
on wood poles (~65–75 ft in height) • SE 38th St/124th Ave SE: SCL double-circuit 230 kV on a lattice tower			
Bellevue South Segment, Willow 1 Option			
Natural Environment: • Topography generally slopes downhill to the south and the west; the corridor also crosses the Coal Creek ravine, which runs south to north • Rise in topography associated with the Somerset neighborhood • Dense vegetation at Coal Creek ravine • Coal Creek **Built Environment:** • I-90 • Single-story and two-story single-family homes • A range of commercial building types; see Figure 3.2-2 • Middle school • Two single-circuit 115 kV on H-frame poles (~60 ft in height)	• Drivers on I-90 • Residents • Shoppers • Retail workers • Students • Park and trail users • Tyee Middle School students and faculty • Utility workers	Areas with generally high visual quality include the Coal Creek Natural Area (where the natural environment is less disturbed by the built environment) and residential areas away from the existing transmission line that have consistent building height and form. Areas with generally low visual quality are those located along I-90 and residential areas located adjacent to the transmission line. Utilities are present, including a 115 kV transmission line, and the utility configuration has consistent form and height along the option.	Views of downtown Seattle from certain locations on I-90. Scenic views from Somerset include views of the Olympics, Lake Washington, and the Bellevue and Seattle skylines.

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Bellevue South Segment, Willow 2 Option			
Natural Environment: • Topography generally slopes downhill to the south and the west; the corridor also crosses the Coal Creek ravine, which runs south to north • Rise in topography associated with the Somerset neighborhood • Dense vegetation at Coal Creek ravine • Coal Creek **Built Environment:** • Single-story and two-story single-family homes • Two- to three-story apartment/condo buildings • Middle school • High school • Preschool • Religious facilities • Existing Corridor: Two single-circuit 115 kV H-frames (~50 – 60 ft) • Newport Way: one double-circuit 12.5 kV wood poles (~40 – 45 ft) • Factoria Blvd SE/Coal Creek Pkwy: one single-circuit 115 kV on wood poles (~65 ft in height)	• Drivers on I-90 • Residents • Religious followers • Newport High School students and faculty • Park and trail users • Tyee Middle School students and faculty • Utility workers	Areas with generally high visual quality include the Coal Creek Natural Area where the natural environment is less disturbed by the built environment, and residential areas away from the existing transmission line, which have consistent building height and form. Areas with generally low visual quality are areas abutting the existing transmission corridor. Utilities are present, including a 115 kV transmission line and a 12.5 kV distribution line, and the configuration has different heights and forms depending on the location along the route.	Views of downtown Seattle from certain locations on I-90. Scenic views from Somerset include views of the Olympics, Lake Washington, and the Bellevue and Seattle skylines.

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Newcastle Segment			
Natural Environment: • Topography slopes to the east. South of SE May Creek Park Drive, there is a steep downhill slope down into the May Creek Valley, which then transitions into a slight uphill slope to the terminus of the segment • Interspersed tree buffering along existing transmission corridor **Built Environment:** • Single-story and two-story single-family homes • Two- to three-story apartment/condo buildings • City Hall • Library • A range of commercial building types; see Figure 3.2-2 • Two single-circuit 115 kV H-frame poles (~55 ft in height) • SCL 230 kV line	• Residents • Retail workers • Shoppers • Municipal workers • Library visitors and workers • Park and trail users • Utility workers	Areas with generally high visual quality include residential areas away from transmission lines, which have consistent building height and form, and areas around Lake Boren and the May Creek ravine where the natural environment is less disturbed by the built environment. Areas with generally low visual quality are areas abutting the existing transmission corridors. Utilities are present, including a 115 kV transmission line, but the utility configuration has consistent height and form.	Scenic views from Olympus include views of Cougar Mountain, the Cascades, the Olympics, and in some places Mount Rainier.

Visual Character	Affected Population	Visual Quality	Visual Resources (Scenic Views)
Renton Segment			
Natural Environment: • Rolling east/west topography with steeper north/south slopes at the Honey Creek and Cedar River ravines • Tall tree stands near Honey Creek and Cedar River ravines **Built Environment:** • Single-story and two-story single-family homes • Two- to three-story apartment/condo buildings • A range of commercial building types; see Figure 3.2-2 • Religious facilities • Cemetery • Technical college • Talbot Hill substation • Two single-circuit 115 kV on H-frame poles (~55 ft in height) • SCL 230 kV line	• Residents • Retail workers • Shoppers • Religious followers • Renton Technical College students and faculty • Park and trail users • Industrial workers • Utility workers	Areas with generally high visual quality include residential areas, which have consistent height and form, Honey Creek and Cedar River ravines, and areas of unincorporated King County adjacent to the existing corridor, where the natural environment is less disturbed by the built environment. Areas of generally low visual quality are present on Monroe Ave where the mixture of uses results in a variety of building forms and heights. The height and form of the 115 kV transmission line is consistent throughout most of the segment, except where it intersects with the Talbot Hill substation, which has lower visual quality.	Scenic views along the corridor include views of the Olympics and the Cascades. Scenic views near Talbot Hill include views of Mount Rainier, Lake Washington, and the Cedar River.



Multi-story retail and office centers

Automobile dealerships

Retail strip malls

Shopping centers

Individual shops

Grocery stores

Source: Google, 2016.

Figure 3.2-2. Examples of Commercial Building Types in the Study Area

3.2.3 Long-term (Operation) Impacts Considered

This analysis examines two types of visual impacts: impacts to the aesthetic environment and impacts to scenic views. It also addresses viewer sensitivity, which applies to both the aesthetic environment and scenic views. The analysis also considers potential mitigation measures to minimize or eliminate project impacts to scenic views and the aesthetic environment.

Methods for Identifying Potential Impacts

Aesthetic Environment: A geographic information system (GIS) analysis was used to determine what portions of the study area would potentially have views of the project, based on the location of the segment or option, the proposed height of the poles, and the surrounding topography. This analysis was further refined to exclude areas where views of the project would be obstructed by major visual barriers, such as dense tree stands or buildings.

Scenic Views: A GIS analysis was performed to identify areas from which the project would obstruct the view of an identified visual resource. The GIS analysis determined where identified visual resources can be seen based on the location and height of the visual resource and the topography of the surrounding area. This area was further refined by overlaying the study area to determine where the project could impact scenic views of visual resources. This analysis identified areas where view impacts were most likely. Site observation from these areas verified the general extent of the areas most affected.

For more information on the GIS analysis, see Appendix C.

3.2.3.1 Impacts to Visual Quality of the Aesthetic Environment

Impacts to the general aesthetic environment are related to the potential for the project to impact visual quality in the study area. As described in Section 3.2.2, visual quality of the aesthetic environment refers to how well the *visual character* meets viewer preferences for the natural and built environments. Changes to visual quality were assessed for each segment and option based on *contrast* (the extent to which a viewer can distinguish between an object and its background) produced by the project against the existing visual character surrounding the segment. The degree of contrast was then evaluated to determine whether or not it would reduce the overall visual quality of the segment.[1] For example, the visual quality of the natural environment could be negatively impacted if a natural area that is relatively undisturbed by development is disturbed by the project. The built environment could be negatively impacted if the project does not blend with an area that has a consistent urban form (similar building height and form) or consistent utility height, configuration, and form. The relationships between the main factors of the analysis of visual resources are illustrated in Figure 3.2-3.

To assess changes to the aesthetic environment, 44 viewpoints were selected at various locations along the existing and new corridors to show different ways the natural and built environments could be impacted. Areas identified as sensitive during public scoping were also considered during the selection of key viewpoints. Visual simulations of the project were developed for each of the viewpoints by Power Engineers (Power Engineers, 2016). Methods for preparing visual simulations are detailed in Appendix C. For this EIS, simulations for 18 of the 46 key viewpoints (KVPs) are used to support impact conclusions (see Section 3.2-5, *Long-term Impacts*). They are listed in Table 3.2-2, and their locations shown on Figure 3.2-4. Appendix C incudes simulations for all 46 KVPs and a map showing their locations.

[1] Alternative 1 was compared to existing conditions, including the existing overhead transmission line if present.

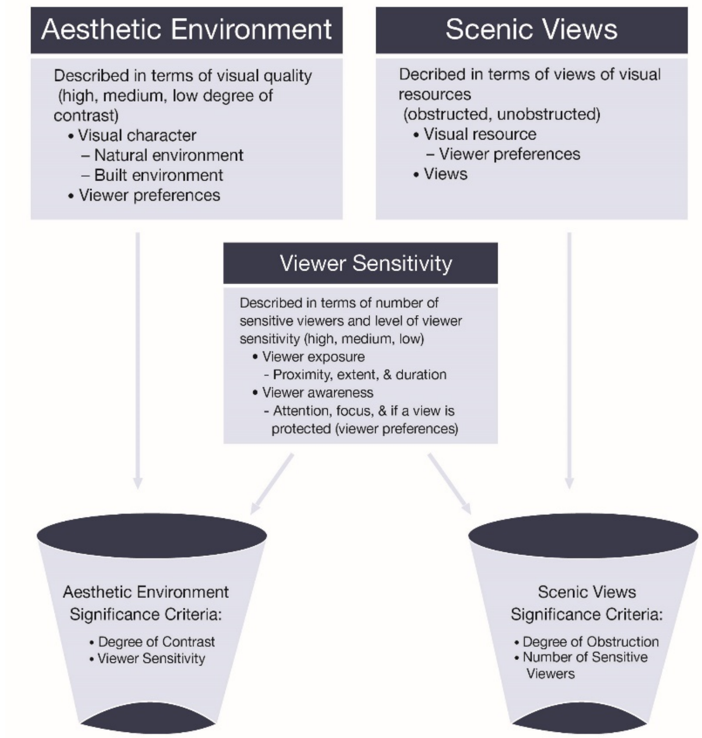


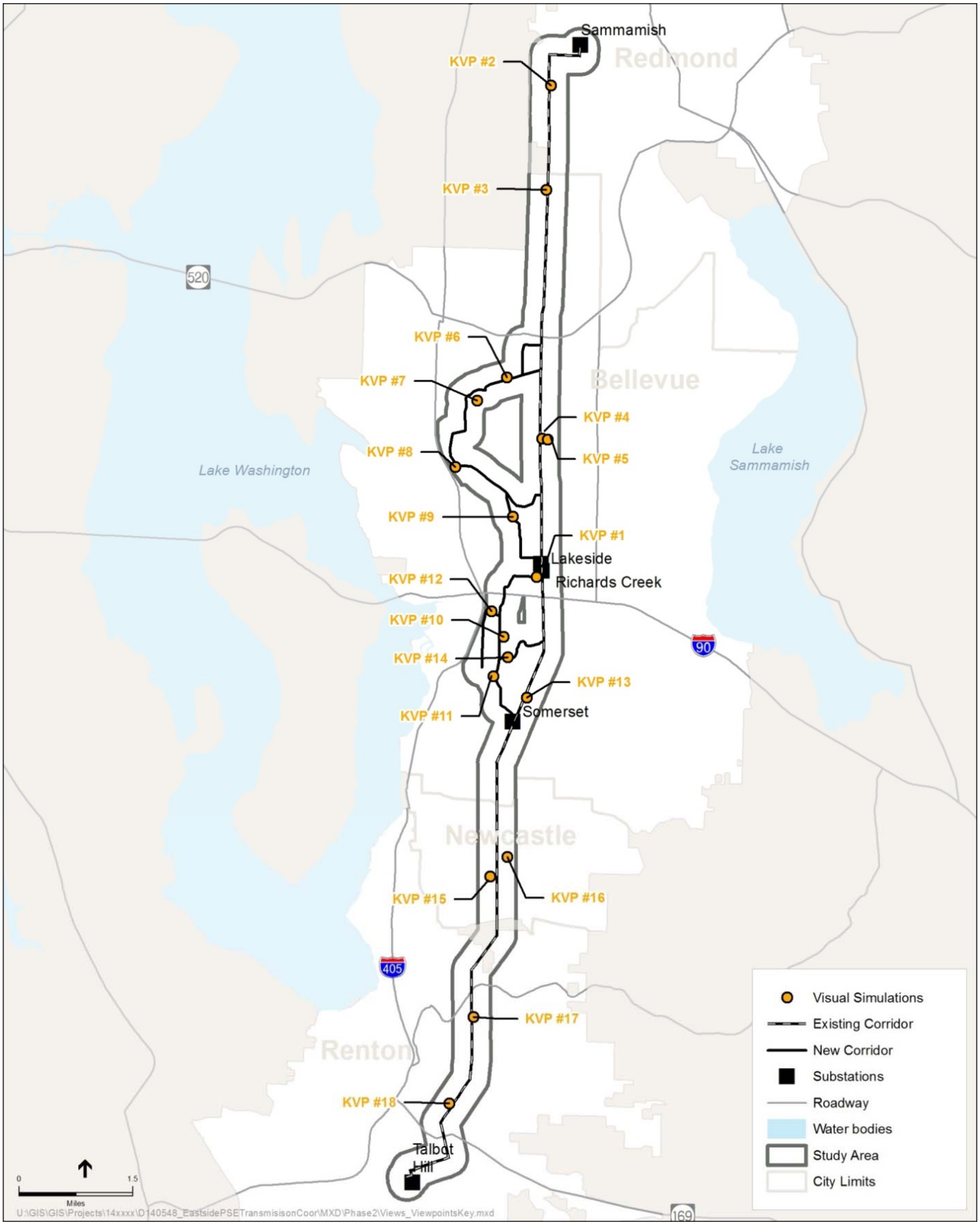
Figure 3.2-3. Factors Considered for the Analysis of the Aesthetic Environment and Scenic Views

Table 3.2-2. Key Viewpoints Selected for the Visual Quality Analysis

KVP	Location	Segment/ Option	Reason for Selecting Viewpoint
1	Richards Creek Substation	All Options	• Shows the new substation when 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 (shows project configuration and height for entire segment).
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 entire segment).
4	13606 Main Street	Bellevue Central – Existing Corridor	• Shows project from rise in topography looking along the transmission line corridor. • Is identified in the Wilburton Subarea Plan as a key view.

KVP	Location	Segment/ Option	Reason for Selecting Viewpoint
5	13636 Main Street	Bellevue Central – Existing Corridor	• Shows project from rise in topography from the side of the transmission line. • Is identified in the Wilburton Subarea Plan as a key view.
6	12828 Bel-Red Rd	Bellevue Central – Bypass Options 1 and 2	• Shows project surrounded by commercial and industrial uses. • Shows project from an area slated for increased density.
7	12239 NE 8th St	Bellevue Central – Bypass 1 and 2 Options	• Identified in the Wilburton Subarea Plan as a key view.
8	Lake Hills Connector	Bellevue Central – Bypass Options 1 and 2	• Identified in the Wilburton Subarea Plan as a key view. • Shows how project would be viewed by future users of the Eastside Rail Corridor.
9	1680 Richards Rd	Bellevue Central – Bypass Option 2	• Richards Rd is identified in the Richards Valley Subarea Plan as an area where the City wants to preserve the vegetated appearance. • Shows impacts to an area with wetland land cover. • Shows the project from the Woodridge Trail trailhead.
10	4122 Factoria Blvd SE	Bellevue South - Oak 1 Option	• Visual connections along Factoria Blvd are protected in the Factoria Subarea Plan.
11	Factoria Blvd/Coal Creek Pkwy	Bellevue South - Oak 1 Option	• Identified via public comment. • Visual connections along Factoria Blvd are protected in the Factoria Subarea Plan.
12	12513 SE 38th St	Bellevue South - Oak 2 Option	• Shows construction of poles where they do not currently exist.
13	4730 134th PL SE	Bellevue South - Willow 1 Option	• Identified via public comment. • Shows the option with the tallest poles in the Somerset neighborhood.

KVP	Location	Segment/ Option	Reason for Selecting Viewpoint
14	12892 SE Newport Way	Bellevue South - Willow 2 Option	• Shows a change in built environment from a 40-foot 12.5 kV line on wooden poles to 75-foot steel monopoles. • Shows removal of underbuild and reduction in clutter.
15	12732 SE 80th Way	Newcastle	• 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.
16	Lake Boren Park	Newcastle	• View from recreational use. • Shows the project from a lower elevation looking up at the project.
17	1026 Monroe Ave NE	Renton	• Shows project surrounded by institutional and single-family residences.
18	318 Glennwood Court SE	Renton	• Shows project surrounded by single-family residential development and placed on a ridge.



Source: King County, 2015; Ecology, 2014.

Figure 3.2-4. Locations of Key Viewpoints used in the Aesthetic Environment Analysis

3.2.3.2 Obstruction of Scenic Views

Impacts to scenic views include the potential for the project to obstruct views of the visual resources identified in Section 3.2.2. A GIS analysis was performed to identify areas from which project-related view impacts were most likely. Site observation from these areas verified the general extent of the areas most affected (see Appendix C).

3.2.3.3 Viewer Sensitivity

The assessments of impacts to the aesthetic environment and scenic views both incorporate viewer sensitivity of the affected population. Viewer sensitivity was determined by examining *viewer exposure* and *viewer awareness*. Awareness considers viewer attention and focus, and whether affected views are protected by policy, regulation, or custom (such as local covenants relating to views or aesthetics). It was assumed that two groups were the most sensitive to changes in the aesthetic environment and scenic views: residents, and recreational users in parks and other recreational settings. These two groups would have the greatest exposure to the project of all of the viewers because they are often near the project and would frequently observe the project over longer durations (particularly residential viewers).

The viewer extent of residential viewers was determined by assigning areas of high, medium, and low population density by assessing American Community Survey 2014 Census block data on a segment-by-segment basis within the study area (U.S. Census Bureau, 2014). The viewer extent of recreational users was assessed by identifying those recreation areas (parks, trails, outdoor recreation facilities) that lie within the study area, and determining whether or not the view or natural setting of the recreation areas is identified as a defining feature (based on findings in the Phase 1 Draft EIS, see Table 11-1 in the Phase 1 Draft EIS, and the recreation analysis in the Phase 2 Draft EIS, see Section 3.6)[2]. If a recreation area that is used for its views or natural setting would be impacted, the assessment considered how frequently the recreation area is used.

Drivers on I-90 are considered sensitive viewers because I-90 is designated as a National Scenic Byway (the Mountains to Sound Greenway) from Seattle to Thorp, Washington. The designation was assigned because of the presence of pastoral valleys, forests, and the mountain landscape (FHWA, 2016). However, the portion of the scenic byway where the project would cross (at the intersection with Richards Road or approximately 137th Avenue SE) is highly urbanized (see Figure 3.2-5).

Viewer Exposure: Exposure considers the proximity, extent, and duration of views. All viewers within the study area are considered to be close to the project. ***Viewer extent*** is specific to each segment or option, and is dependent on residential density along the segment/ option and how many outdoor recreation areas (parks, trails, outdoor recreation facilities) are impacted that are used for their scenic views or natural setting. The ***duration*** of views is consistent for all segments and options, with residential viewers experiencing the longest view duration due to their stationary nature and fixed views of the transmission line. Recreational users have a shorter view duration that is confined to the time spent at the recreational resource, with park users having longer view duration and trail users, who are more mobile, having shorter view duration.

Viewer Awareness: Awareness considers viewer attention and focus, and whether affected views are protected by policy, regulation, or custom. This analysis is based on policies and regulations of the areas each component crosses, and therefore is specific to each component. Applicable polices and regulations are described in Section 3.2.1.

[2] Please note: the study area for the scenic views and aesthetic environment assessment is larger than the study area used for the recreation analysis.

Existing westbound view where Willow options would cross I-90

Existing westbound view where Oak options would cross I-90

Source: Google, 2016.

Figure 3.2-5. Existing Views for I-90 Crossing Locations

In addition, the crossings are located within 1 mile of the I-405/ I-90 interchange, reducing viewer focus on the visual setting as many drivers are exiting I-90. Drivers on I-90 would also have the shortest view duration in the study area due to the speed at which they travel (approximately 40–65 mph depending on traffic conditions). There are views of downtown Seattle from certain locations on I-90. However, scenic views from I-90 are not expected to be impacted because the transmission line would be located high enough to be above the drivers' line of sight to these views.

Viewer sensitivity was assigned a value of low, medium, or high depending on the following (Table 3.2-3):

Table 3.2-3. Assigning a Degree of Viewer Sensitivity

Viewer Sensitivity	Viewer Exposure	Viewer Awareness
High	Residential density along the segment/ option is high and outdoor recreation areas (parks, trails, outdoor recreation facilities) used for their scenic views or natural setting would be impacted.	Areas with scenic views or aesthetics that are protected by policy, regulation, or custom are impacted, and viewers have access to and regularly enjoy these views for extended periods.
Moderate	Residential density along the segment/ option is high, or outdoor recreation areas (parks, trails, outdoor recreation facilities) used for their scenic views or natural setting would be impacted.	Areas with scenic views or aesthetics that are protected by policy, regulation, or custom, but where viewer focus and attention are limited, for reasons such as travel speed, duration of visit, or topography that limits available views.
Low	Residential density along the segment/ option is not high and no outdoor recreation areas (parks, trails, outdoor recreation facilities) used for their scenic views or natural setting would be impacted.	Areas with scenic views or aesthetics that are not protected by policy, regulation, or custom, or where viewers are not likely to focus on a view that may be protected.

3.2.3.4 *Magnitude of Impact*

Because the value of scenic views and the aesthetic environment is subjective, it is difficult to quantify or estimate impacts. There is no widely accepted definition of significant visual effects because the significance of an activity varies with the setting and viewer preferences. Extensive research for significance criteria for transmission line projects was conducted by the EIS Consultant Team and did not identify any applicable criteria. For this project, significance was determined based on criteria similar to those described in *The State Clean Energy Program Guide: A Visual Impact Assessment Process for Wind Energy Projects* (Vissering et al., 2011). These criteria, while not used for transmission lines, were used for wind turbines, which can be similar in height and scale to utility poles and are widely studied for visual impacts. This guide suggests the following criteria for determining if a project would result in “undue or unreasonable visual impacts:” violation of aesthetic standards, dominance of the project in views from highly sensitive viewing areas, and failure to take reasonable mitigation measures (Vissering et al., 2011).

A review of policies and regulations applicable to the study area revealed that the existing regulatory framework was insufficient for determining significance because no clear written standards are included for aesthetic impacts in any of the Partner Cities. To develop a threshold for significance that reflects the policies of the Partner Cities, the EIS Consultant Team held a workshop in August 2016 with staff from the Partner Cities. The purpose of the workshop was to collaboratively define significance thresholds based on policies, past precedent, and practice within the Partner City jurisdictions. Information on the workshop process and how significance was identified is detailed in Appendix C.

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

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 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; and the degree of additional obstruction of views compared to existing conditions would be substantial.

3.2.4 Long-term Impacts: No Action Alternative

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.

3.2.5 Long-term Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

3.2.5.1 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 below (and illustrated in Figure 3.2-6).

Contrast with the Natural Environment: Contrast with the natural environment results from inconsistency with natural setting (vegetation, topography, etc.). This includes the removal of vegetation, changes to topography (grading), or introduction of new infrastructure whose height and form do not blend with the height and form of the surrounding natural environment.

- *Vegetation Removal*. Periodic trimming and tree removal would occur within the Managed Right-of-Way in accordance with PSE's vegetation management criteria (see Section 3.4). The width of the Managed Right-of-Way would depend on the pole configuration (see Appendix E). However, in general it would extend 16 feet from the outside transmission wires and 6 feet from wire-free side of poles. PSE would trim or remove trees that mature to a height of 15 feet or greater in the Managed Right-of-Way for a 230 kV transmission corridor, and trees that mature to a height of 25 feet or greater in the Managed Right-of-Way for a 115 kV transmission corridor. A more detailed discussion of vegetation removal and PSE's Vegetation Management Program is provided in Section 3.4, *Plants and Animals*. Tree removal within an existing utility corridor that is already subject to PSE's vegetation management criteria would generally produce less contrast with the natural environment than areas where a new corridor is created.

- *Changes to Topography*. Grading can cause substantial contrast with the natural environment if it is inconsistent with the underlying topography of the area. Grading is proposed for the Richards Creek substation. Minimal grading is expected for the transmission line.
- *Blending with Natural Setting*. The project would place poles in some areas with high density of tree stands, and some with low density of tree stands surrounding the existing or new corridor. In general, poles placed in areas with no trees would result in greater contrast because it would introduce a new type of geometry in an area where that geometry does not currently exist. Contrast can also occur if the poles are taller than the existing tree stands. Contrast with the natural environment would be low in areas where the poles would be surrounded by vegetation and would not protrude above the tree line. The project would be constructed in areas with varying topography. Areas where the poles would be placed on ridges are more likely to contrast with the natural environment because they would become a prominent feature on the landscape (being taller than all of the surrounding landforms). Conversely, poles that are located next to rises in topography would be more likely to blend with the surrounding landscape because they would not extend into the skyline, and would be less visible from areas located at higher elevations.
- *Contrast with the Built Environment:* Contrast with the built environment results from inconsistency with the built setting (buildings, utility infrastructure, etc.). This includes introducing infrastructure that has a height and/or form that is incompatible with the surrounding built environment, introducing infrastructure that is inconsistent in height and form itself, or creating more visual clutter.
- *Incompatible Height and Form with Surrounding Built Environment*. All segments and options would result in new or additional utility infrastructure being introduced into the built environment. Contrast with the built environment would be most substantial where new infrastructure is introduced (e.g., a new transmission line is placed in an area where there currently is no transmission infrastructure). Contrast could also occur where the height and form of the new infrastructure are inconsistent with the surrounding structures (buildings and other utility infrastructure). For this analysis, typical pole heights (65 – 95 ft) were used when describing the change in height from existing to proposed. It is possible that some pole heights may reach the maximum pole heights listed in Chapter 2. However, having one or a few taller poles alone would not result in a significant impact because of the limited extent of the impact.

Vegetation removal

Changes in topography

Blending with the natural setting

Incompatible height and form with surrounding built environment

Inconsistent project height and form

Visual clutter

Source: Google, 2016.

Figure 3.2-6. Examples of Contrast

- *Inconsistent Project Height and Form.* Depending on the segment and option, the height and form of the transmission infrastructure varies in consistency. More contrast would occur in areas where the pole configuration and/or height would change. Almost all of the pole configurations would be made of steel with patina applied to provide a rust-colored look. Some variability in pole height is possible within areas identified as having a consistent pole height and form, depending on whether or not the typical or maximum pole height is used (usually based on topographic or other constraints). Having one or a few taller poles would not be considered a significant impact because of the limited extent of the impact.
- *Visual Clutter*. Visual clutter occurs where there is a dense presence of poles, wires, and other utility infrastructure. Higher contrast would occur in areas where more poles would be required than under existing conditions, and there would be more wires. There is the potential for a reduction in contrast in areas where the number of poles and wires would be reduced (i.e., removal of underbuild).

Obstruction of Scenic Views

Scenic views would not be impacted to the same degree under all of the segments or options. 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 3.2.3.1, viewer sensitivity applies to both the aesthetic environment and scenic views, and was determined by examining viewer exposure and viewer awareness. Relevant plans, policies, and regulations were also reviewed to identify potential impacts that would affect more sensitive viewers (Table 3.2-4). Some jurisdictions have policies that apply to the project and address potential impacts to scenic views, the aesthetic environment, or both. Only those jurisdictions with applicable policies relating to the project and scenic views or the aesthetic environment were included. Table 3.2-4 provides an overview of applicable policies that describe what scenic views and elements of the aesthetic environment should be protected, and identifies the project's potential inconsistencies with these policies. Policies suggesting measures for reducing scenic view and aesthetic impacts are summarized as potential mitigation measures in Section 3.2.6.

Table 3.2-4. Consistency with Relevant Plans, Policies, and Regulations

Planning Document	Applicable Planning Statement, Policy, or Regulation*	Potential Inconsistencies with Policies	Segment/Option
King County			
Eastside Rail Corridor Master Plan 2016	**Scenic:** In some cases, bridges may also be locations for viewpoints. **Aesthetic:** Existing landscape that does not need to be removed for trail construction will be evaluated to determine if it is consistent with public use, including aesthetics and overall trail design.	**Scenic:** The project could be adjacent to a bridge where the trail would cross the Lake Hills Connector. However, it is not likely that it would impact scenic views because the 230 kV line would be to the east of the bridge, and scenic views from that bridge would likely be to the west (e.g., the Bellevue skyline). **Aesthetic:** Project could impact the aesthetics of the trail setting on SE 1st St through presence of 230 kV poles and vegetation clearing.	Bellevue Central

Planning Document	Applicable Planning Statement, Policy, or Regulation*	Potential Inconsistencies with Policies	Segment/Option
Redmond			
City of Redmond Comprehensive Plan	**Scenic:** Public view corridors of Mount Rainier, the Cascade Mountains, and Lake Sammamish should be protected (Plan Policy CC-14). Unique public views that provide a sense of place should be protected. **Aesthetics:** Views of surrounding hillsides, mountains, and tree line should be protected. Tree stands and views from the valley should be protected (Plan Policy N-SV-4). Woodland views from neighborhood residences should be protected.	**Scenic:** Project could obscure public scenic views. **Aesthetics:** Project could change the visual quality of the natural environment through clearing or grading.	Redmond
Redmond Zoning Code (RZC)	**Scenic:** Public view corridors and gateways should be protected (RZC 21.42).	**Scenic:** Project could be inconsistent with public view corridor and gateway design standards.	
	Aesthetics: Appearance of public ways should be protected.	**Aesthetics:** Project could be inconsistent with public way design standards (RZC 21.17.020).	

Planning Document	Applicable Planning Statement, Policy, or Regulation*	Potential Inconsistencies with Policies	Segment/Option
City of Bellevue			
Bellevue Comprehensive Plan 2015	**Scenic:** Views of water, mountains, and skylines from public places should be protected (Plan Policy UD-23). **Aesthetics:** Overhead lines should not be located in green belts and open spaces identified in the Parks and Open Space System Plan (Plan Policy UT-45). Distinctive neighborhood character within Bellevue's diverse neighborhoods should be protected (Plan Policy N-9). The following boulevards should be designed to reflect scenic elements of the surrounding areas and neighborhoods. Streetscape design should promote a comfortable park-like experience for all users (Plan Policy UD-70): • Bel-Red Road • Lake Hills Connector • Richards Road • Factoria Blvd SE • Coal Creek Parkway • SE Newport Way	**Scenic:** Project could obstruct scenic views from parks, trails, and other public spaces (Plan Policies UD-23 and UT-45). **Aesthetics:** Project could locate overhead lines in greenbelts and open spaces (Plan Policy UT-45). Project could, through introduction of a new transmission line, or substantial changes in transmission pole type, height, or form could create contrast with existing, distinctive neighborhood character (Plan Policy N-9). Construction of transmission line along boulevards could be inconsistent with policy UD-70 if the degree of contrast is substantial or design requirements specific to these boulevards are not met.	Bellevue North, Bellevue Central, Bellevue South

Planning Document	Applicable Planning Statement, Policy, or Regulation*	Potential Inconsistencies with Policies	Segment/Option
Bridle Trails Subarea Plan 2015	**Aesthetics:** Wooded, natural, rural, and equestrian character of the subarea should be protected (Plan Policy S-BT-3). Vegetation on the lower slopes of the bluff adjacent to SR 520 at approximately 136th Ave NE should be retained to provide a visual separator between residential areas and the freeway (Plan Policy S-BT-42). Roadsides in Bridle Trails Subarea should be protected (Plan Policy S-BT-43).	**Aesthetics:** Project could remove vegetation and change the wooded, natural, rural, and equestrian character of the subarea (Plan Policy S-BT-3). Project could remove vegetation on the lower slopes of the bluff adjacent to SR 520 at approximately 136th Ave NE to the point that it no longer provides a visual separator between residential areas and the freeway (Plan Policy S-BT-42). Project could reduce the unified visual appearance of roadways (Plan Policy S-BT-43).	Bellevue North
Bel-Red Subarea Plan 2015	**Aesthetics:** Bel-Red Subarea street environment should be protected (Plan Policy S-BR-25; S-BR-39; S-BR-59). Bel-Red Subarea parks and open space system should be protected (Plan Policy S-BR-35).	**Aesthetics:** Project could remove street trees and/or reduce the aesthetic beauty of subarea parks or open spaces.	Bellevue Central
Wilburton/NE 8th St Subarea Plan 2015	**Scenic:** Significant views from park lands should be protected (Plan Policy S-WI-11). **Aesthetics:** Views of prominent landforms, vegetation, watersheds, drainage ways, downtown, and significant panoramas in the subarea should be protected (Plan	**Scenic:** Project could obstruct scenic views from park lands. **Aesthetics:** There would be noticeable changes to the key views through new contrast.	Bellevue Central

Planning Document	Applicable Planning Statement, Policy, or Regulation*	Potential Inconsistencies with Policies	Segment/Option
	Policy S-WI-40). Key views include: • West from NE 8th St and NE 5th St on the ridge between 122nd Ave NE and 123rd Pl NE. • South from the Lake Hills Connector north of SE 8th St. • From SE 1st St and Main Street at the power line right-of-way at 136th Ave.		
Southeast Bellevue Subarea Plan 2015	**Aesthetics:** Existing residential character should be protected (Plan Policy S-SE-2).	**Aesthetics:** Project could introduce new infrastructure into the built environment that is not consistent with the existing height and form of the surrounding residential neighborhoods.	Bellevue Central
Richards Valley Subarea Plan 2015	**Scenic:** Views from Woodridge Hill should be protected. **Aesthetics:** Views of the wooded areas and wetlands in the valley (associated with Richards Creek and Kelsey Creek) should be protected. Eastgate I-90 corridor should be protected. Natural character surrounding streets and arterials should be protected. Green and wooded character of the	**Scenic:** Project could obstruct views from Woodridge Hill. **Aesthetics:** Project could remove trees or wetlands, particularly within the valley or along Richards Rd. Project could change the visual quality of the Eastgate I-90 corridor or other streets and arterials.	Bellevue Central, Bellevue South

Planning Document	Applicable Planning Statement, Policy, or Regulation*	Potential Inconsistencies with Policies	Segment/Option
	Richards Rd corridor should be protected (Plan Policy S-RV-30).		
Eastgate Subarea Plan 2015	**Scenic:** Existing views from public spaces should be protected (Plan Policy S-EG-23). View amenities of adjacent single-family neighborhoods should be protected (Plan Policy S-EG-22).	**Scenic:** Project could obstruct views from public spaces or single-family residents adjacent to the project.	Bellevue Central, Bellevue South
Factoria Subarea Plan 2015	**Aesthetics:** Pathways and access points with views of Sunset Creek, Richards Creek, and Coal Creek should be protected (Plan Policy S-FA-18). Visual connections along Factoria Blvd should be protected (Plan Policy S-FA-32).	**Aesthetic:** Project could obstruct views of Sunset Creek, Richards Creek, Coal Creek, or view connections along Factoria Blvd.	Bellevue South
Newport Hills Subarea Plan 2015	**Aesthetics:** Emphasize as a distinct visual element the preservation of existing trees on protected slopes and hilltops (Plan Policy S-NH-44). Existing visual features such as trees and hilltops, views of water, and passive open space should be protected (Plan Policy S-NH-54).	**Aesthetics:** Project could remove trees on protected slopes and hilltops or change the overall visual quality of the natural environment.	Bellevue South

Planning Document	Applicable Planning Statement, Policy, or Regulation*	Potential Inconsistencies with Policies	Segment/Option
Newcastle			
City of Newcastle 2035 Comprehensive Plan	**Aesthetics:** Existing character, scale, and neighborhood quality should be protected (Plan Policy LU-G3). Open space, wildlife habitats, recreational areas, trails, connection of critical areas, natural and scenic resources, as well as shoreline areas should be identified and preserved (Plan Policy LU-G6). Natural features that contribute to the city's scenic beauty should be protected (Plan Policy LU-G8).	**Aesthetics:** Project could reduce the visual quality of the natural or built environment. The project could affect the visual character of trails within the existing transmission line corridor.	Newcastle
Community Business Center/ Lake Boren Corridor Master Plan 2000	**Aesthetics:** Developments will also take advantage of the area's viewsheds, whether down a street corridor, view of Lake Boren, or views from or to surrounding hillsides.	**Aesthetics:** Project could change views of the western hillside (where it would be located). Although the project would be placed within the existing transmission corridor, the increased pole height could make it more visible than under existing conditions. However, the presence of dense, tall tree stands would continue to reduce the contrast the line would have with the surrounding aesthetic environment. The transmission line would be located to the west of Master Plan development, and would not hinder views from the Master Plan area of Lake Boren or of the hillsides to the east.	Newcastle

Planning Document	Applicable Planning Statement, Policy, or Regulation*	Potential Inconsistencies with Policies	Segment/Option
Renton			
City of Renton Comprehensive Plan 2015	**Scenic:** Public scenic views and public view corridors, such as "physical, visual, and perceptual linkages to Lake Washington and Cedar River" should be protected (Plan Policy L-55). Views of the water from public property or views enjoyed by a substantial number of residences should be protected. **Aesthetics:** 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" should be protected (Plan Policy L-56).	**Scenic:** Project could obscure public scenic views, views of the water from public property, or views enjoyed by a substantial number of residences. **Aesthetics:** Project could create a large degree of contrast.	Renton

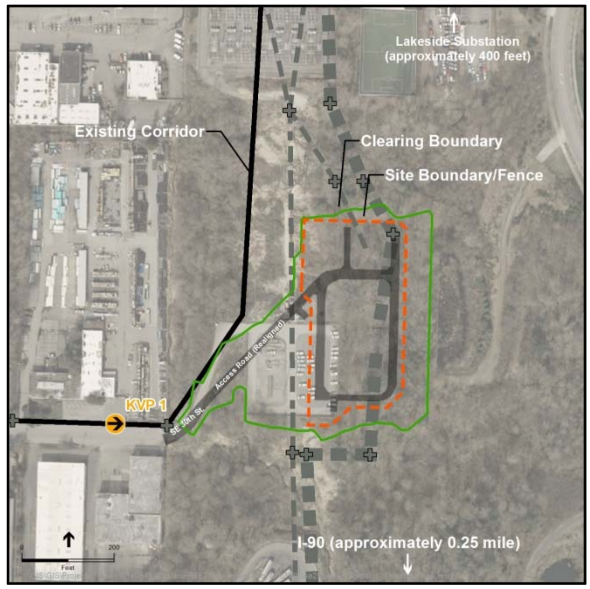
Source: City of Bellevue, 2011, 2015b, 2015c, 2015d, 2015e, 2015f, 2015g, 2015h, 2015i, 2015j; City of Newcastle, 2000, 2016; City of Redmond, 2015a; City of Renton, 2011, 2015a; and King County, 2016.

*Statements that are not identified in this table as being related to specific policy or regulation are general planning statements from adopted plans.

3.2.5.2 New Richards Creek Substation

Impacts to the aesthetic environment for the Richards Creek substation would be less-than-significant 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 has cleared open space and wooded hillside. Clearing and grading associated with site development would result in new contrast in the aesthetic environment (see Figure 3.2-7). Visual quality of the natural environment would change 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 a 115 kV transmission corridor currently crosses the site heading north and south. Because the project would be built adjacent to similar development, it would add to the existing visual clutter. 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 located approximately 700 feet to the northeast of the substation site, but they would not be able to see the new substation. The proposed substation would not be inconsistent with any study area plans or policies (see Appendix C). Therefore, viewer sensitivity would be low.

Existing Pole Height: 65-70 feet

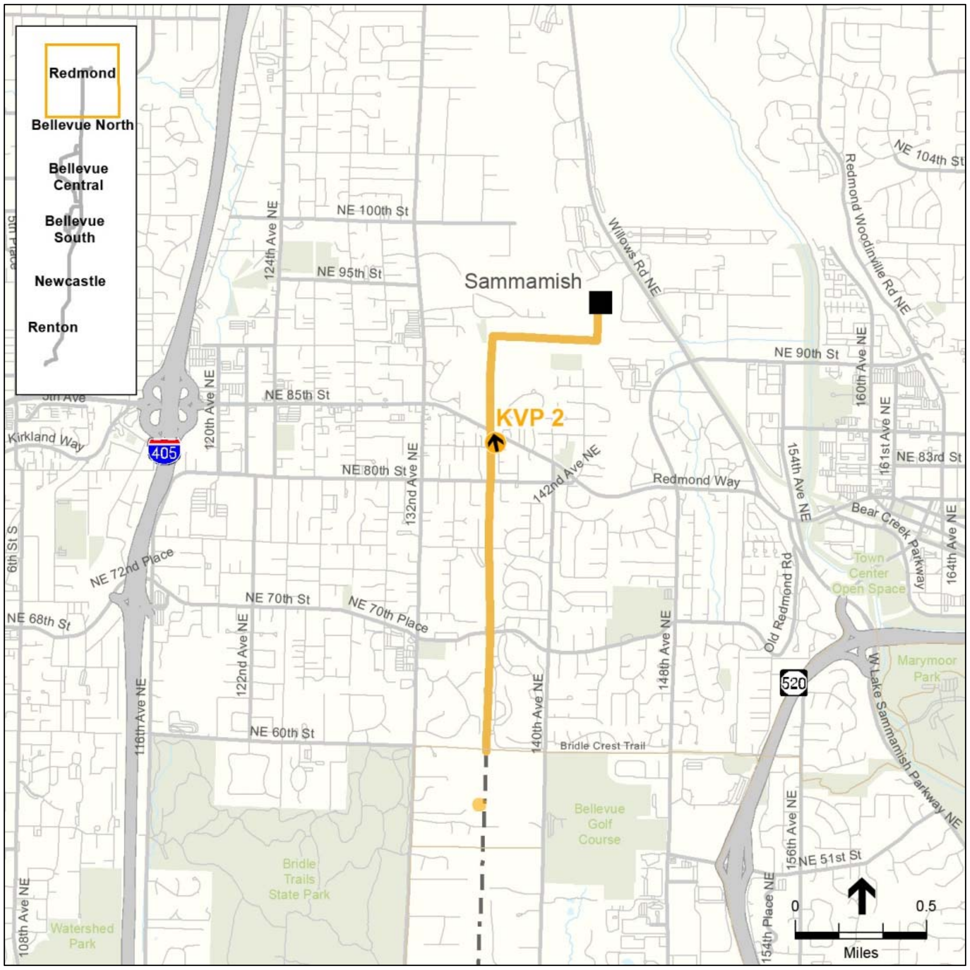
Proposed Pole Height: 70-90 feet

Note: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography, etc.
Source: Power Engineers, 2016

Figure 3.2-7. KVP 1, Existing and Proposed Conditions of Richards Creek Substation from SE 30th Street Looking East

3.2.5.3 Redmond Segment

Impacts to the aesthetic environment for the Redmond Segment would be less-than-significant. 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 35 feet taller than the existing poles. With a typical pole height of 95 feet, 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, such as the northern portion of the segment. 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 line would have consistent height and form throughout the segment. The project would reduce visual clutter in the corridor by reducing the number of poles from existing conditions (see Figure 3.2-8). 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 are expected to 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. The City of Redmond Comprehensive Plan policies call for protecting woodland views in residential neighborhoods. Trees would need to be removed, which could potentially change the wooded character of the area. However, tree removal would occur within an existing transmission corridor. Tree removal would be most noticeable to residents adjacent to the corridor, but the overall appearance of tree stands and woodland views is not expected to be adversely impacted because the area where additional clearing would occur is already mostly cleared. 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 would be moderate.

Existing Pole Height: 50 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, etc.
Source: Power Engineers, 2016

Figure 3.2-8. KVP 2, Existing and Proposed Conditions from Redmond Way Looking North

3.2.5.4 Bellevue North Segment

Impacts to the aesthetic environment on the Bellevue North Segment would be less-than-significant. The transmission line 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). 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 visual separator between residential areas and the freeway would not be removed (see Appendix C).

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 95-foot poles would in most cases be shorter than the surrounding vegetation or would appear shorter than surrounding vegetation due to vegetation density (see Figure 3.2-9). In general, the topography does not affect the visibility of the transmission line along this segment because dense, tall vegetation obscures the view of the transmission line. Within the built environment the poles would be approximately 35 feet taller than existing conditions, and the pole diameter would be wider than existing conditions, contrasting more with the surrounding houses and existing utility infrastructure. The new transmission line would have consistent form and height throughout the segment, and would reduce visual clutter by reducing the number of poles. 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 and Viewpoint Park. In general, because of the high density of tall vegetation, only residential viewers close to the transmission line would be able to view it. The closer viewers are to the transmission line, the less likely they are to view the lines because increasing the existing pole height by 35 feet would raise the lines out of their line of sight. The presence of dense vegetation also reduces the likelihood that the transmission line would be visible from any of the recreational resources, except where it directly crosses 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, 2015d). It is estimated that approximately 0.5 percent of 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 considered 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, etc.
Source: Power Engineers, 2016

Figure 3.2-9. KVP 3, Existing and Proposed Conditions from NE 54th Place Looking North

3.2.5.5 Bellevue Central Segment, Existing Corridor Option

Impacts to the aesthetic environment would be less-than-significant because the transmission line would be within the existing corridor, and contrast with the existing environment would be minimal. Viewer sensitivity would be low because the project would not be inconsistent with study area plans or policies.

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

- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would be greater 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 topography reduces the visibility of the line to the west because the decline in elevation is steep enough that views of the transmission line from the west are blocked by vegetation and housing in the foreground. Contrast with the built environment would be slightly greater than existing conditions because the poles would be approximately 40 feet taller and the pole diameter would be wider than the existing poles. However, a transmission line already exists in the corridor, and the new transmission line would have consistent form and height throughout the option route, and would reduce visual clutter by reducing the number of poles. Impacts would be less-than-significant.

- **Scenic Views:** Scenic view impacts along this option would be minimal because topography and vegetation obscure scenic views from most of the study area.
- **Viewer Sensitivity***:* Sensitive viewers along the option route 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. The presence of dense vegetation reduces the likelihood that the transmission line would be visible from Kelsey Creek Park. The project would directly cross and/or follow the SE 3rd Trail, the SE 10th Trail, three unnamed trails, the Highland–Glendale Property, and Skyridge Park. However, 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 3.2-10). A transmission line already exists, and the project would only change the height and form of the line.

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, etc.
Source: Power Engineers, 2016

Figure 3.2-10. KVP 4, Existing and Proposed Conditions from Main Street Looking North

Existing Pole Height: 55 feet

Proposed Pole Height: 105 feet

Note: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography, etc.
Source: Power Engineers, 2016

Figure 3.2-11. KVP 5, Existing and Proposed Conditions from Main Street Looking West

3.2.5.6 Bellevue Central Segment, Bypass Option 1

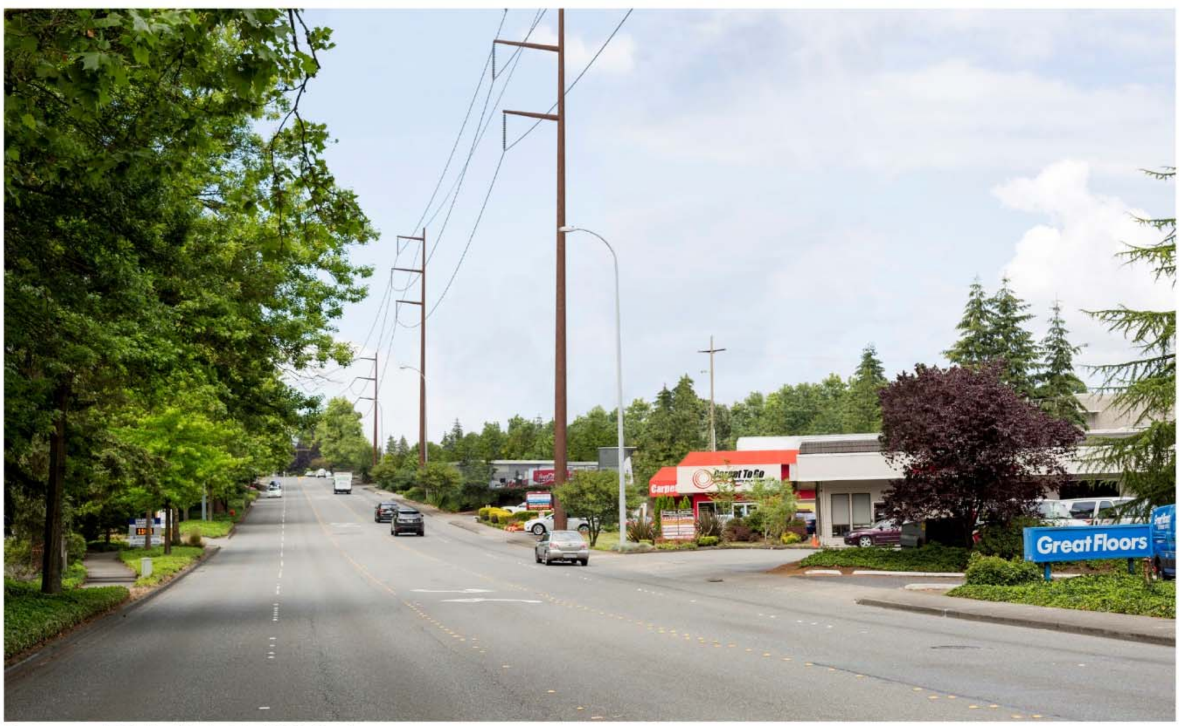
Bypass Option 1 would be located in a new corridor and would have a high degree of contrast with the existing aesthetic environment due to the introduction of new electrical infrastructure in the built environment and the amount of clearing that would be required. Viewer sensitivity would also be high because the new corridor would require the removal of, and prevent future planting of, street trees over 15 feet in height along streets in the Bel-Red Subarea. This would be inconsistent with the Bel-Red Subarea Plan in areas that are expected to have a high future population density (e.g., the Bel-Red Corridor). In addition, the view corridors of Lake Hills Connector, NE 5th Street, and NE 8th Street would be impacted. Impacts to the aesthetic environment would be significant.

Bypass Option 1 would impact scenic views, but the degree of obstruction of views would be minimal. Although there would be a moderate potential for scenic view impacts, the degree of view obstruction would be minimal due to the spacing of poles, width of the poles, and width of the wires. Therefore, impacts to scenic views would be less-than-significant.

- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would be greatest where vegetation is present because clearing within the new 30- to 55-foot wide easement would be required for the option. This clearing along the Lake Hills Connector, along with the contrast introduced by poles where there are currently no poles, would significantly impact the quality of the aesthetic environment. In general, the topography would reduce the visibility of the line uphill of the bypass route, but would not hide it completely from view. Contrast with the built environment would be higher than existing conditions because new poles would be introduced into the built environment that are taller than the surrounding low-rise buildings. The project would provide consistent form in that the same pole height and configuration would be used throughout the new corridor except where it rejoins with the existing corridor at the south end of the route, at the intersection of NE 20th Street and Northup Way, and where it goes under the existing SCL transmission lines (near the intersection of 124th Avenue NE and Bel-Red Road and southeast of the intersection of SE 8th Street and the Lake Hills Connector). These four areas would present a contrast to the built environment. However, the current SCL transmission line contrasts strongly with the surrounding built environment at 124th Avenue NE and Bel-Red Road (see Figure 3.2-6) and the natural environment surrounding the Lake Hills Connector. Therefore, even though the lattice towers adjacent to the PSE transmission line crossing would be raised by approximately 12 feet, it is unlikely that the change from existing conditions would be highly perceptible, except that the SCL pole type would be changed from a lattice tower to a monopole. Overall, impacts to the visual quality of the aesthetic environment surrounding Bypass Option 1 would be significant due to the high degree of contrast.
- **Scenic Views:** Bypass Option 1 has the potential to impact scenic views of downtown Bellevue from east of 120th Avenue NE and from the area bounded by Northup Way to the north, Bel-Red Road to the south, 132nd Avenue NE to the west, and approximately 136th Place NE to the east. However, the degree of scenic view obstruction is expected to be limited because of the presence of other obstructions (trees, buildings, etc.). Raising the SCL line where the project would cross it would require that the SCL poles on either side of the crossings be converted from the existing 130- to 145-foot lattice steel towers to 142- to 157-foot monopoles. This would occur immediately to the north and south of the Bel-Red crossing and the Lake Hills Connector crossing. The north crossing of the SCL line (near the intersection of 124th Avenue and Bel-Red Road) has a high likelihood of impacting scenic views because one of the neighboring parcels, the Spring District development, is zoned with a maximum building height of 150 feet. It is possible that views of the Cascades from two proposed Spring District office buildings (Block 16 and Block 24) would be impacted. Views from Block 24 would likely be obstructed by wires; however, views from Block 16 would also have the monopole in front of the north portion of the building. The remaining neighboring parcels surrounding the north crossing are zoned with maximum building heights of 45 feet or 70 feet, lower than the existing and proposed towers, so impacts are not expected. It is unlikely that scenic view impacts would occur at the south crossing of the SCL line (just south of the Lake Hills Connector) because the primary viewers would be drivers on the Lake Hills Connector and users of trails within the Woodridge Open Space, both of which are already beneath the lines and would remain so under the proposed change. Therefore, there would be no new scenic view obstruction. Overall, because of the limited extent of these impacts, the impacts to scenic views would be less-than-significant.

- **Viewer Sensitivity:** Sensitive viewers along Bypass Option 1 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. The presence of dense vegetation reduces the likelihood that the transmission line would be visible by users of Kelsey Creek Park. The new corridor would not directly cross any other recreational resources, except for the future Eastside Rail Corridor. According to the Eastside Rail Corridor Regional Trail Final Master Plan (King County, 2016), the Eastside Rail Corridor (ERC) will likely be the most heavily used trail corridor on the Eastside. Connecting the Eastside's largest communities and employment centers, it is expected that "*the trail would become part of the everyday experience for thousands of King County residents for commute trips, trips from home to school, and recreation*" (King County, 2016). A high number of viewers could be impacted by the project in the future. The project would be inconsistent with the Bel-Red Subarea Plan because it would require the removal of vegetation along approximately 0.8 mile of Bel-Red Road, 0.4 mile along 132nd Avenue NE, and 0.2 mile along NE 20th Street and would preclude the placement of street trees over 15 feet in height (see Figure 3.2-12). Plans for the Bel-Red Corridor involve redevelopment along the road and future Link Light Rail stations (such as the Spring District) for high-density employment and residential centers. As a result, the population density in that area would likely be classified as high in the future and a large number of residential viewers could be affected (City of Bellevue, 2011). The project would also be inconsistent with the Wilburton/NE 8th Street Subarea Plan because it would impact the following key views: (1) south from the Lake Hills Connector north of SE 8th Street, and (2) west from NE 5th Street and NE 8th Street on the ridge between 122nd Avenue NE and 123rd Place NE (see Figures 3.2-13 and 3.2-14). Viewer sensitivity along much of the option is high.

Existing Pole Height: N/A

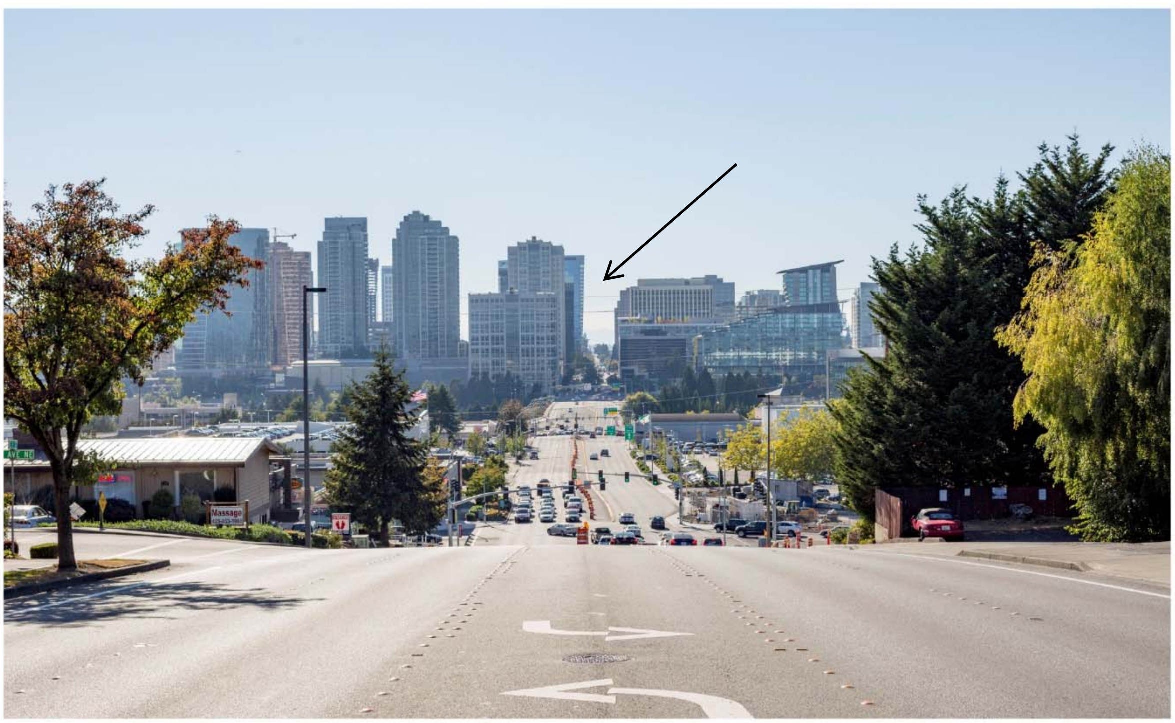


Proposed Pole Height: 120 feet

Note: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography, etc.
Source: Power Engineers, 2016

Figure 3.2-12. KVP 6, Existing and Proposed Conditions from Bel-Red Road Looking Southwest

Existing Pole Height: N/A



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, etc.
Source: Power Engineers, 2016

Figure 3.2-13. KVP 7, Existing and Proposed Conditions from NE 8th Street Looking West

Existing Pole Height: N/A

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, etc.
Source: Power Engineers, 2016

Figure 3.2-14. KVP 8, Existing and Proposed Conditions from Lake Hills Connector Looking East.

3.2.5.7 Bellevue Central Segment, Bypass Option 2

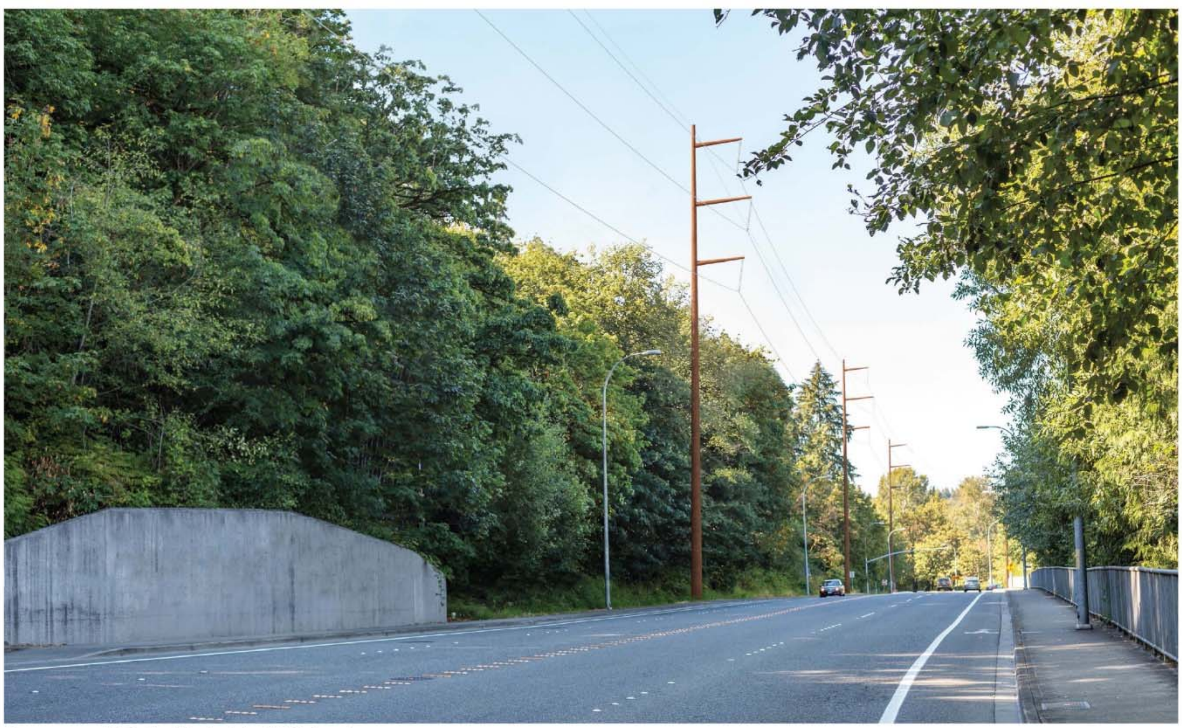
Similar to Bypass Option 1, Bypass Option 2 would be built in a new corridor and would have significant impacts to the aesthetic environment because of the high degree of contrast created by the addition of a new transmission line corridor and high viewer sensitivity.

Impacts to scenic views would be less-than-significant because although there would be a moderate potential for scenic view impacts, the degree of view obstruction would be minimal due to the spacing of poles, width of the poles, and width of the wires.

- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would be greatest where vegetation is cleared. Similar to Bypass Option 1, a new 20- to 30-foot wide easement would be required for the option, except for along SE 26th Street where a 30- to 55-foot easement would be required. Overall, impacts associated with Bypass Option 2 would be similar to those associated with Bypass Option 1. In addition to inconsistent height and form at the intersection of NE 20th Street and Northup Way and where both options would go under the existing SCL transmission lines, Bypass Option 2 would not provide consistent height and form at the intersections of Richards Road and SE 26th Street, and SE 26th Street and the existing corridor. Unlike Bypass Option 1, underbuild on SE 26th Street would be removed, which would decrease the clutter and potentially improve the visual quality along that portion of the option. Overall, impacts to the visual quality of the aesthetic environment surrounding Bypass Option 2 would be significant due to the high degree of contrast that the project would introduce.

- **Scenic Views:** Bypass Option 2 has the potential to impact scenic views of downtown Bellevue from east of 120th Avenue NE. However, the degree of scenic view obstruction is expected to be minor because of the presence of other obstructions (trees, buildings, etc.). Impacts from raising the SCL line would be similar to those described for Bypass Option 1. Impacts to scenic views would be less-than-significant.
- **Viewer Sensitivity**: Sensitive viewers along Bypass Option 2 are residential viewers and users of Kelsey Creek Park. The presence of dense vegetation reduces the likelihood that the transmission line would be visible from Kelsey Creek Park. A new pole would be placed near the Woodridge Trail trailhead, but it is not expected to negatively impact the natural setting for trail users because it would not be visible once trail users walk uphill into the Woodridge Open Space and are surrounded by dense vegetation (see Figure 3.2-15). The project would be inconsistent with the Bel-Red Subarea Plan because it would require the removal of vegetation along approximately 0.8 mile of Bel-Red Road and 0.2 mile along NE 20th Street, and would preclude the placement of street trees over 15 feet in height. Similar to Bypass Option 1, the population density along the Bel-Red Corridor would likely be classified as high in the future (City of Bellevue, 2011). The project would be inconsistent with the same key views in the Wilburton/ NE 8th Street Subarea Plan that were identified for Bypass Option 1. In addition, Bypass Option 2 would be inconsistent with the Richards Valley Subarea Plan because it would change the green and wooded character of the Richards Road corridor. Under Bypass Option 2, trees within 30 feet of the alignment would need to be cleared along Richards Road between the Lake Hills Connector and SE 26th Street (approximately 0.9 mile). The largest amount of tree removal would be required along the Woodridge Open Space, which would change the wooded character of Richards Road along that portion of the road (see Figure 3.2-15). Viewer sensitivity along much of the option is high.

Existing Pole Height: N/A



Proposed Pole Height: 110 feet

Note: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography, etc.
Source: Power Engineers, 2016

Figure 3.2-15. KVP 9, Existing and Proposed Conditions from Richards Road Looking North

3.2.5.8 Comparison of Bellevue Central Options

All options have the potential to impact scenic views and aesthetics. The potential impacts of the options for the Bellevue Central Segment to these resources are compared below (Table 3.2-5). In some instances, there is a moderate potential for scenic view impacts due to pole height and placement; however, because the degree of obstruction would be low due to pole spacing and line width, no significant scenic view impacts are anticipated under the any of the Bellevue Central Options. Because none of the options would result in significant adverse impacts to scenic views, the comparison below focuses on differences in impacts to the aesthetic environment.

In the Bellevue Central Segment, two of the three options (Bypass Options 1 and 2) would require the creation of a new transmission line in an area where such a corridor does not currently exist. As a result, these options would create a high degree of contrast by introducing new electrical infrastructure into the built environment and requiring substantial clearing. Both options would also be inconsistent with subarea plan policies (see Table 3.2-4), resulting in a high likelihood of viewer sensitivity to the change. Both bypass options would result in significant adverse impacts to the aesthetic environment; however, Bypass Option 2 would result in more significant impacts due to the tree removal required along Richards Road.

Table 3.2-5. Comparison of Bellevue Central Options

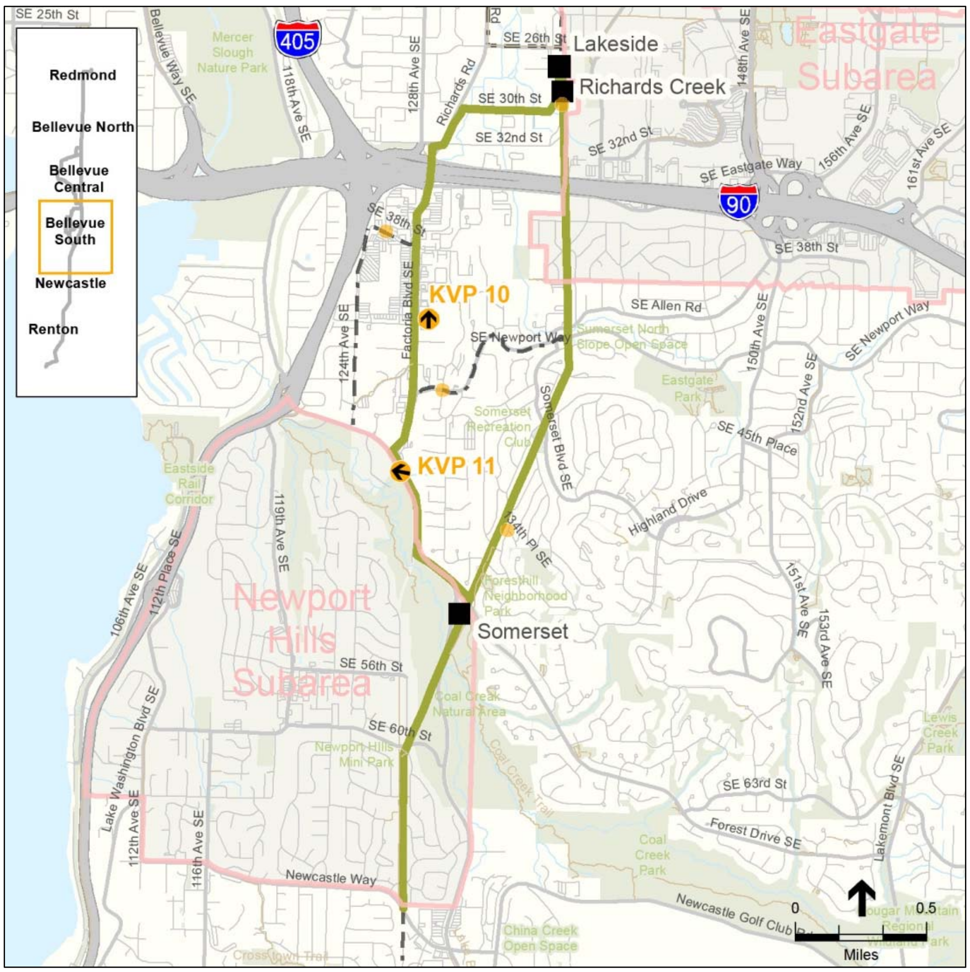
Scale:	Lower Potential for Impact	Moderate Potential for Impact	Higher Potential for Impact

Segment / Option	Impacts to Visual Quality of the Aesthetic Environment	Impacts to Scenic Views	Viewer Sensitivity
Existing Corridor Option	Low	Low	Low
Bypass Option 1	High	Moderate	High
Bypass Option 2	High	Moderate	High

3.2.5.9 Bellevue South Segment, Oak 1 Option

Portions of the Bellevue South Oak 1 Option would be in the existing corridor, and impacts to the aesthetic environment would be less-than-significant in those areas because of the low degree of contrast with existing conditions. The portions of the Oak 1 Option that would be in a new corridor would have a higher degree of contrast than in the existing corridor; however, because transmission line infrastructure is already present throughout the route, the project would not contrast greatly compared to existing conditions. There is a relatively high density of residential viewers along the new corridor, and there is the potential for some subarea plan inconsistency. Therefore, viewer sensitivity is moderate along this option. However, overall impacts to the aesthetic environment would be less-than-significant because of the low degree of contrast.

Impacts to scenic views would be less-than-significant because of the low degree of additional view obstruction.



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- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would occur where new clearings would be required. This includes along the following road locations where the typical easement width would be 35 feet (with a range of 30 to 55 feet): SE 30th Street, Factoria Boulevard SE, Richards Road, and Coal Creek Parkway. In general, the topography would limit the visibility of the line along the existing corridor. The flatter topography surrounding Factoria Boulevard SE would make that portion of the option more visible than in other portions (see Figure 3.2-16). Because transmission line infrastructure is already present throughout the route the project would not contrast greatly compared to existing conditions. Pole height would increase along Factoria Boulevard/Coal Creek Parkway by approximately 15 feet, and on SE 30th Street by approximately 20 feet. There would be no change in form within the existing corridor. However, along all of the other portions of the option route, pole configuration would change to various 230 kV configurations (see Chapter 2). The project would not provide consistent pole height and form throughout the option route although on any given right-of-way there would be consistent form and height. The areas where a change in pole form and height would occur include the substation locations (Richards Creek and Somerset) and at the intersection of the existing transmission corridor and SE 60th Street. The option would be in the line of sight for single-family residences directly abutting the corridor southeast of the ravine. However, the topography associated with corridor south of SE 60th Street would make the line more visible for houses located within a block of the corridor than other locations in the study area, so the change in pole height and form would have few viewers. Removal of the underbuild on Coal Creek Parkway and Factoria Boulevard SE would decrease the clutter and potentially improve the visual quality along that portion of the option route (see Figure 3.2-17). Overall, impacts to the visual quality of the aesthetic environment would be less-than-significant.
- **Scenic Views***:* Most of the scenic views are from the Somerset neighborhood and are of the Olympics, Lake Washington, and the Bellevue and Seattle skylines. There are also scenic views of downtown Seattle and the Olympics from multi-family residential housing off of Factoria Boulevard SE. Both areas are associated with a relatively high population density (see Appendix C). However, the degree of scenic view obstruction is expected to be low in the Somerset neighborhood because the existing transmission line would be unchanged. Impacts along Factoria Boulevard SE could be greater than under existing conditions because the new poles would be 15 feet taller. However, the presence of existing vegetation and other obstructions to scenic views reduces the potential for scenic view obstruction. Impacts to scenic views would be less-than-significant.
- **Viewer Sensitivity:** Sensitive viewers along this option route 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. The project would directly cross the Somerset Recreation Club, Forest Hill Neighborhood Park, Coal Creek Natural Area, and Newport Hills Mini Park. However, these crossings would be in areas where the recreational resources are already crossed by the existing transmission line corridor; therefore, the contrast would be low. Approximately eight trees would be removed near the Coal Creek to Forest Drive segment of the Lower Coal Creek Trail, and approximately 20 trees would be removed near the Coal Creek to SE 60th Street segment of the Lower Coal Creek Trail. In both instances, the tree removal would diminish the natural setting and would make Coal Creek Parkway more visible to trail users. Trees would need to be removed along Richards Road within 30 feet of the transmission line for approximately 550 feet between SE 30th Street and SE 32nd Street. This is not expected to impact the wooded character of Richards Road because the portion of the roadway where trees would be

removed comprises 7 percent of the roadway as a whole. Placement of higher poles in the existing corridor has the potential to impact views from adjacent single-family neighborhoods in the Eastgate Subarea. There is also the potential for inconsistency with the Newport Hills Subarea Plan, which emphasizes the protection of existing trees on slopes and hilltops. 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 Coal Creek to the degree that it would no longer be considered a “distinct visual element” (see Table 3.2-4). The option also traverses the Somerset neighborhood. The Somerset neighborhood has neighborhood covenants that protect views (i.e., the View Guideline for Somerset). 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. Per the methodology adapted for this analysis, the viewer sensitivity assessment should take into account customs along with other locally adopted guidance for aesthetic and viewer preferences. Therefore, incompatibility between the project and the neighborhood covenants is likely to result in increased viewer awareness of the impact (Section 3.2.3.3). 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). 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 spirit of the guideline is “to preserve the views of a residence, the way they were, when the house was built” (Somerset Community, 2016). (Note that, in context, “the view of a residence” refers to views that can be seen from a residence, rather views looking at the residence.) Under the Oak 1 Option, the existing 115 kV H-frame structures would remain within the existing transmission line corridor, and no visual changes to the Somerset neighborhood are anticipated. In general, viewer sensitivity is moderate.

Existing Pole Height: 80 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, etc.
Source: Power Engineers, 2016

Figure 3.2-16. KVP 10, Existing and Proposed Conditions from Factoria Boulevard SE Looking North

Existing Pole Height: 65 feet

Proposed Pole Height: 75-80 feet

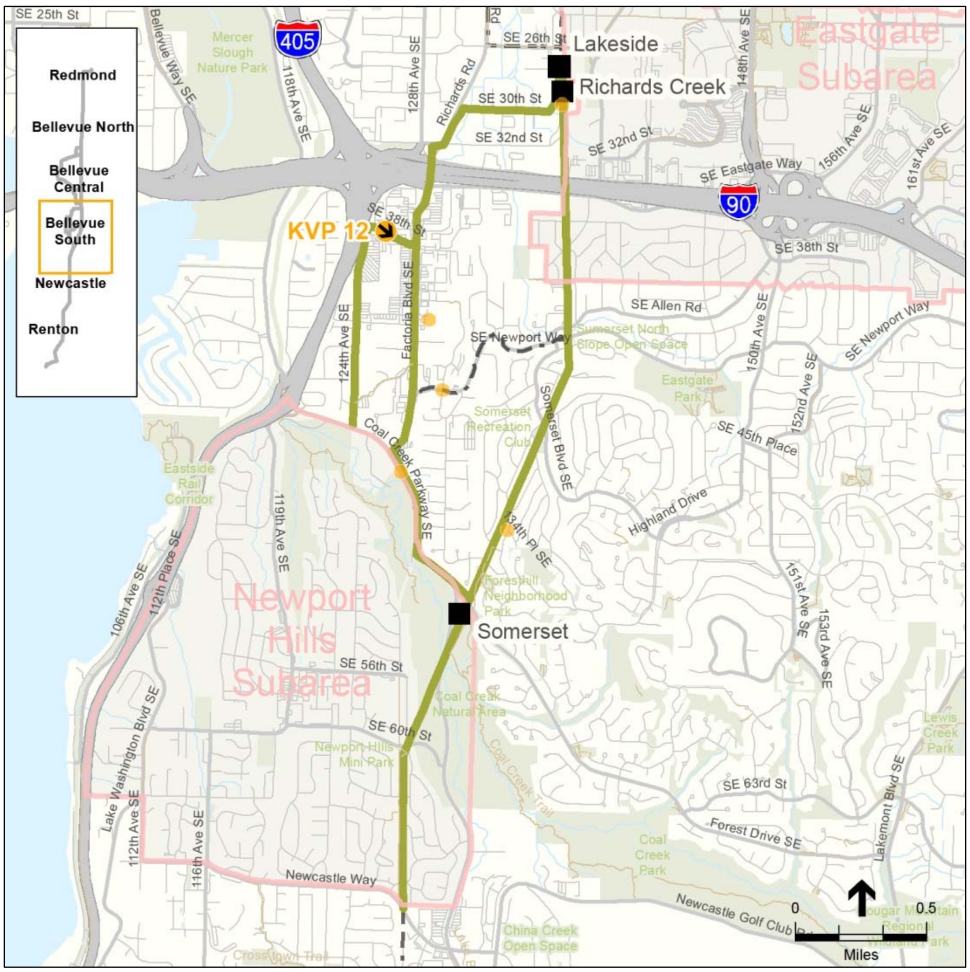
Note: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography, etc.
Source: Power Engineers, 2016

Figure 3.2-17. KVP 11, Existing and Proposed Conditions from Coal Creek Parkway Looking Northwest toward the Intersection with Factoria Boulevard SE

3.2.5.10 Bellevue South Segment, Oak 2 Option

Impacts of the Oak 2 Option on the aesthetic environment would be similar to the Oak 1 Option and would be less-than-significant because of the low degree of contrast with the existing aesthetic environment. Although the option would make changes within the Somerset neighborhood, an area with higher visual sensitivity, the degree of contrast would be low because the pole height would only increase by approximately 5 feet, the pole configuration would be the same as existing conditions (H-frame structures), and there would be only a single set of H-frames in the corridor, rather than two sets as at present. Even though viewer sensitivity is high in Somerset, the Oak 2 Option would not result in a substantial change in contrast and therefore would not result in significant adverse impacts.

Impacts to scenic views would be less-than-significant because there would be minimal additional view obstruction beyond existing conditions.



- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would occur where new clearings would be required along the following locations: (1) where the typical easement width would be 35 feet (with a range of 30 to 55 feet): SE 30th Street, Factoria Boulevard SE, Richards Road, and Coal Creek Parkway; and (2) where the typical easement width would be 10 feet (with a range of 5 to 25 feet): 124th Avenue SE and SE 38th Street. Contrast with the built environment would be more where new poles are placed (on SE 38th

Street and 124th Avenue SE) versus where transmission poles currently exist (see Figure 3.2-18). However, the SCL transmission line currently abuts 124th Avenue SE, so contrast there would be less. Pole height would increase along Factoria Boulevard SE/Coal Creek Parkway by approximately 15 feet, and on SE 30th Street by approximately 20 feet. Within the existing corridor, pole height would typically increase by 5 feet (the existing pole height is approximately 60 feet within the existing corridor). There would be no change in form within the existing corridor. However, along all of the other portions of the option route, pole configuration would change to various 230 kV configurations (see Chapter 2). Pole height and form would vary throughout the option route. The areas where a change in pole form and height would occur include the substation locations, the intersection of SE 38th Street and Factoria Boulevard SE, and at the intersection of the existing transmission corridor and SE 60th Street. Removal of the underbuild on Coal Creek Parkway and Factoria Boulevard SE would decrease visual clutter and potentially improve the visual quality along those portions of the option route. However, because the lines would still be 115 kV, there would be the potential for underbuild to be placed on the poles in the future. In addition, construction of a 115 kV line on 124th Avenue SE would allow for underbuild to be built in the future where it currently is not supported. This could result in increased visual clutter along 124th Avenue SE. Overall, impacts to the visual quality of the aesthetic environment would be less-than-significant.

- **Scenic Views***:* Most of the scenic views are from the Somerset neighborhood and are of the Olympics, Lake Washington, and the Bellevue and Seattle skylines. There are also scenic views of downtown Seattle and the Olympics from multi-family residential housing off of Factoria Boulevard SE. Both areas are associated with a relatively high population density (see Appendix C). However, the degree of scenic view obstruction is expected to be low in the Somerset neighborhood because there is an existing transmission line, and the new line would protrude approximately 5 feet higher than under existing conditions, which would not present a substantial visual change. Impacts could also occur along Factoria Boulevard SE because the new poles would be 15 feet taller than existing poles. However, the presence of existing vegetation and other obstructions to scenic views reduces the potential for scenic view obstruction. Impacts to scenic views would be less-than-significant.
- **Viewer Sensitivity:** Sensitive viewers along this option route are residential viewers and recreational users. Coal Creek Natural Area is the only recreational resource identified by the City as being used for its views or natural setting. Approximately eight trees would be removed near the Coal Creek to Forest Drive segment of the Lower Coal Creek Trail, and approximately 20 trees would be removed near the Coal Creek to SE 60th Street segment of the Lower Coal Creek Trail. In both instances, the tree removal would diminish the natural setting and would make Coal Creek Parkway more visible to trail users. Areas with a high population density include the Somerset neighborhood and the area east and west of Factoria Boulevard SE from approximately I-90 to SE Newport Way (east of Factoria Boulevard SE) and Coal Creek Parkway (west of Factoria Boulevard SE), and south of SE 60th Street to Newcastle Way. Trees would be removed along Richards Road within 30 feet of the transmission line for approximately 550 feet between SE 30th Street and SE 32nd Street. This is not expected to impact the wooded character of Richards Road because the portion of the roadway where trees would be removed comprises 7 percent of the roadway as a whole. The placement of higher poles in the existing corridor also has the potential to impact views from adjacent single-family neighborhoods in the Eastgate Subarea. There is the potential for inconsistency with the Newport Hills Subarea Plan, which emphasizes the protection of existing trees on slopes and hilltops. 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 Coal Creek to the degree that it would no longer be considered a “distinct visual element” (see Table 3.2-4). The Somerset neighborhood has neighborhood covenants that protect views (see the full explanation in Section 3.2.5.9), which suggests high viewer sensitivity in that area. Overall, viewer sensitivity is moderately high.

Existing Pole Height: N/A

Proposed Pole Height: 70 feet

Note: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography, etc.
Source: Power Engineers, 2016

Figure 3.2-18. KVP 12, Existing and Proposed Conditions from SE 38th Street Looking Southeast

3.2.5.11 Bellevue South Segment, Willow 1 Option

Contrast with the existing aesthetic environment would generally be low because the transmission line would be within the existing corridor. The exception to this is where the option would traverse the Somerset neighborhood. The Somerset neighborhood has covenants that impose height restrictions on trees and buildings, making the existing aesthetic environment within that neighborhood unique in this segment and among other neighborhoods in Bellevue that are affected by the project. As a result of these covenants, building and vegetation height is lower than other areas of the corridor, and the degree of contrast created by the taller poles is substantial. Viewer sensitivity is generally high along this option, 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 this option would mean that significant impacts to the visual quality are expected along the that portion of the Willow 1 Option.

Impacts to scenic views would be less-than-significant because only residents located approximately 200 to 400 feet to the east of the transmission corridor (along the portion that would traverse the Somerset neighborhood) would potentially experience scenic view impacts.

- **Visual Quality of the Aesthetic Environment:** The option would be fully located within the existing corridor; the corridor has been cleared and managed, and in most areas vegetation would not change substantially. In some portions of the residential areas north and south of the Coal Creek Natural Area, a substantial number of trees in the existing corridor have been identified for potential removal. However, because those areas have long been managed to keep the area clear, viewer sensitivity to 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 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. North of SE Newport Way and south of the Somerset substation, double-circuit 100-foot tall steel monopoles would be used. South of SE Newport Way to the Somerset substation, pairs of single-circuit, 85-foot tall monopoles would be used. Contrast with the built environment is expected to be less-than-significant, except for where the option would cross the Somerset neighborhood. Although the new transmission lines would be within an existing transmission corridor, and the height and form of the transmission line itself would be consistent through that area, there would be a substantial degree of contrast between the low-scale buildings and vegetation within the Somerset neighborhood (see Figure 3.2-19). 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 is more pronounced than in other areas along the segment where buildings and vegetation are taller.
- **Scenic Views:** Most of the scenic views 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). The degree of scenic view obstruction is expected to be higher in the Somerset neighborhood because the poles would protrude approximately 30 feet higher than under existing conditions. This would raise the lines out of the viewshed of some residential viewers and into the viewshed of others. However, only residents located approximately 200 to 400 feet to the east of the transmission corridor (along the portion that would traverse the Somerset neighborhood) would potentially experience scenic view impacts. Therefore, impacts overall would be less-than-significant.
- **Viewer Sensitivity:** Sensitive viewers along this option 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. Approximately 20 trees would be removed near the Coal Creek to SE 60th Street segment of the Lower Coal Creek Trail. In both instances, 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 and Somerset North Slope Open Space would be directly crossed by the project. Because these recreation areas are already traversed by a transmission line corridor, viewer sensitivity is lower for users entering the corridor. Sensitivity is expected to be high at the Somerset North Slope Open Space, where park users would view a higher degree of contrast as the new transmission line would change in height and form. The placement of higher poles in the existing corridor has the potential to impact views from adjacent single-family neighborhoods in the Eastgate Subarea. However, the increase in pole height (approximately 40 feet) would reduce 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 protection of existing trees on slopes and hilltops. 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 Coal Creek to the degree that it would no longer be considered a “distinct visual element” (see Table 3.2-4). The Somerset neighborhood has neighborhood covenants that restrict height to protect views from all residences (as explained above in Section 3.2.5.9). As such, viewer sensitivity to changes in the views from those residences is high. Overall, viewer sensitivity is moderately high, but it is high within the Somerset neighborhood.

Existing Pole Height: 44 feet

Proposed Pole Height: 85 feet

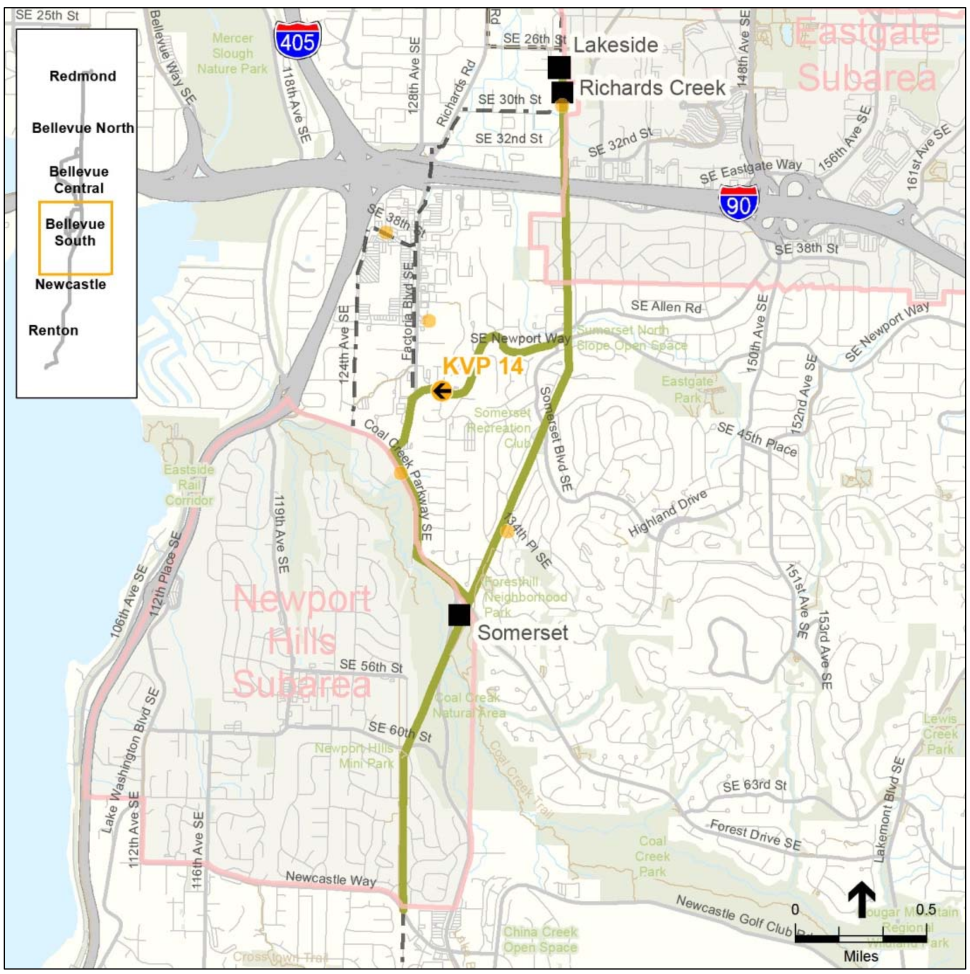
Note: Simulated pole heights are site-specific and may differ from the typical pole heights described in Chapter 2 due to topography, etc.
Source: Power Engineers, 2016

Figure 3.2-19. KVP 13, Existing and Proposed Conditions from Somerset Drive SE Looking West.

3.2.5.12 Bellevue South Segment, Willow 2 Option (PSE's Preferred Alignment)

Impacts of the Willow 2 Option on the aesthetic environment would be less-than-significant where it is within the existing corridor, similar to the impacts of the Willow 1 Option. The portion of the Willow 2 Option that is in a new corridor would contrast with the existing environment, but impacts are expected to be less-than-significant because electrical infrastructure is already present. Viewer sensitivity is generally high in the Coal Creek Natural Area, where vegetation would be removed, but would be less-than-significant because the removal is not extensive. Although the option would make changes within the Somerset neighborhood, an area with higher visual sensitivity, the degree of contrast would be low because the pole height would only increase by approximately 5 to 15 feet, the pole configuration would be the same as existing conditions (H-frame structures), and there would be only one set of H-frames rather than two as at present. Therefore, the Willow 2 Option would not result in substantial contrast with the existing aesthetic environment and would not result in significant adverse impacts.

Impacts to scenic views would be less-than-significant because there would be a low degree of additional view obstruction.



- **Visual Quality of the Aesthetic Environment:** Contrast with the natural environment would occur where new vegetation clearings would be required. This includes along SE Newport Way, Coal Creek Parkway, and Factoria Boulevard SE, where the typical easement width would be 20 feet (with a range of 20 to 30 feet). Contrast with the built environment would be more than existing conditions, but is not expected to be significant because electrical infrastructure is present within much of the new corridor. Pole height would increase within the existing corridor (40–50 feet taller north of SE Newport Way and between Somerset substation and SE 60th Street, 5–15 feet taller between SE Newport Way and Somerset Substation, and 20–35 feet taller south of SE 60th Street); along Newport Way SE (35–40 feet taller); and along Factoria Boulevard SE and Coal Creek Parkway (approximately 15 feet taller). The project would not provide consistent pole height and form throughout the option, but pole height would generally be consistent along each roadway. The areas where a change in pole form and height would occur include the substation locations, the intersection of Newport Way and the existing corridor, the intersection of Factoria Boulevard SE and Newport Way, the intersection of Factoria Boulevard SE and Coal Creek Parkway, and at the intersection of the existing corridor and SE 60th Street. At these locations, visual quality would be impacted but the impacts would be less-than-significant because of low viewer sensitivity due to existing infrastructure. Underbuild would be removed on Newport Way, Factoria Boulevard SE, and Coal Creek Parkway. This removal of the underbuild would decrease the clutter and potentially improve the visual quality along that portion of the option route (see Figure 3.2-20). However, because the new lines would also be 115 kV, there would be the potential for underbuild to be restrung to the new poles in the future, resulting in visual clutter.

- **Scenic Views:** Most of the scenic views are from the Somerset neighborhood and are of the Olympics, Lake Washington, and the Bellevue and Seattle skylines. There are also scenic views of downtown Seattle and the Olympics from multi-family residential housing off of Factoria Boulevard SE. This area has a relatively high population density (see Appendix C). However, the degree of scenic view obstruction is expected to be low in the Somerset neighborhood because the poles would protrude approximately 5–15 feet higher than under existing conditions, which is not a substantial visual change. Existing vegetation and other blockages reduce the potential for scenic view obstruction. Impacts to scenic views would be less-than-significant.
- **Viewer Sensitivity:** Sensitive viewers along this option route are residential viewers and users of the Coal Creek Natural Area. Approximately eight trees would be removed near the Coal Creek to Forest Drive segment of the Lower Coal Creek Trail and approximately 20 trees would be removed near the Coal Creek to SE 60th Street segment of the Lower Coal Creek Trail. In both instances, the tree removal would diminish the natural setting and would make Coal Creek Parkway more visible to trail users. Placement of higher poles in the existing corridor has the potential to impact views from adjacent single-family neighborhoods in the Eastgate Subarea. The increase in pole height (approximately 5–15 feet) would impact a limited degree of scenic views uphill from the transmission line, while residences abutting the existing corridor would have reduced view obstruction due to the wires being higher than their line of sight. There is the potential for inconsistency with the Newport Hills Subarea Plan, which emphasizes the protection of existing trees on slopes and hilltops. 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 Coal Creek to the degree that it would no longer be considered a "distinct visual element" (see Table 3.2-4). The Somerset neighborhood has neighborhood covenants that restrict height to protect views from all residences (as explained above in Section 3.2.5.9). As such, viewer sensitivity to changes in the views from those residences is high. Overall, viewer sensitivity for this option is moderately high.

Existing Pole Height: 40 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, etc.
Source: Power Engineers, 2016

Figure 3.2-20. KVP 14, Existing and Proposed Conditions from SE Newport Way Looking West

3.2.5.13 Comparison of Bellevue South Options

All of the Bellevue South Options have the potential to impact scenic views and aesthetics. The potential impacts of the options for the Bellevue South Segment to these resources are compared below (Table 3.2-6). However, the Willow 1 Option is the only option that would result in significant adverse impacts to scenic views or the aesthetic environment.

In some instances, there is a moderate potential for scenic view impacts due to pole height and placement; however, because the degree of obstruction would be low due to pole spacing and line width, no significant scenic view impacts are anticipated under the proposed project.

The Willow 1 Option would have significant impacts to the aesthetic environment in the Somerset neighborhood due to inconsistency, high viewer sensitivity due to view protection covenants (which are supportive of and consistent with the City of Bellevue's policy to protect distinctive neighborhood character), and a substantial change in contrast as a result of the project. All of the other options would have minor impacts to the aesthetic environment within the existing corridor. The portions of the Oak 1, Oak 2, and Willow 2 Options that would be in a new corridor would have a higher degree of contrast than in the existing corridor; however, because transmission line infrastructure is already present throughout the Oak 1 and Oak 2 Option routes, these options would not contrast greatly compared to existing conditions. The SE Newport Way portion of the Willow 2 Option has a greater potential for contrast than most other options for this segment because, while electrical infrastructure is present, the existing poles are not as tall as the proposed poles. Implementation of the Willow 2 Option would also result in the removal of underbuild, which would reduce visual clutter along SE Newport Way. However, because the new transmission lines would also be 115 kV, there would be the potential for underbuild to be restrung to the new poles in the future. After the Willow 1 Option, the Oak 1 Option would have the lowest potential for impacts to the aesthetic environment because less new corridor would be required and transmission infrastructure already exists where the new corridor would be constructed. Viewer sensitivity along all of the Bellevue South Options is moderate to high; however, due to the low to moderate potential for impacts to scenic views and the aesthetic environment in all portions except the Somerset neighborhood under the Willow 1 Option, significant impacts are not anticipated.

Table 3.2-6. Comparison of Bellevue South Options

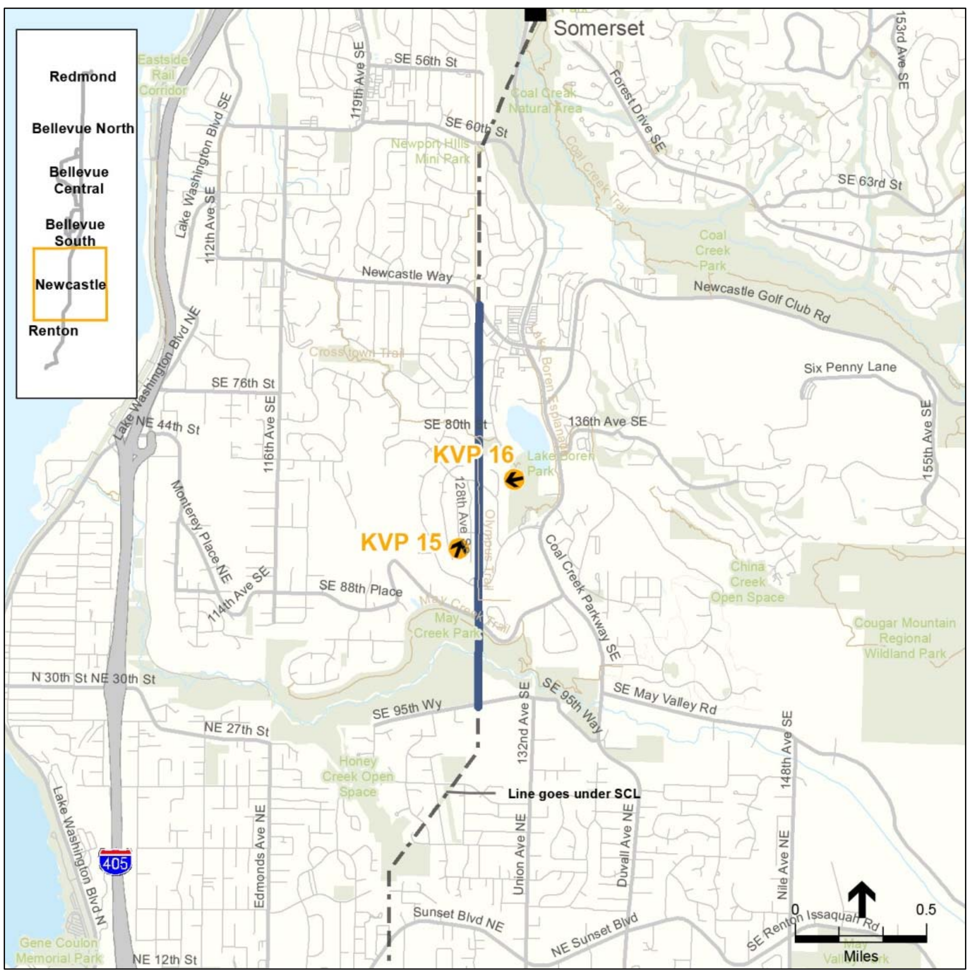
Scale:	Lower Potential for Impact	Moderate Potential for Impact	Higher Potential for Impact

Segment / Option	Impacts to Visual Quality of the Aesthetic Environment	Impacts to Scenic Views	Viewer Sensitivity
Oak 1 Option	Low	Low	Moderate
Oak 2 Option	Low	Low	Moderately High
Willow 1 Option	High	Moderate	High
Willow 2 Option	Low	Low	Moderately High

3.2.5.14 Newcastle Segment

North of the May Creek ravine, project impacts on the aesthetic environment of the Newcastle Segment would be significant. Although the proposed project would be placed in the existing transmission line corridor, the poles would be almost double the height (to approximately 100 feet) of the existing poles and would be closer to neighboring residences and residential streets. This, when coupled with placement of the project on the ridge, would make the new transmission line 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. However, the portion of the segment 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.



- **Visual Quality of the Aesthetic Environment:** In general, the poles and wires are more noticeable where the transmission line is on a ridge with low vegetation (e.g., the portion of the segment 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 100 feet) and would be placed farther from the center of the corridor than the existing poles, making them more visible from residential streets and less likely to be concealed by vegetation due to their proximity to residences. This, when coupled with the placement of the line on the top of a ridge, would result in the poles contrasting more with the surrounding houses and utility infrastructure due to the pronounced prominence of the transmission line. This would significantly change the residential character of the surrounding neighborhood as the transmission line would become a defining visual feature for the neighborhood (see Figure 3.2-21). Therefore, although transmission lines already exist in the corridor, and the new transmission line would have consistent height and form throughout the segment, the degree of contrast with the built environment would be significant within the residential portion of Newcastle. However, 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:** Most views from the Olympus neighborhood are of the Cascades, the Olympics, and in some places Mount Rainier. There is the potential for residential views of the Cascades, Cougar Mountain, and potentially Mount Rainier to be impacted, some of which could occur in places with high population density (see Appendix C). However, 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 Park, 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 is in the north portion of Newcastle, between Newcastle Way and SE 80th Way (see Appendix C). 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 the recently adopted 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 (City of Newcastle, 2016). From some vantage points, such as from Lake Boren Park, the distance from the line would diminish the perceptible differences in height and inconsistency with the surrounding built environment (see Figure 3.2-22). However, within the neighborhoods surrounding the transmission line, the new transmission line would become a defining visual feature and significantly change the residential character of the area (see Figure 3.2-21). Therefore, the project would be inconsistent with the Newcastle Comprehensive Plan.

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, etc.
Source: Power Engineers, 2016

Figure 3.2-21. KVP 15, Existing and Proposed Conditions from 128th Ave SE 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, etc.
Source: Power Engineers, 2016

Figure 3.2-22. KVP 16, Existing and Proposed Conditions from Lake Boren Park Looking Southwest

3.2.5.15 Renton Segment

Overall, impacts to the aesthetic environment from the Renton Segment would be less-than-significant. Although the poles would be 30 to 45 feet taller and larger in diameter than existing poles, the segment would be located within PSE's existing corridor, resulting in low contrast with existing conditions. Overall, viewer sensitivity is low because no policies specifically address aesthetic impacts from transmission lines, although general policies do address general aesthetic qualities and public views. Impacts to the aesthetic environment would be less-than-significant.

Impacts to scenic views would also 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 River. Near the creek and river, the poles would blend with the natural environment because they would have similar height and form as the abutting tree stands. Although the corridor width would not change, tree removal would be required, particularly on the upper slopes of the Cedar River ravine and within the Honey Creek ravine. None of the trees in the Cedar River ravine would need to be removed because the transmission line would be well above the tops of trees (as is the case with the existing line), and would meet PSE requirements (The Watershed Company, 2016). In general, the poles are more visible when the transmission line is located 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 3.2-23 and 3.2-24). Poles and wires are marginally visible from within ravines (such as the Cedar River ravine). This would continue to be the case under the project. Contrast with the built environment would be slightly more than existing conditions because the poles would be taller (30 feet taller than the existing poles north of Honey Creek, and 45 feet taller south of Honey Creek); the pole diameter would also be wider than existing poles, but the number of poles would be reduced. Changes to the built environment would be less-than-significant because transmission lines already exist in the corridor; however, they would be replaced with a new transmission line with a different height and form.

North of the Honey Creek ravine, the line would consist of paired single-circuit monopoles. South of Honey Creek the line would consist of double-circuit monopoles approximately 15 feet taller than the paired monopoles to the north. However, this change in project form and height would occur in an area with few viewers. 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 line. 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.

The project could require that the existing SCL transmission line be raised in two locations along this segment: one location just south of the intersection of 126th Avenue SE with NE 25th Street, and one location within the Cedar River ravine. The SCL pole type would be changed from a lattice tower to a monopole. The current SCL transmission line contrasts strongly with the surrounding built environment at 126th Avenue SE and NE 25th Street and the natural environment surrounding the Cedar River ravine. Therefore, even though the towers adjacent to the PSE transmission line crossing would be approximately 12 feet taller, it is unlikely the change would be highly perceptible, except the change in pole type. In general, visual clutter would be reduced due to the reduction in the number of poles. 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 in Liberty Ridge and on Talbot Hill (areas with medium to low population density). The only public recreation site from which scenic views have the potential to be impacted is along the Cedar River Trail. However, changes to the existing corridor are not expected to result in significant impacts. The height and location of the proposed poles and transmission line would not obscure views of the Cedar River from the trail. Raising the SCL poles immediately to the north and south of the crossings with the project is not expected to obscure scenic views. The crossing to the north would be in a flat location surrounded by single-family residences, and therefore the lines would continue to be overhead. The crossing within the Cedar River ravine would also not have significant impacts because it is surrounded by tall, dense vegetation. Impacts to scenic views would be less-than-significant.

Viewer Sensitivity*:* Primary viewers are residential viewers and recreational users of the Cedar River Park, Cedar River Trail, Honey Creek Open Space, Philip Arnold Park, and Riverview Park. No new poles would be placed within these parks, so changes to the aesthetics for these viewers would be associated with any clearing or changes in the height and appearance of the transmission line. The height of the poles would be 30 to 45 feet taller than existing poles, but not noticeable because they would be 500 to 1,200 feet away from these parks and behind vegetation. No clearing would be required where the project crosses the Cedar River Park, Cedar River Trail, and Riverview Park because the topography of the Cedar River ravine provides sufficient clearance between the lines and the vegetation below. Figure 3.2-25 shows the appearance of the 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 3.2-25) (also see Appendix C, 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, 2015a). Changes to the appearance of those features would be minor because an existing corridor would be used (see Figure 3.2-24). In general, viewer sensitivity 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, etc.
Source: Power Engineers, 2016

Figure 3.2-23. KVP 17, Existing and Proposed Conditions from Monroe Avenue Looking North

Existing Pole Height: 50-70 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, etc.
Source: Power Engineers, 2016

Figure 3.2-24. KVP 18, 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 3.2-25. Existing Views from the Cedar River Trail

3.2.6 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. 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. Conversely, 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.

3.2.6.1 Regulatory Requirements

All of the segments and options within the City of Bellevue would need to meet the following regulations.(Note: the cities of Redmond, Newcastle, 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.) These regulations provide 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 presented below based on the stage when they would be applied. Each jurisdiction's discretionary decision-making will be informed by the analysis and comparison of options presented above, in the context of the alternatives analysis required under SEPA and comparison of other impacts for options under review. The following would be required to incorporate in the design prior to construction.

Prior to Construction

- Design and align new or expanded utility systems to minimize impacts to natural systems and features and minimize grading within the shoreline (City of Bellevue LUC 20.25E.070).
- Within the shoreline environment, co-locate underground new or expanded utility systems within existing or planned improved rights-of-way, driveways, and/or utility corridors whenever possible (City of Bellevue LUC 20.25E.070).
- Sight-screen electrical utility facilities through landscaping and fencing (BCC 20.20.255).
- Within the shoreline environment, where the visual quality of the shoreline or surrounding neighborhood will be negatively impacted, new or expanded utility systems and facilities should incorporate screening and landscaping sufficient to maintain the shoreline aesthetic quality (City of Bellevue LUC 20.25E.070).

3.2.6.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on City of Bellevue and City of Newcastle's comprehensive plans. (Note: plans and policies of the cities of Redmond and Renton do not directly address mitigation of impacts to scenic views or the aesthetic environment that would be produced by this project. However, 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. Additional mitigation measures are also proposed by the EIS Consultant Team based on their ability to reduce contrast.

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).
- 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 patina) to reduce contrast with the surrounding environment.

During Construction

- 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 screening of above-ground utility facilities to diminish visual impacts (City of Newcastle Plan Policy UT-P20).

3.3 WATER RESOURCES

This section provides a project-level analysis of potential impacts to 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 3.3-1. More detailed maps of the streams, rivers, and wetlands in the study area are included in Section 3.3.5.

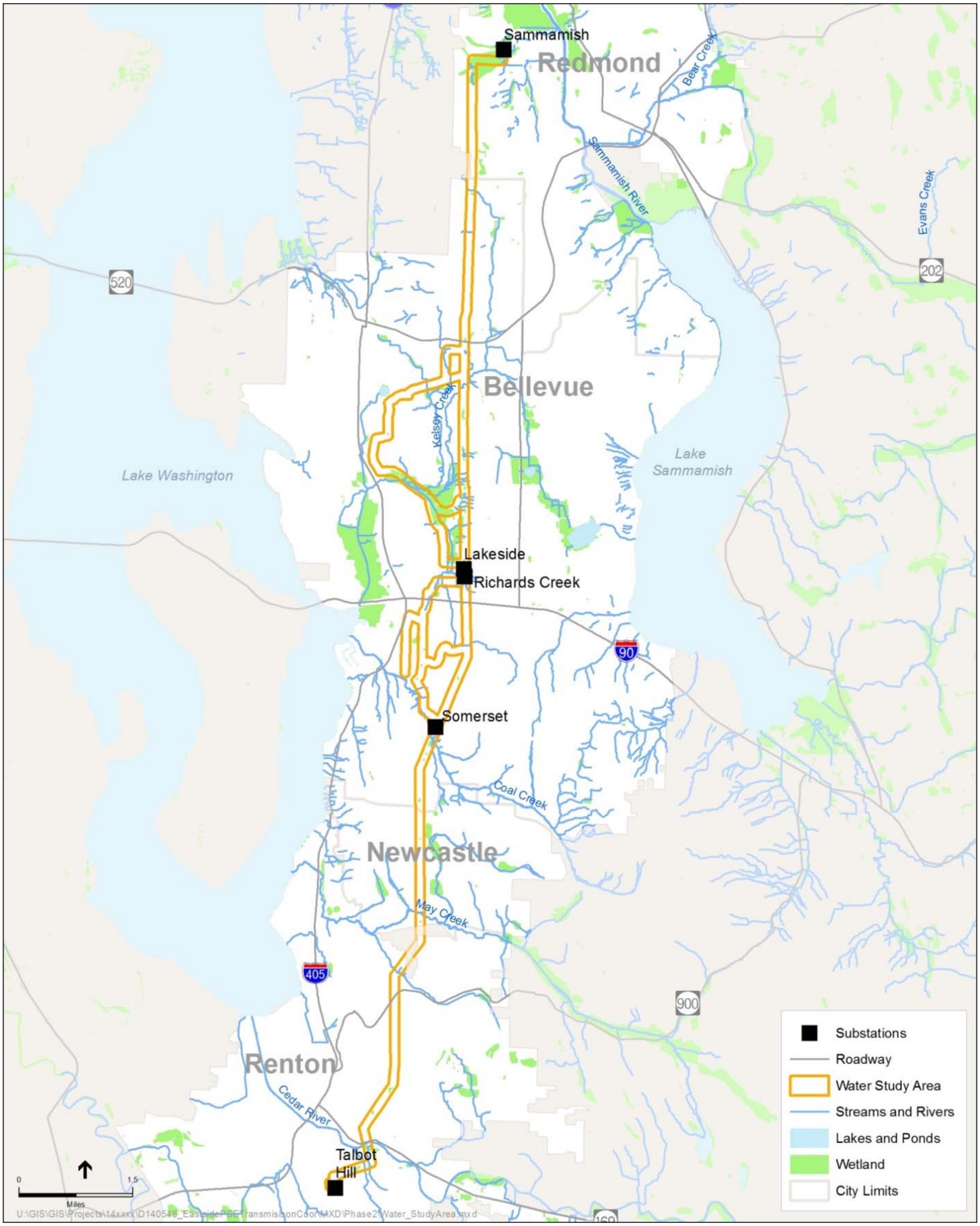
Methods for Studying the Affected Environment

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.

Water resources within the study area were assessed primarily using the critical areas delineation reports prepared by The Watershed Company for PSE for the Energize Eastside project (The Watershed Company, 2016). 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.
- USDA Natural Resources Conservation Service (NRCS) soil maps.
- Washington Department of Fish and Wildlife (WDFW) interactive mapping programs (PHS on the Web and SalmonScape).
- 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 for the study area.
- Project-specific technical reports for critical areas within the study area (The Watershed Company, 2016; Geoengineers, 2016).
- Aerial imagery.

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, 2010; Kirkland, 2015; Redmond, 2015; Sammamish, 2015; Issaquah, 2015; Newcastle, 2015; Renton, 2015; Bellevue, 2015.

Figure 3.3-1. Water Resources in the Study Area

3.3.1 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).

Any impacts to 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.

3.3.2 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, segment, and option. 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 to floodplains are not described further.

3.3.2.1 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 King County, 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 3.1 and Appendix B for additional discussion of the Shoreline Master Programs).

Table 3.3-1 summarizes the streams within the existing and new corridors for each segment and option, 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). The table uses the same naming convention as The Watershed Company report for unnamed tributaries.

Table 3.3-1. Streams in the Study Area

Stream	Stream Type[1]	Required Buffer (feet)
Richards Creek Substation Site – Several streams occur in the vicinity of the Richards Creek substation site, including East Creek, Streams C and JB01, and smaller unnamed tributaries. Stream C flows along the west edge of the site and is crossed by the existing access road. Stream JB01, located on the southeast side of the site, is the upstream segment of Stream C.		
East Creek	F-Type	100
Stream C	F-Type	100
Stream JB01	F-Type	100
Unnamed tributaries of Richards Creek[2]	F-Type	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.		
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	N-Type	50
Bellevue Central Segment, 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	F-Type	100
Kelsey Creek tributaries EB02 to EB05, EB10, EB11	N-Type	25
Kelsey Creek tributaries EB9, EB12 to EB14	N-Type	50
East Creek	F-Type[2]	100
Other Richards Creek tributaries	F-Type[2]	100

Stream	Stream Type[1]	Required Buffer (feet)
Bellevue Central Segment, Bypass Option 1 – The Bypass 1 Option is located mostly in the Kelsey Creek drainage with a small portion in the Richards Creek drainage. This option parallels the shoreline jurisdiction of Kelsey Creek.		
Goff Creek	F-Type	100
Kelsey Creek (Shoreline)	F-Type	100
West tributary of Kelsey Creek	F-Type[2]	50
Wilburton tributary of Kelsey Creek	F-Type	100
Richards Creek	F-Type	50
Four unnamed streams	F-Type	100
Bellevue Central Segment, Bypass Option 2 – Similar to the Bypass 1 Option, the Bypass 2 Option is located mostly in the Kelsey Creek drainage. This option parallels the shoreline jurisdiction of Kelsey Creek and also parallels Richards Creek.		
Goff Creek	F-Type	100
Kelsey Creek (Shoreline)	F-Type	100
West tributary of Kelsey Creek	F-Type	50
Wilburton tributary of Kelsey Creek	F-Type	100
Richards Creek	F-Type	50
East Creek	F-Type	100
Bellevue South Segment, Oak 1 Option - The Oak 1 Option crosses the tributaries of East Creek; Sunset, Richards, and Coal creeks; and unnamed tributaries of Coal Creek.		
Two unnamed tributaries of East Creek	F-Type	50
One unnamed tributary of East Creek	O-Type	25
Sunset Creek	F-type	50
Richards Creek	F-type	50
Coal Creek	F-Type	100
Two unnamed tributaries of Coal Creek	N-Type	25

Stream	Stream Type[1]	Required Buffer (feet)
Bellevue South Segment, Oak 2 Option - The same streams are located in the Oak 2 Option as in the Oak 1 Option. No streams are located along the portion of the Oak 2 Option that differs from the Oak 1 Option.		
Two unnamed tributaries of East Creek	F-Type	50
One unnamed tributary of East Creek	O-Type	25
Sunset Creek	F-Type	50
Richards Creek	F-Type	50
Coal Creek	F-Type	100
Two unnamed tributaries of Coal Creek	N-Type	25
Bellevue South Segment, Willow 1 Option - The Willow 1 Option crosses unnamed tributaries of East Creek and Sunset and Coal creeks.		
Two unnamed tributaries of East Creek	F-Type	50
One unnamed tributary of East Creek	O-Type	25
Sunset Creek	F-Type	50
Coal Creek	F-Type	100
Bellevue South Segment, Willow 2 Option - The north portion of the Willow 2 Option crosses the same streams as the Willow 1 Option, but also crosses unnamed tributaries of Coal Creek.		
Two unnamed tributaries of East Creek	F-Type	50
One unnamed tributary of East Creek	O-Type	25
Sunset Creek	F-Type	50
Coal Creek	F-Type	100
Two unnamed tributaries of Coal Creek	N-Type	50
Newcastle Segment - The Newcastle Segment crosses May Creek and a small seasonal drainage that flows to Lake Boren.		
Unnamed stream MN01	Type Ns	25
May Creek	Type F	100

Stream	Stream Type[1]	Required Buffer (feet)
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.

[2] These streams were not delineated or classified by The Watershed Company. For this analysis, the streams are classified as Type F and assigned a 100-foot buffer except the West Tributary to Kelsey Creek, which is assigned a 50-foot buffer in LUC 20.2H.075. All streams along the selected alignment will be delineated, and classifications and buffers will be developed as part of the permitting process.

Source: The Watershed Company, 2016.

3.3.2.2 Wetlands

Wetlands in the study area were delineated as part of the critical areas assessments conducted by The Watershed Company in 2016. The Watershed Company delineated wetlands generally 25 feet on either side of the existing and new corridors. In some areas, a wider study area was used based on conditions at the site.

Table 3.3-2 summarizes the wetlands within the existing and new corridors for each segment and option, 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). The table uses the same naming convention for wetlands as The Watershed Company report.

Table 3.3-2. Wetlands in the Study Area

Wetland	Wetland Category[1]	Required Buffer (feet)
Richards Creek Substation - Wetland BC is located to the north and west of the Richards Creek substation site. Wetlands FG and JB01 are located on the south side of the site.		
Wetlands BC, FG	Category III	110
Wetland JB01	Category III	60

Wetland	Wetland Category[1]	Required Buffer (feet)
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, 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]
Bellevue Central Segment, Bypass Option 1 - Most of the wetlands along Bypass Option 1 are associated directly or indirectly with streams, with the largest wetlands associated with the larger streams (i.e., Kelsey and Richards creeks). Five of these wetlands are Category I. Several wetlands are associated with roadside ditches, and most of the rest are adjacent to small non-fish bearing streams and ditches.		
Wetlands BpB04, BpB10, BpB12, BpB14, BpB16	Category I	225
Wetlands BpB03, BpB05, BpB06, BpB07, BpB08, BpB09, BpB11, BpB15	Category II[3]	225
Wetlands EB17, BC	Category III	110
Wetlands EB13, EB15, EB16, EB19, EB20, EE	Category III	60
Wetlands EB12	Category IV	40
Wetlands EB14, EB18	Category IV	--[2]

Wetland	Wetland Category[1]	Required Buffer (feet)
Bellevue Central Segment, Bypass Option 2 – Twenty of the 25 wetlands along Bypass Option 2 are in the shared alignment (of the new corridor) with Bypass Option 1. These wetlands include some of the largest wetlands along the corridor, typically associated with Kelsey and Richards creeks. Six of these wetlands are Category I. Most of the other wetlands are small wetlands associated with roadside ditches and small streams.		
Wetlands BpB04, BpB10, BpB12, BpB14, BpB16, BpB23	Category I	225
Wetlands BpB03, BpB05, BpB06, BpB07, BpB08, BpB09, BpB11, BpB15, BpB20, BpB21, BpB22	Category II[3]	225
Wetlands EB17, BC	Category III	110
Wetlands EB15, EB16, EB19, EB20, EE	Category III	60
Wetland EB18	Category IV	--[2]
Bellevue South Segment Oak 1 Option - The 18 wetlands identified along the Oak 1 Option are primarily along Coal Creek, although one small wetland is just south of I-90, and two others are near the south end of the option. These wetlands are associated with small streams that cross Coal Creek Parkway or roadside ditches, although several are associated with Kelsey and Richards creeks. With the exception of the large wetland complexes associated with East, Richards, and Coal creeks, the wetlands along the route are small.		
Wetlands G2B01	Category II	75
Wetlands FG, BC	Category III	110
Wetlands JB01 JB08, MB01	Category III	60
Wetlands JB05, MB04,	Category IV	40
Wetlands JB02, JB03, JB04, JB06, JB07, MB02, MB03, IB01, IB02, IB03, IB04	Category IV	--[2]
Bellevue South Segment, Oak 2 Option - The Oak 2 Option wetlands are the same as those described above for the Oak 1 Option. No wetlands are located along the portion of the Oak 2 Option that differs from the Oak 1 Option.		
Wetland G2B01	Category II	75
Wetlands FG, BC	Category III	110
Wetlands JB01, JB08, MB01	Category III	60
Wetlands JB05, MB04	Category IV	40
Wetlands JB02, JB03, JB04, JB06, JB07, MB02, MB03, IB01, IB02, IB03, IB04	Category IV	--[2]

Wetland	Wetland Category[1]	Required Buffer (feet)
Bellevue South Segment, Willow 1 Option - Fourteen wetlands were identified along the Bellevue South Segment, Willow 1 Option. These wetlands are associated with small streams crossing the existing corridor, as well as several larger wetland complexes associated with East and Coal creeks.		
Wetlands FG, BC, JB01	Category III	110
WetlandsJB08, MB01	Category III	60
Wetlands MB04, JB05	Category IV	40
Wetlands JB02, JB03, JB04, JB06, JB07, MB02, MB03	Category IV	--[2]
Bellevue South Segment, Willow 2 Option - The Willow 2 Option wetlands are similar to those described above for the Willow 1 Option. Two additional wetlands are located along the Coal Creek Parkway.		
Wetlands FG, BC, JB01	Category III	110
Wetlands JB08, MB01	Category III	60
Wetlands MB04, JB05	Category IV	40
Wetlands JB02, JB03, JB04, JB06, JB07, MB02, MB03, IB03, IB04	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 IV	40
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 categorized as Category I, II, III, and IV based on the 2014 Ecology Wetland Rating System (Hruby, 2014) (Bellevue's classification is based on the 2004 version [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] These wetlands were identified through reconnaissance only and were not delineated by The Watershed Company. For this analysis, the wetlands are classified as Category II and assigned a 225-foot buffer. All wetlands along the selected route will be delineated, and classifications and buffers will be developed as part of the permitting process.

Source: The Watershed Company, 2016.

3.3.2.3 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.

3.3.3 Long-term (Operation) Impacts Considered

Potential long-term impacts to 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 to 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 to 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 to 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 to 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.

3.3.4 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 to water resources. Environmental requirements regarding the protection of these resources would apply to PSE's activities. No Action Alternative activities would be limited in scale and frequency, typically consisting of periodic vegetation maintenance activities along the existing transmission line corridor. These 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. These activities would not have a significant impact on stormwater runoff, surface water quality or quantity, or groundwater.

3.3.5 Long-term Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

3.3.5.1 Impacts Common to all Components

In general, long-term impacts to water resources would be less-than-significant. 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. Although the preliminary design indicates that some poles could be located in streams, 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. This analysis assumes that any poles proposed near streams would be located within stream buffers and not the stream bed. Similarly, PSE would move poles to avoid locating them in wetlands to the extent feasible. However, in some places it may not be possible to avoid putting new poles in wetlands. PSE would not locate permanent access roads in wetlands. Any poles in wetlands or buffers would require compliance with the Partner Cities' critical areas and shoreline management ordinances, which require avoidance and mitigation. The size of disturbance and the permanent reduction in wetland or buffer acreage would be small (generally less than 25 square feet per pole). 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 3.4, *Plants and Animals*.

The new 230 kV transmission lines would require tree removal along the existing and new corridors. As described in detail in Section 3.4.1.3, *Plants and Animals*, PSE's vegetation management plan 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 to 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. 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 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.

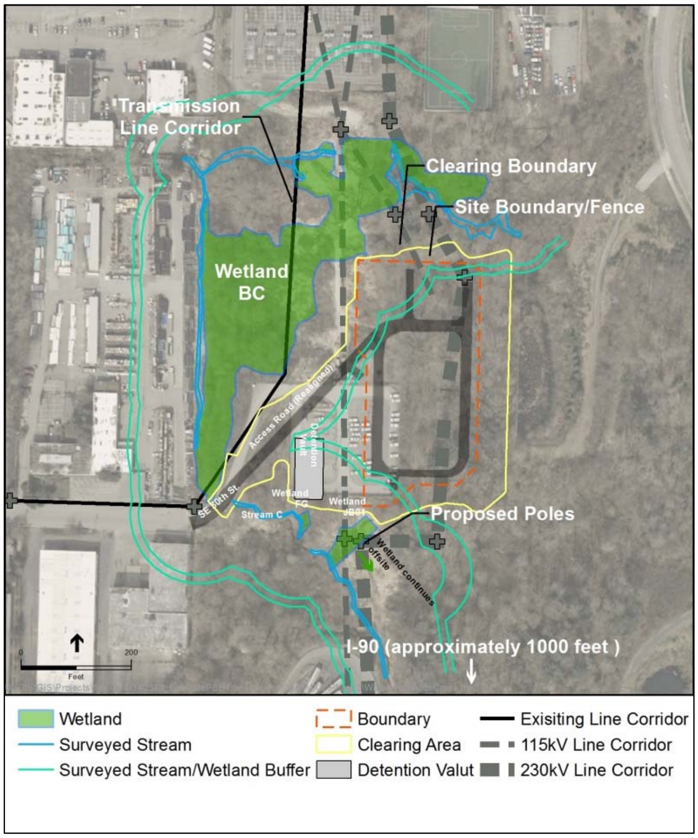
Once installed, poles would not affect stormwater runoff, groundwater infiltration, or shallow groundwater flow. The new poles would be steel and would not generate substances that could contaminate surface or groundwater (except for some wood poles on a portion of the Oak 2 Option). Where old poles 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 303d 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 303d listings. Avoiding tree removal by pruning or topping trees in compliance with critical areas regulations would help maintain shading and reduce temperature increases.

3.3.5.2 New Richards Creek Substation

The Richards Creek substation would be sited to avoid the wetlands and streams on-site to the extent possible. A large wetland (Wetland BC) is on the north and west side of the site, and Stream C is west and south of the site. Wetlands FG and JBO1 and Stream JB01 are southeast of the property. None of the facilities would be in Wetland BC, but the realigned access road and the north portion of the substation, including a large cleared area, would be within its 110-foot buffer (see Figure 2.1-1). The access road would cross Stream C, requiring a new culvert. Impacts to Stream C would be mitigated through compliance with City of Bellevue Critical Areas Ordinance standards for stream crossings and restoration (see Appendix D). The stormwater detention vault would be in the buffers for Wetland BC and Stream C. Two poles would be in Wetland JB01 or its buffer. Impacts to the wetlands and buffers would be mitigated in compliance with City of Bellevue requirements, which include on-site buffer enhancement. According to The Watershed Company (2016), Wetland BC and its buffer are currently degraded, and there is potential for mitigation and enhancement on the site (The Watershed Company, 2016).

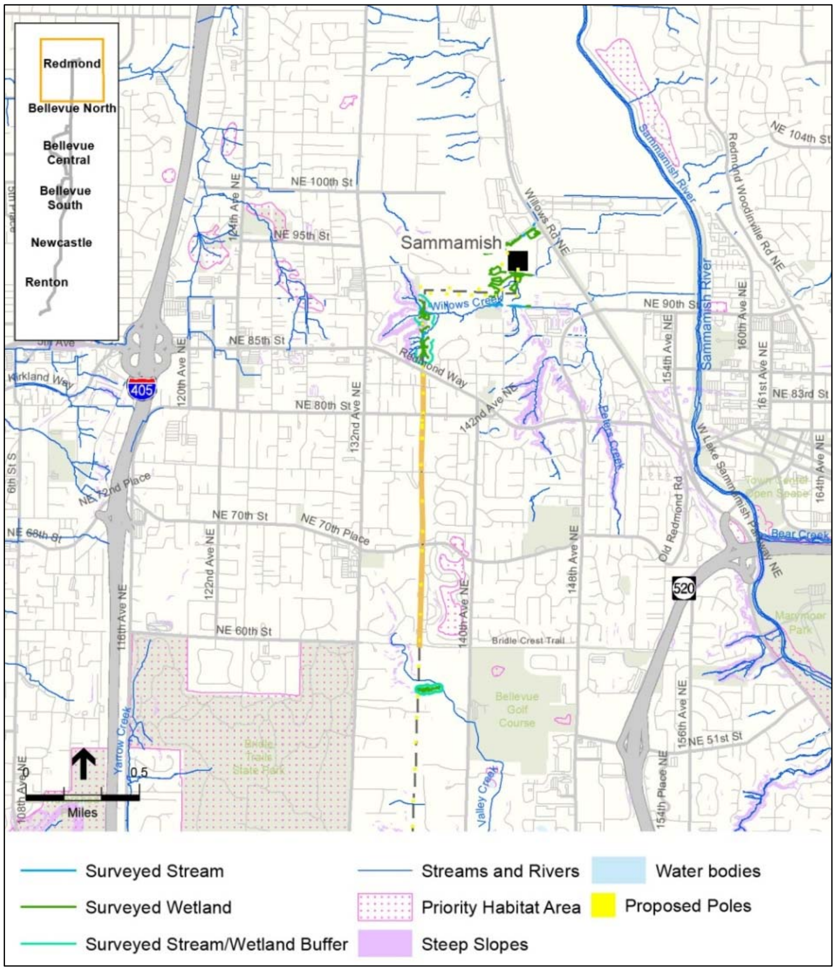
Some of the site is currently covered with gravel, which is typically considered an impervious surface by regulatory agencies. The majority of the 2-acre site would be covered with gravel to prevent water from ponding near the transformers and other facilities. The gravel areas would not be pollution-generating 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 to 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.
- **Wetlands and Buffers**. The new substation would impact the buffer of Wetland BC, but required mitigation would protect the wetland functions and values. Impacts would be less-than-significant.

3.3.5.3 Redmond Segment

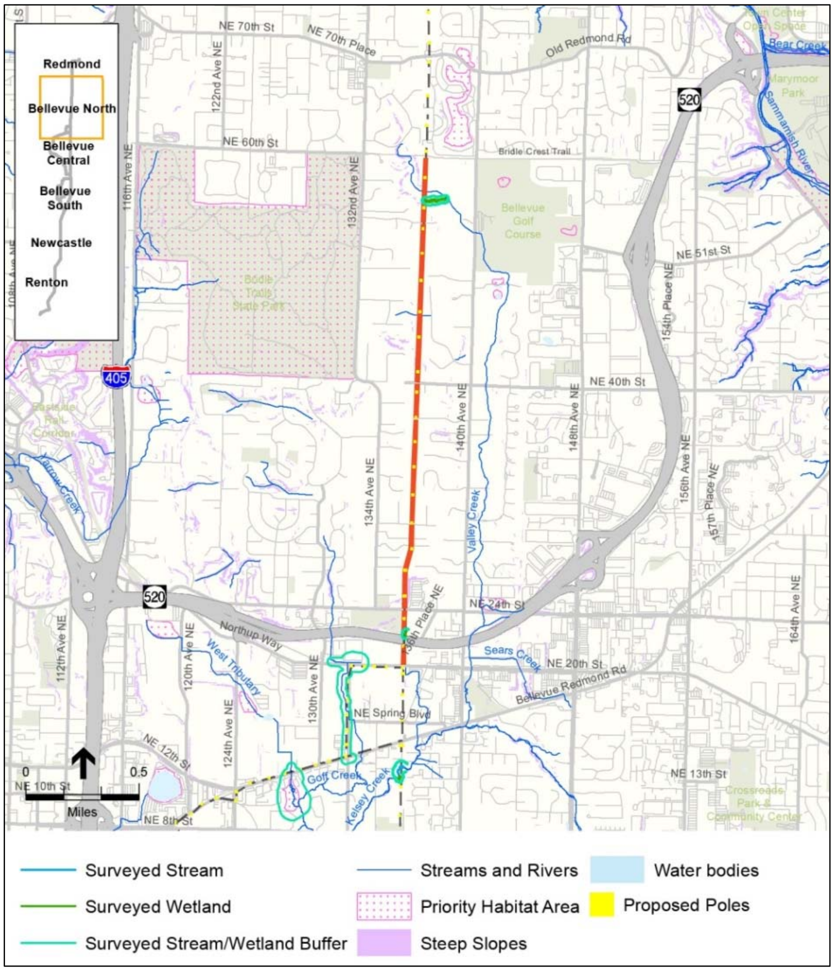
In general, impacts to water resources would be less-than-significant along this segment because it follows the existing corridor and would cause only minor alterations to or disturbances of water resources.



- **Streams and Buffers.** The transmission line would continue to cross Willows Creek and its tributaries, but the crossings would not cause long-term impacts to the streams or buffers.
- **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 to 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.

3.3.5.4 *Bellevue North Segment*

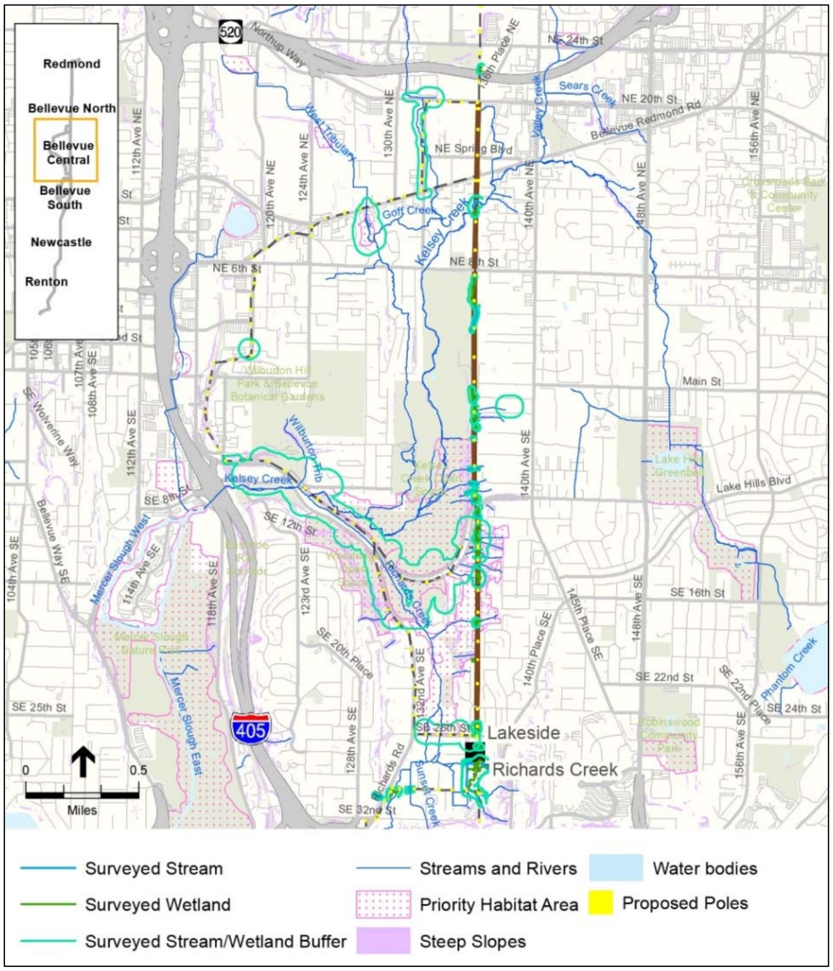
In general, impacts to water resources would be less-than-significant along this segment because it follows the existing corridor and would cause only minor alterations to or disturbances of water resources.



- **Streams and Buffers.** None of the poles would be in 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.

3.3.5.5 Bellevue Central Segment, Existing Corridor Option

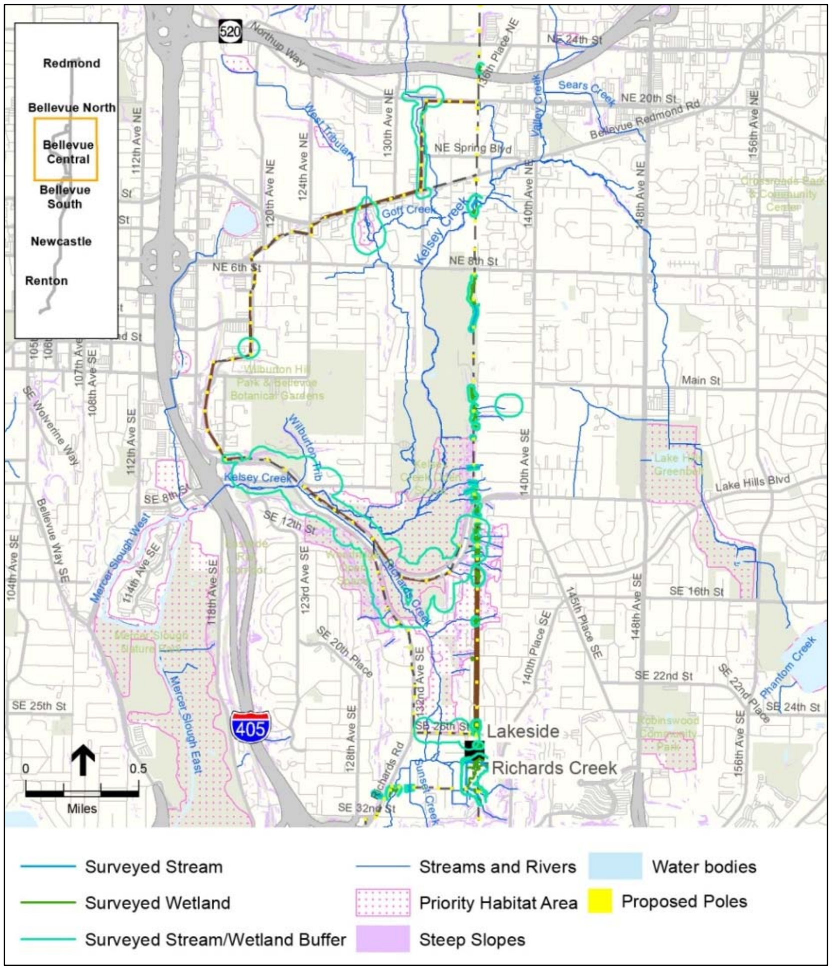
Impacts to water resources would be less-than-significant along this option because it follows the existing corridor and would cause only minor alterations to or disturbances of water resources.



- **Streams and Buffers.** None of the poles would be in stream buffers, so no impacts would occur.
- **Wetlands and Buffers**. All of the wetlands along this option are Category III or IV with relatively small buffers. Some of the Category IV wetlands are too small to be regulated. The existing three poles in wetlands would be reduced to two with this option. Replacing the poles would cause a minor reduction in wetland acreage that would be mitigated in accordance with permit requirements. Therefore, there would be no long-term impact to wetlands. The number of poles in buffers would be reduced from 14 to six, resulting in beneficial impacts.
- **Shorelines.** The Existing Corridor Option is outside the Kelsey Creek shoreline jurisdiction, so no impacts would occur.

3.3.5.6 Bellevue Central Segment, Bypass Option 1

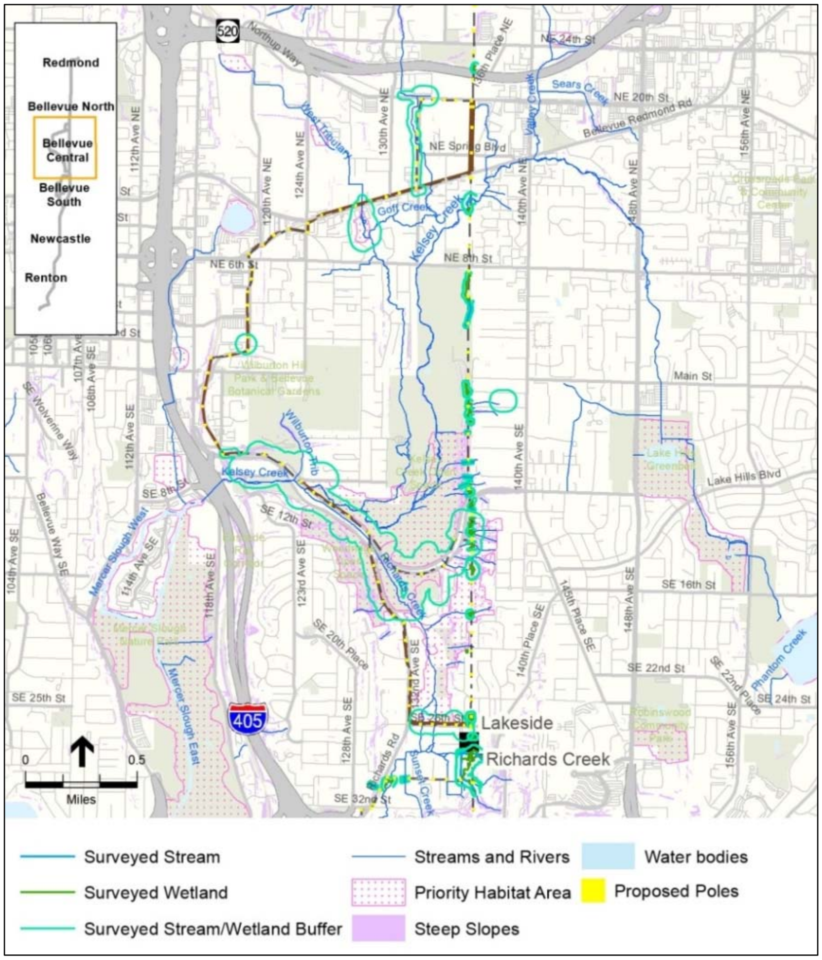
Bypass Option 1 would be in a new corridor and require the placement of poles in wetlands and along Kelsey and Richard creeks. Impacts to water resources would be less-than-significant because the installation of poles would be in compliance with permit requirements, including mitigation for stream and wetland impacts.



- **Streams and Buffers**. The transmission line would require 15 stream crossings, and three poles would be in stream buffers. The crossings would not cause long-term impacts to streams, and impacts to buffers would be minor and mitigated in accordance with applicable permit requirements.
- **Wetlands and Buffers**. Three of the wetlands along this option are Category I wetlands, in which the City of Bellevue only permits new or expanded facilities where no technically feasible alternative exists. Three poles would be located in wetlands, and 23 poles would be located in wetland buffers. This would cause a minor reduction in wetland and buffer acreage, which would be mitigated in accordance with permit requirements.
- **Shorelines**. Portions of this option are in the Kelsey Creek shoreline jurisdiction. The City of Bellevue only permits new or expanded facilities in shoreline critical areas where no technically feasible alternative exists. The determination of whether there is a technically feasible alternative that avoids the shoreline would be made through the permit process if this option were selected.

3.3.5.7 Bellevue Central Segment, Bypass Option 2

Bypass Option 2 would be in a new corridor and require the placement of poles in wetlands and along the buffers of Kelsey and Richard creeks. Impacts to water resources would be less-than-significant because the installation of poles would be in compliance with permit requirements, including mitigation for stream and wetland impacts.



- **Streams and Buffers.** The transmission line would require 17 stream crossings, and three poles would be located in stream buffers. The crossings would not cause long-term impacts to streams, and impacts to buffers would be minor and mitigated in accordance with applicable permit requirements. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers**. Three of the wetlands along this option are Category I wetlands, and the City of Bellevue only permits new or expanded facilities where no technically feasible alternative exists. Six poles would be located in wetlands, and 22 poles would be located in wetland buffers. This would cause a minor reduction in wetland and buffer acreage, which would be mitigated in accordance with permit requirements.
- **Shorelines.** Portions of this option are in the Kelsey Creek shoreline jurisdiction. The City of Bellevue only permits new or expanded facilities in shoreline critical areas where no technically feasible alternative exists. As with Bypass Option 1, the determination of whether there is a technically feasible alternative that avoids the shoreline would be made through the permit process if this option were selected.

3.3.5.8 Comparison of Bellevue Central Options

In the Bellevue Central Segment, the Existing Corridor Option would have the least impacts to water resources of the options considered. No impacts would occur to streams, and the number of poles located in wetland buffers would be reduced, resulting in beneficial impacts. Bypass Options 1 and 2 involve a new corridor, and both would require multiple new stream crossings and locating new poles in wetlands and stream and wetland buffers. Bypass Option 1 includes poles located in five Category I wetlands, and Bypass Option 2 includes poles located in six Category I wetlands. The City of Bellevue only permits new or expanded facilities in Category I wetlands if no technically feasible alternative exists. Bypass Options 1 and 2 are located in the shoreline jurisdiction of Kelsey Creek, where the City of Bellevue only permits new or expanded facilities if no technically feasible alternative exists.

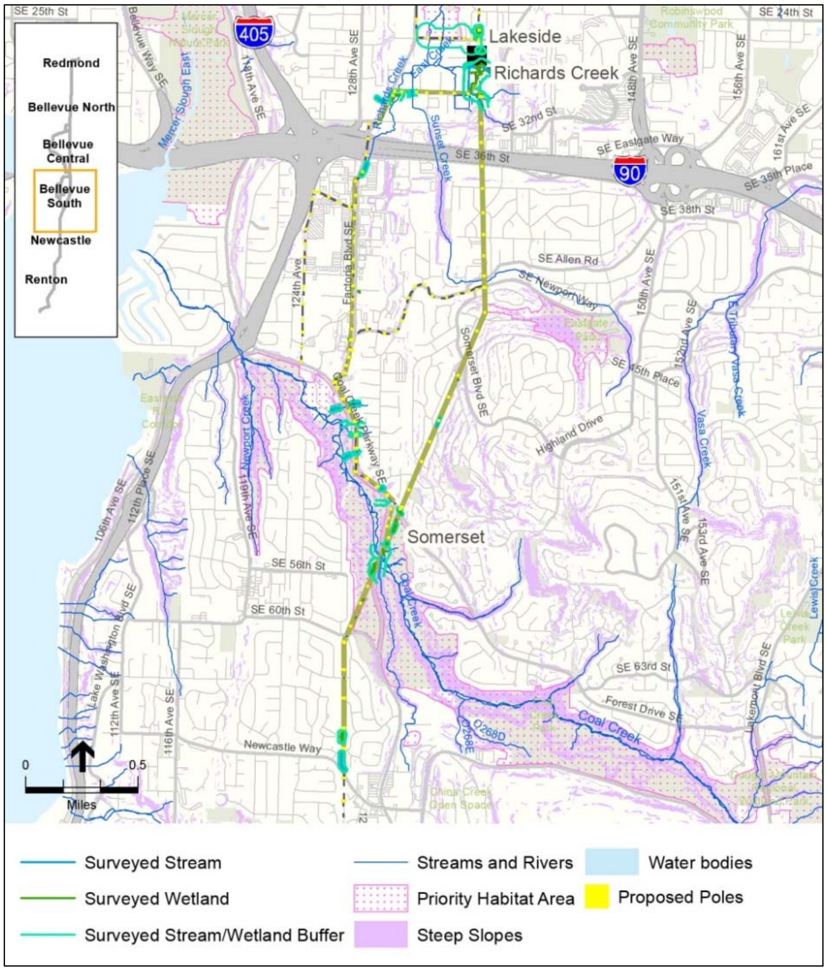
The potential impacts to water resources are compared below by option (Table 3.3-3).

Table 3.3-3. Comparison of Bellevue Central Options

Segment / Option	Stream and Buffer Impacts	Wetland and Buffer Impacts	Shoreline Management Impacts
Existing Corridor Option	Existing corridor No impacts	Reduced number of poles in buffers Beneficial impacts	No impacts
Bypass Option 1	15 new stream crossings Minor impacts with required mitigation	New buffer and wetland impacts Minor impacts with required mitigation Locating in the five Category I wetlands only permitted if no technically feasible alternative exists	Poles proposed in Kelsey Creek the shoreline jurisdiction Locating in the shoreline jurisdiction is only permitted if no technically feasible alternative exists
Bypass Option 2	17 new stream crossings Minor impacts with required mitigation	New wetland and buffer impacts Minor impacts with required mitigation Locating in the six Category I wetlands only permitted if no technically feasible alternative exists	Poles proposed in the Kelsey Creek shoreline jurisdiction Locating in the shoreline jurisdiction is only permitted if no technically feasible alternative exists

3.3.5.9 Bellevue South Segment, Oak 1 Option

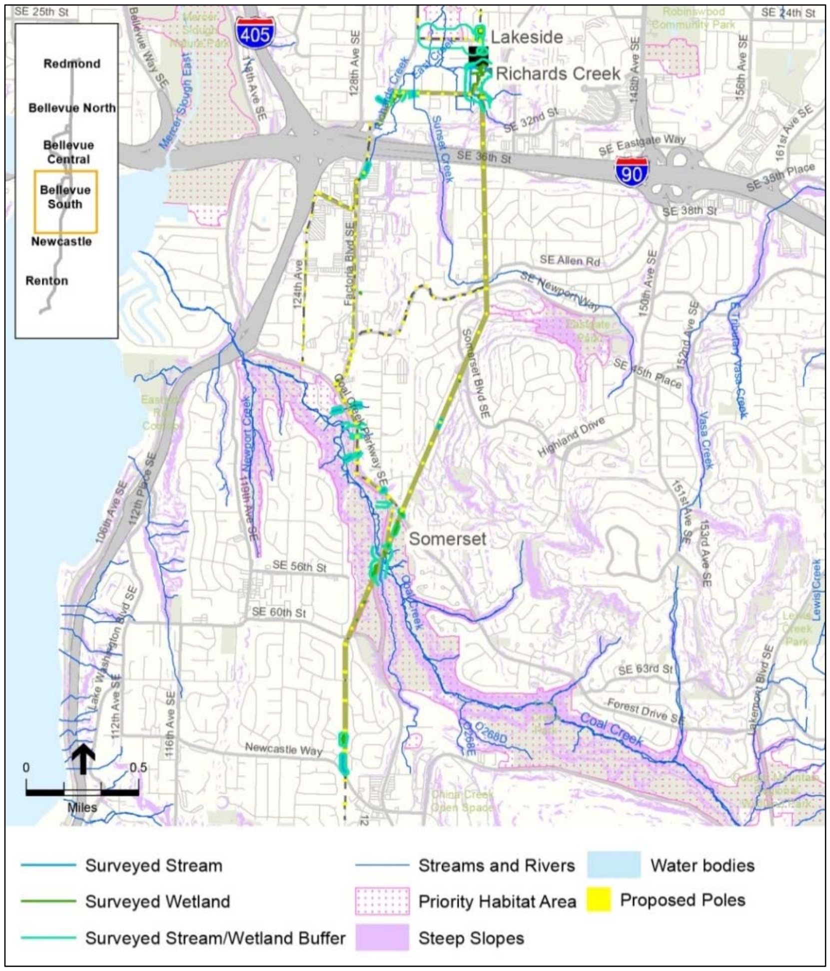
Portions of the Oak 1 Option would be in a new corridor and require a new stream crossing. Impacts to water resources would be less-than-significant because the installation of poles would be in compliance with permit requirements, including mitigation for stream and wetland impacts.



- **Streams and Buffers.** The transmission line would cross East, Sunset, and Coal creeks, with a substantial portion of the line in the Coal Creek buffer. The crossings would not cause long-term impacts to streams, and impacts to buffers would be minor and mitigated in accordance with applicable permit requirements. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers**. Wetlands along this option are Category III or IV with relatively small buffers except for one Category II wetland. The number of poles located in buffers would decrease from ten to seven. Impacts would be minor and mitigated in accordance with applicable permit requirements and would be less-than-significant.

3.3.5.10 Bellevue South Segment, Oak 2 Option

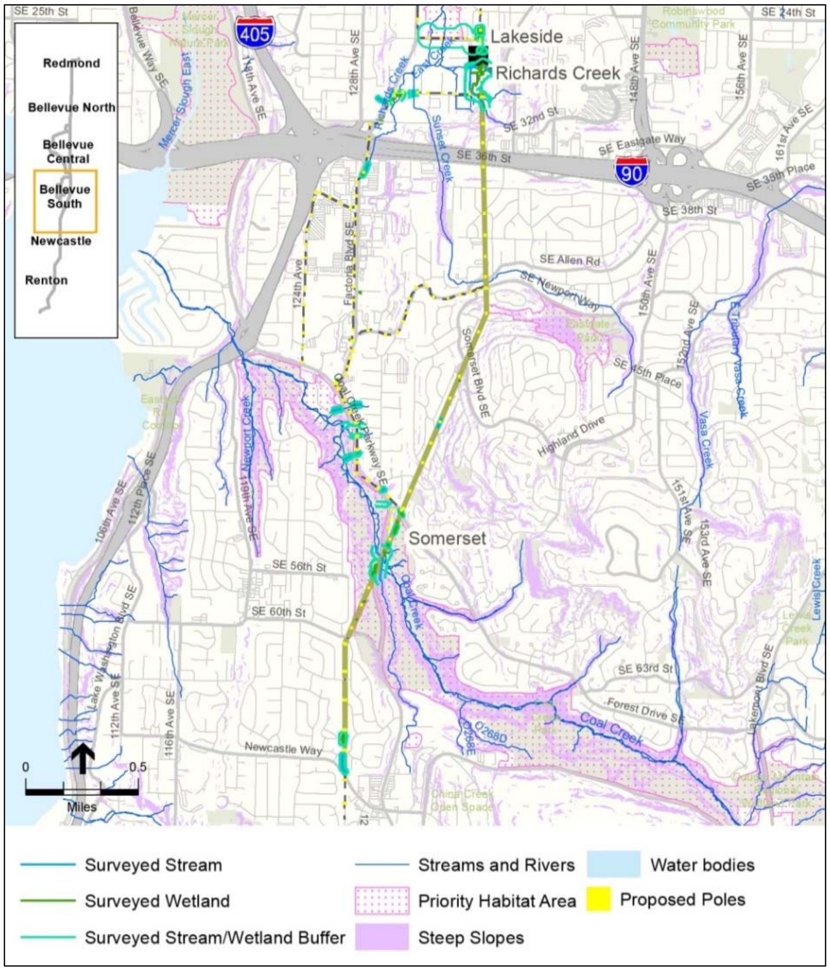
The Oak 2 Option would have the same impacts to water resources as the Oak 1 Option. No wetlands or streams are located along the portion of the Oak 2 Option that differs from the Oak 1 Option.



- **Streams and Buffers**. The transmission line would cross East, Sunset, and Coal creeks, with a substantial portion of the line in the Coal Creek buffer. The crossings would not cause long-term impacts to streams, and impacts to buffers would be minor and mitigated in accordance with applicable permit requirements. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers**. Wetlands along this option are Category III or IV with relatively small buffers except for one Category II wetland. The number of poles in buffers would decrease from ten to seven. Impacts to buffers would be minor and mitigated as required by permits. Therefore, impacts would be less-than-significant.

3.3.5.11 Bellevue South Segment, Willow 1 Option

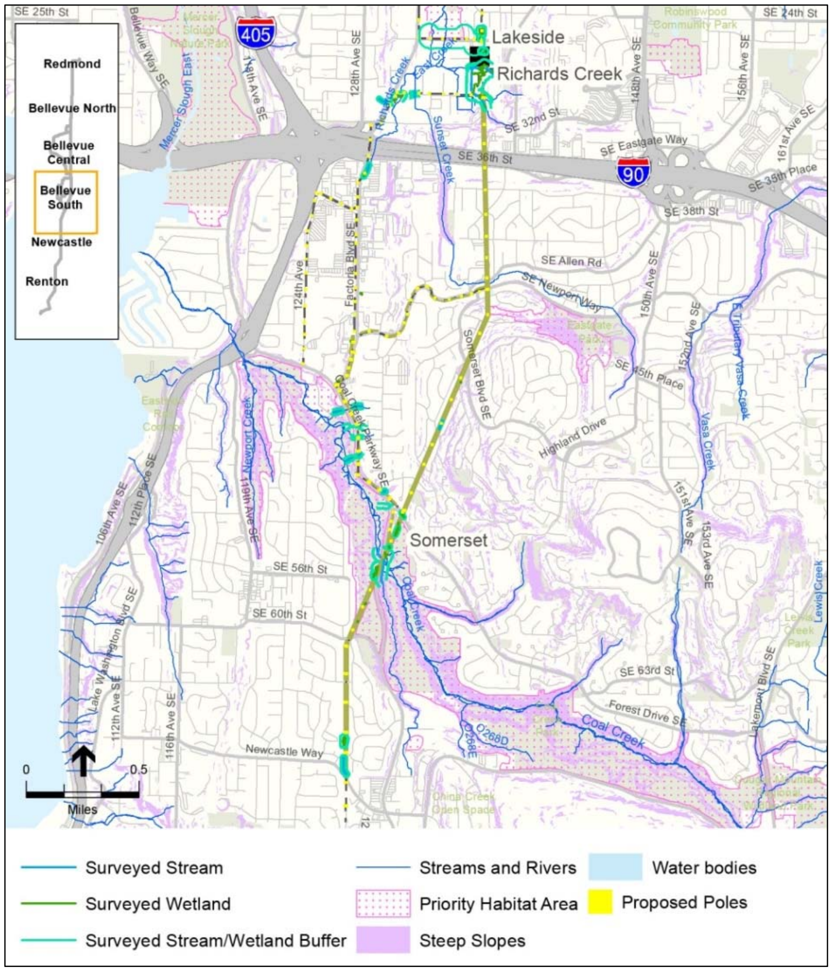
The Willow 1 Option is within the existing corridor. Impacts to water resources would be less-than-significant along this option because it would cause only minor alterations to or disturbances of water resources that could be mitigated.



- **Streams and Buffers.** The transmission line crosses unnamed tributaries of East, Sunset, and Coal creeks. The crossings would not cause long-term impacts to streams, and impacts to buffers would be minor and mitigated in accordance with applicable permit requirements. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers**. All of the wetlands along this option are Category III or IV with relatively small buffers. The number of poles located in buffers would decrease from seven to three, resulting in beneficial impacts.

3.3.5.12 *Bellevue South Segment, Willow 2 Option (PSE's Preferred Alignment)*

The Willow 2 Option follows the existing corridor, but would also include a new corridor that loops to the west, parallel to portions of Coal Creek. Impacts to water resources would be less-than-significant because installation of the poles would be in compliance with permit requirements, including mitigation for stream and wetland impacts, and long-term impacts would not occur.



- **Streams and Buffers.** The transmission line crosses the same streams as the Willow 1 Option in the north, but the new corridor also crosses unnamed tributaries of Coal Creek. The crossings would not cause long-term impacts to streams, and impacts to buffers would be minor and mitigated in accordance with permit requirements. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers.** All of the wetlands along this option are Category III or IV with relatively small buffers. The number of poles in buffers would decrease from seven to three, resulting in beneficial impacts.

3.3.5.13 Comparison of Bellevue South Options

In the Bellevue South Segment, all of the four options except Willow 1 Option would involve a new corridor with new stream, wetland, and buffer impacts. All impacts would be minor with implementation of required mitigation.

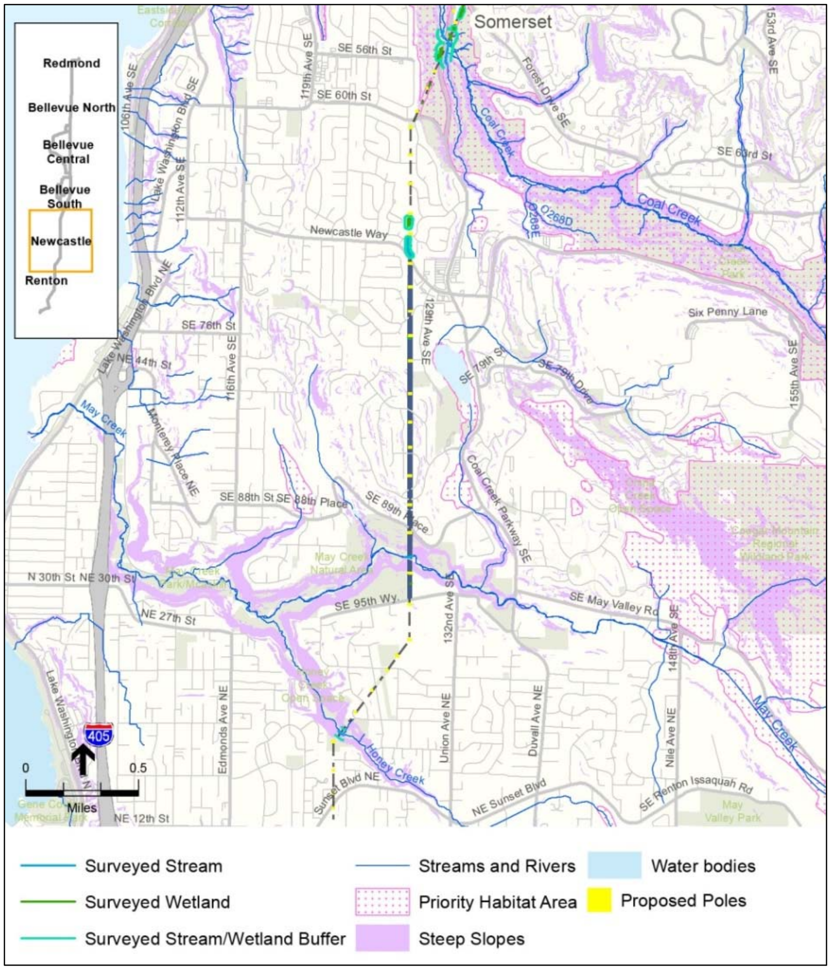
The potential impacts to water resources are compared below by option (Table 3.3-4).

Table 3.3-4. Comparison of Bellevue South Options

Segment / Option	Stream and Buffer Impacts	Wetland and Buffer Impacts	Shoreline Management Impacts
Oak 1 Option	Five new stream crossings Minor impacts with required mitigation	New buffer impacts Minor impacts with required mitigation	No impacts
Oak 2 Option	Five new stream crossings Minor impacts with required mitigation	New buffer impacts Minor impacts with required mitigation	No impacts
Willow 1 Option	Existing corridor Minor impacts with required mitigation	Existing corridor Minor impacts with required mitigation	No impacts
Willow 2 Option	One new stream crossing Minor impacts with required mitigation	Fewer poles in buffers Beneficial impacts	No impacts

3.3.5.14 Newcastle Segment

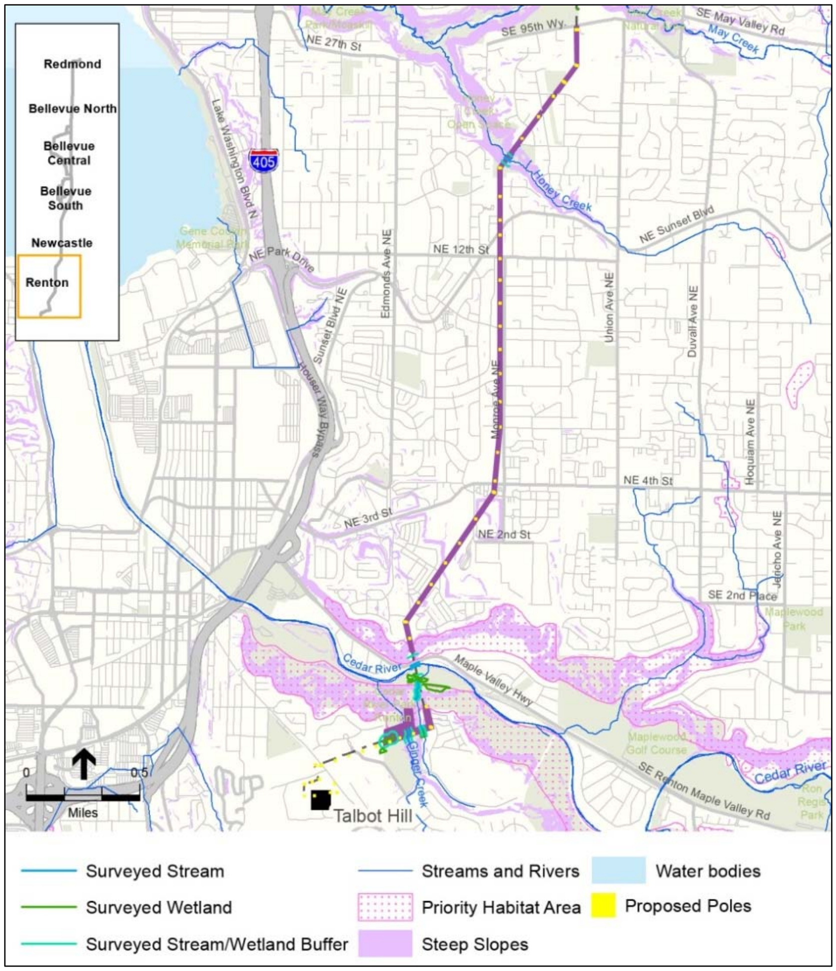
The Newcastle Segment would be within the existing corridor. Impacts to water resources would be less-than-significant along this segment because it would cause only minor alterations to or disturbances of water resources that could be mitigated. No poles would be located in wetlands, streams, or buffer.



- **Streams and Buffers**. The Newcastle Segment crosses May Creek and a small seasonal drainage along the existing corridor. No poles would be placed in buffers. The crossings would not cause long-term impacts to streams, and no impacts to buffers would occur. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers**. No poles would be located in wetlands or buffers, so no impacts would occur.

3.3.5.15 Renton Segment

The Renton Segment would be within the existing corridor. Impacts to 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 and the Cedar River in the existing corridor, the same as existing conditions. No poles would be placed in buffers. The crossings would not cause long-term impacts to streams, and no impacts to buffers would occur. Therefore, impacts would be less-than-significant.
- **Wetlands and Buffers.** The one wetland in this segment is Category III with a 100-foot buffer. One pole would be placed in the buffer. Impacts would be minor and mitigated in accordance with applicable permit 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.

3.3.6 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

3.3.6.1 Regulatory Requirements

All of the segments and options would need to comply with applicable federal, state, and local regulations, some of which would mitigate the potential for long-term adverse impacts to 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

- Comply with the stormwater regulations of the Partner Cities, which are based on the standards set by Ecology's *Stormwater Management Manual for Western Washington* (Ecology, 2014).
- Comply with the requirements of Shoreline Master Programs for Bellevue and Renton in crossing Kelsey Creek and the Cedar River (see Appendix B).
- Comply with the requirements of each applicable Partner City's critical areas ordinances (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.

3.4 PLANTS AND ANIMALS

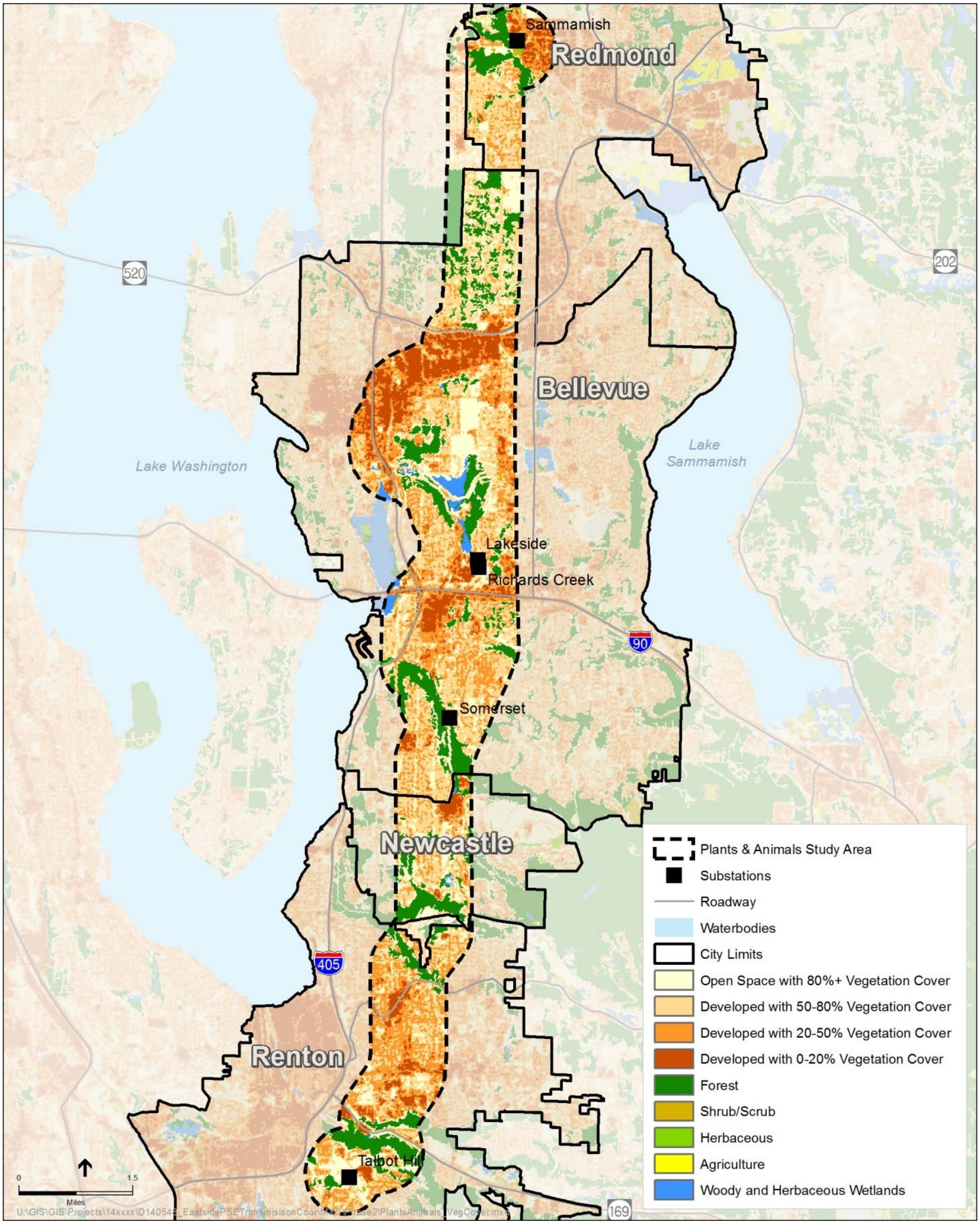
This section provides a project-level analysis of potential impacts to wildlife, fish, and plant communities and their available habitat within the study area (Figure 3.4-1). The study area extends about one-half mile on either side of the segment and option routes, based on the estimated extent that construction noise from project activities or project operations could potentially influence wildlife behavior.

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 plant and animal resources. Technical reports for critical areas were reviewed to characterize resources in the study area.

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 types), 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 include the following:

- Washington Natural Heritage Program (rare or sensitive plant) database
- USFWS National Wetlands Inventory (NWI)
- USFWS and National Marine Fisheries Service websites
- U.S. Geological Survey, National Land Cover database
- WDFW interactive mapping programs (Priority Habitats and Species on the Web and SalmonScape)
- City of Bellevue, Urban Wildlife Habitat Literature Review
- City of Bellevue, Draft Storm and Surfacewater System Plan (City of Bellevue, 2016a)
- King County's GIS mapping website (iMAP)
- Critical areas GIS datasets and mapping websites for the study area
- Project-specific tree inventory and critical area reports (The Watershed Company, 2016a, 2016b)
- Technical reports regarding typical powerline impacts to wildlife, particularly avian species
- PSE vegetation management protocols
- Aerial imagery



Source: King County, 2015; Ecology, 2014.

Figure 3.4-1. 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.

Much of 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). The option routes typically occur along existing roadways in areas that provide limited wildlife habitat, with some exceptions. These existing roadways would also typically provide access along the option routes. 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 3.3, *Water Resources*. This section analyzes their value as fish and wildlife habitat.

3.4.1 Relevant Plans, Policies, and Regulations

The study area encompasses a range of habitat areas that support aquatic and terrestrial species, including the existing corridor managed by PSE. Public entities that manage undeveloped or public lands include the WDNR, King County, and the Partner Cities.

Federal, state, and local government policies and regulations (see Tables 6-1 and 6-2 in the Phase 1 Draft EIS) are expected to minimize impacts to fish and wildlife species and their habitats. The Partner Cities' comprehensive plans include policies associated with the protection and enhancement of plants and animals, including restoration of natural features, tree retention, targets for tree canopy cover, and/or protection of ecological processes and functions of natural features (e.g., wetlands and streams).

3.4.1.1 Fish and Wildlife Habitat Conservation Area Regulations

A discussion of critical area regulations is provided in Section 3.3, *Water Resources,* as well as Appendix D. In addition to the protection of the water-related aspects of critical area regulations (e.g., wetland and stream buffer requirements), state and local entities have regulations to protect Fish and Wildlife Habitat Conservation Areas. The habitat-related regulations are described below, along with regulations that specifically address utility uses.

- **City of Redmond Zoning Code (RZC 21.64.020 - Fish and Wildlife Habitat Conservation Areas)** allows the construction of utilities and accessory structures in stream buffers if there is no feasible alternative location, subject to the following:
  - Avoid habitat alterations that create adverse impacts to core preservation areas.
  - Implement species management recommendations for impacts to species of concern, priority species, and species of local importance.
  - Avoid alteration of quality habitat areas.
  - Use native species in any landscaping of disturbed or undeveloped areas and in any enhancement of habitat or buffers.
  - Emphasize heterogeneity and structural diversity of vegetation.

- Remove and/or control noxious weeds or animals as defined by the City.
- Preserve significant trees, preferably in groups.

- **City of Bellevue Land Use Code (LUC 20.25H.155 – Uses in Habitat for Species of Local Importance and LUC 20.25H.160 Performance Standards)** requires protection for habitat areas, not otherwise classified as critical habitat in LUC 20.25H.025, associated with locally important species. The regulations allow alteration of these habitats with the implementation of the wildlife management plan developed by WDFW for the applicable locally important species.
- **City of Newcastle Code (NMC 18.24.302 – Fish and Wildlife Habitat Conservation Areas)** requires:
  - Establishing buffer areas for activities in or adjacent to these conservation areas.
  - Implementing seasonal restrictions to limit impacts to sensitive species.
  - Avoiding or minimizing potential adverse impacts to or degradation of habitat functions.
  - Mitigating for habitat alterations to achieve equivalent or greater biological functions.
- **City of Renton Municipal Code (RMC 4-3-050 – Critical Areas Regulations)** provides exemptions from the regulations for the installation, maintenance, and replacement of utilities in Fish and Wildlife Habitat Conservation Areas, providing that habitat alterations are minimized and disturbed areas restored.

3.4.1.2 Tree Protection Regulations

Tree protection regulations in the study area include the following:

- **City of Redmond Zoning Code (RZC 21.72-Tree Protection)** provides permit exemptions for tree removal in easements and rights-of-way, not including critical areas or critical area buffers, but requires mitigation in compliance with RZC 21.72.080:
  - One replacement tree for each significant tree (greater than 6-inch diameter) removed, except for hazardous, dead, or diseased trees, or those with no reasonable assurance of regaining vigor.
  - Three replacement trees for each landmark tree (greater than 30-inch diameter) removed, with the same exemptions described above for significant trees.
  - On-site tree replacement is preferred (if feasible), although off-site replanting is allowable for approved sites.
- **City of Redmond Zoning Code (RZC 21.64-Critical Areas)** allows normal and routine maintenance, operation, and reconstruction of existing roads, streets, utilities, and associated rights-of-way and structures, provided that reconstruction of any structures may not increase the impervious area, remove flood storage capacity, or further encroach into a critical area or its buffer.

- **City of Bellevue City Code (BCC 20.20.900 Tree Retention and Replacement)** requires retention of significant trees for any type of land alteration activity. Areas to be cleared for utilities are exempt from these tree retention standards. Significant trees are defined as 8-inch diameter for evergreen trees and 12-inch diameter for deciduous trees; replacement trees would have a combined diameter equal to the diameter of the removed tree. Subsection E applies to the R-1 Land Use District in the Bridle Trails Subarea.
- **City of Newcastle Municipal Code (NMC 18.16 Development Standards – Landscaping and Tree Retention)** exempts utility development from specific tree retention requirements, including significant trees.
- **City of Renton Municipal Code (RMC 4-4-130 Tree Retention and Land Clearing Regulations)** allows tree removal for maintenance activities and essential tree removal for public utilities except for restrictions in critical areas. The critical areas regulations (RMC 4-3-050) permit critical area disturbances for utilities within existing, improved right-of-way or easements if the impacts are minimized and disturbed areas restored during or immediately after the disturbance occurs. The removal of landmark trees (30-inch diameter) would require a vegetation management or land development permit. Tree removal in critical areas may also require mitigation monitoring.

3.4.1.3 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

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 maintains (i.e., trims or removes) trees that mature to a height of greater than 25 feet 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 (referred to as the Border Zone) (Figure 3.4-2). 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 outside of the Managed Right-of-Way that are at risk of falling or that are likely to come in contact with nearby wires are proactively removed (referred to as the Danger Tree Zone), which also varies by the height of the trees in this zone.

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).

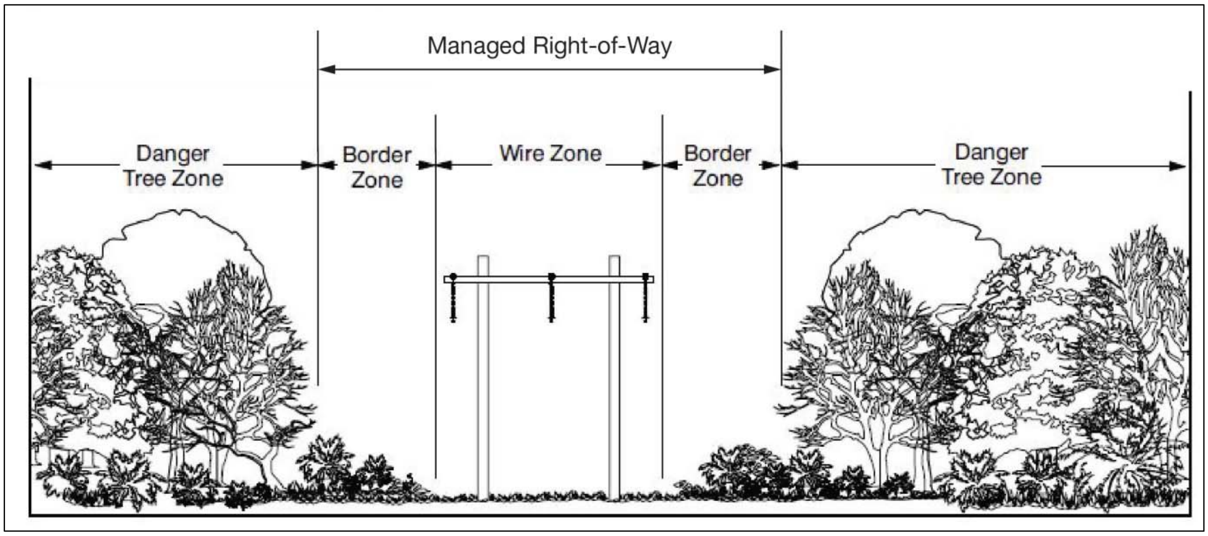


Figure 3.4-2. Vegetation Management Zones for 115 kV Transmission Lines

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.

Vegetation Management/Maintenance Standards for 230 kV Transmission Lines

To provide reliable service to PSE customers and respond to current 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 3.4-3). The overall size of the vegetation management/maintenance area typically varies by transmission pole type (see Appendix E). Based on these standards, PSE removes any vegetation within the Managed Right-of-Way that matures to a height of more than 15 feet (PSE, 2014). Trees outside of the Managed Right-of-Way within the Danger Tree Zone could also be trimmed or removed based on some combination of tree height, species, health, and distance from the wires. For this analysis, it was assumed that trees with a height of 70 feet or greater with the potential to fall or contact the powerlines would be removed.

This is the management practice that PSE would use for the 230 kV line in the existing and new corridors if the project were implemented.

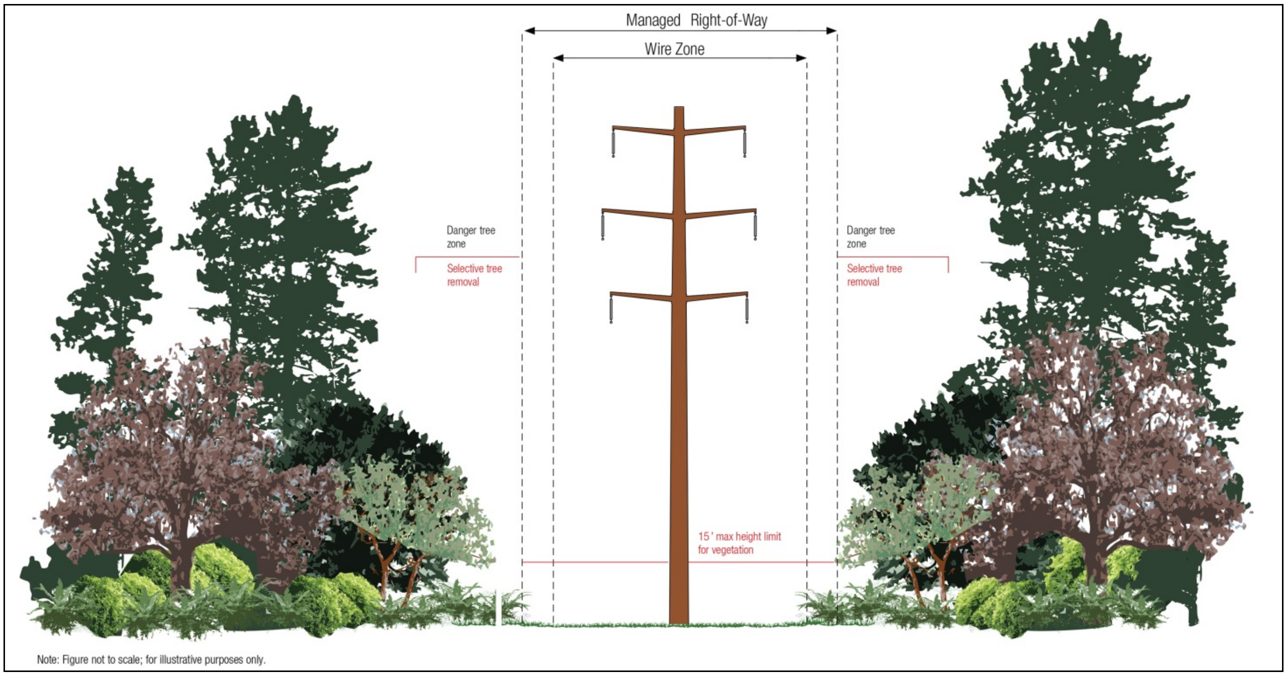


Figure 3.4-3. Vegetation Management Zone for 230 kV Transmission Lines

PSE's policies for weed management and vegetation restoration are the same for 230 kV and 115 kV transmission lines.

3.4.1.4 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 protected under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and the Endangered Species Act. The three primary mechanisms for harming birds are electrocutions, collisions, and problem nests (PSE, 2016b). In addition to the potential for harming birds, these incidences can cause power outages, fires, and other damage to the electrical system. Between 2009 and 2012, an average of about 1,500 bird or animal-caused outages occurred over PSE's entire distribution system. To improve system reliability and reduce wildlife impacts, PSE completes over 400 avian-safe system modifications each year system-wide and builds new facilities using avian safe standards. System modifications include adding safe perching structures, line markers, bird guards, perch discouragers, wire and equipment covers, and nesting platforms.

3.4.2 Plants and Animals in the Study Area

3.4.2.1 Vegetation Cover

As with the study area evaluated in the Phase 1 Draft EIS, a substantial portion of the Phase 2 study area is already developed to varying degrees, with different amounts of vegetation cover (see Figure 3.4-1 and Figure 3.4-4). The primary land cover types within this study area consist of developed properties with varying levels of vegetation cover, with 35 percent of the study area having 50 percent or less vegetation cover, and 34 percent between 50 and 80 percent vegetation cover. The remaining area consists primarily of forest (15 percent) and open space (15 percent) habitat, and about 1 percent shrub/scrub, herbaceous, and wetland habitats. The largest patches of forested vegetation cover are found in parks, open space areas, and undeveloped areas.

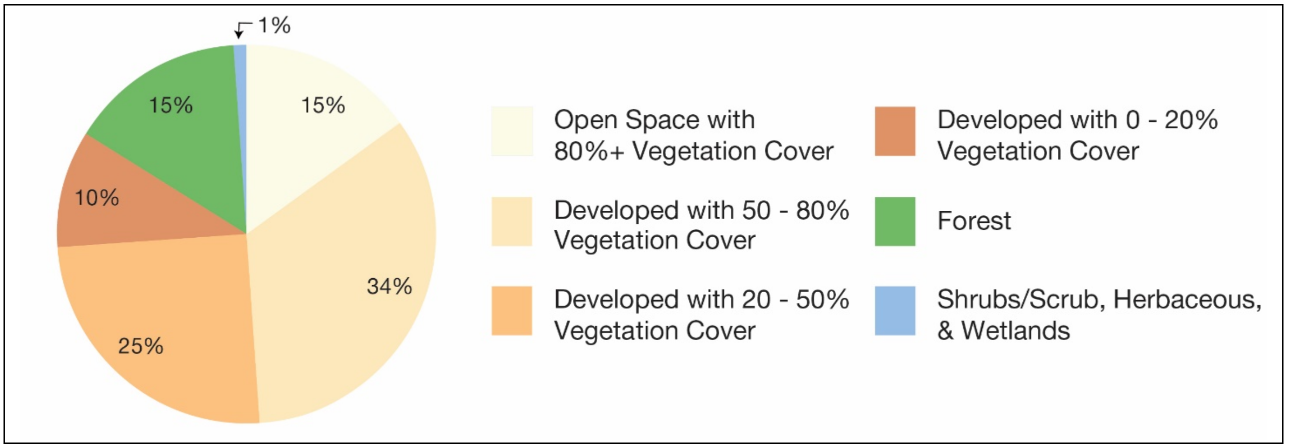


Figure 3.4-4. Vegetation Cover Types in the Study Area

Rare Plants

As indicated in the Phase 1 Draft EIS, the Washington Natural Heritage Program database, managed by WDNR, identifies one rare plant occurrence in the vicinity of the study area: Vancouver ground-cone *(Boschniakia hookeri),* which is a parasitic plant found in Bridle Trails State Park. While the study area is adjacent to this park, it does not encompass any portion of the park. No other rare plants are documented in, or near, the study area (WDNR, 2016).

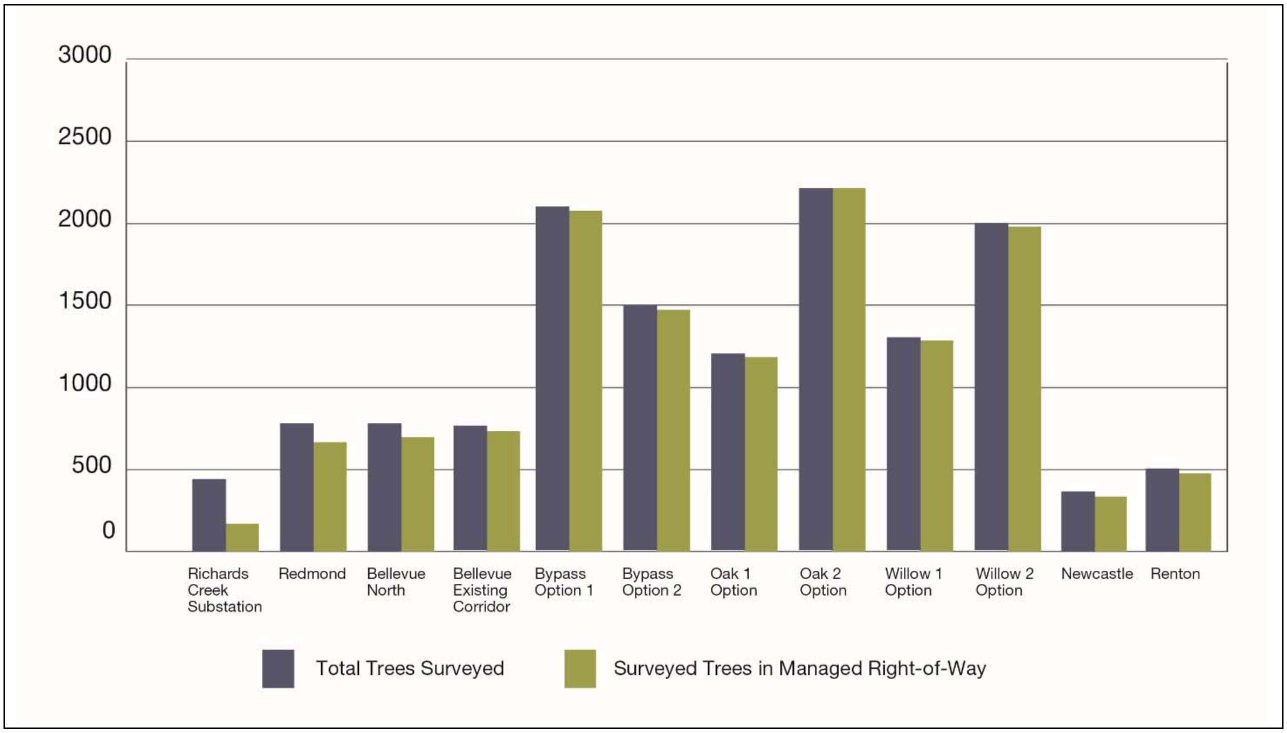
Plants

As indicated in the Phase 1 Draft EIS (see Section 6.3.3), 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 stream 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.

The potential vegetation impacts of the project are based largely on the number of trees that could be subject to removal or maintenance (trimming) within the existing corridor and along the new corridor associated with the route options. Project-specific tree inventories were conducted in 2015 and 2016 along the approximately 100-foot-wide easement that includes the existing PSE transmission lines, as well as along both sides of the road for the route options (The Watershed Company, 2016a)[1]. These surveys inventoried a total of over 10,000 trees along the existing corridor and new corridor, including at least 4,300 trees occurring within the Managed Right-of-Way, depending on segment and option (see Figure 3.4-5). The purpose of the inventories was to survey the number and location of all vegetation with a potential to reach a mature height of 15 feet or more (by segment), including significant trees. Significant trees are defined in this study as healthy evergreen or deciduous trees, 8 inches in diameter or greater, measured 4 feet above existing grade. However, the classification of what is a significant tree varies slightly between jurisdictions.

[1] Approximately 25 trees on both sides of Bel-Red Road between 132nd Avenue NE and 136th Avenue NE and approximately 25 trees on the east side of Richards Road between SE 23rd Street and SE 26th Street were not surveyed by The Watershed Company. For purposes of this analysis, it was assumed that all 50 trees would be considered significant and would be removed as part of Bypass Option 2.

Based on these surveys, the number of trees within the Managed Right-of-Way ranges from approximately 340 in the Newcastle Segment to about 2,220 in the Oak 2 Option (see Figure 3.4-5).



Source: The Watershed Company, 2016a.

Figure 3.4-5. Total Trees Surveyed, by Segment, and Trees in the Managed Right-of-Way Areas, by Segment and Option

The inventory also surveyed the location of smaller (non-significant) trees or shrubs if they were, or could potentially reach, a height of 15 feet or more, regardless of their current height. Typical criteria for a 230 kV PSE transmission corridor call for removing or pruning vegetation in the Managed Right-of-Way areas that could exceed 15 feet in height. The non-significant trees and shrubs were characterized as groups, ranging from 2 to more than 50 individual plants, ranging from 10 to 25 feet in height, and one-half to 3 inches in diameter.

3.4.2.2 Fish and Wildlife

As described in the Phase 1 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 the existing corridor and new 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 are somewhat common 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 occur more frequently near open water or open field foraging areas, which typically do not occur in the study area.

The study area wetlands, streams, floodplains, and rivers (described in Section 3.3, *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).

3.4.2.3 Sensitive or Protected Fish and Wildlife

As described in the Phase 1 Draft EIS (Section 6.4), 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). 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. Species of local concern include the following: bald eagle, great blue heron, osprey, peregrine falcon, Vaux's swift, red-tailed hawk, northern goshawk, pileated woodpecker, purple martin, marbled murrelet, western grebe, merlin, green heron, Townsend's big-eared bat, Western big-eared bat, Keen's myotis, long-legged myotis, long-eared myotis, western pond turtle, Oregon spotted frog, western toad, Chinook salmon, steelhead, bull trout, and river lamprey.

3.4.3 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 potentially disturbing events. 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.

In general, the project would install new poles as close to the existing poles as practicable, and the existing poles would be removed. This 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 of natural resource habitat in the study area is not expected to substantially decrease, although the quality of the habitat and the species uses could potentially change. 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. Additional tree removal would also occur along the new corridor.

3.4.3.1 Magnitude of Impact

The magnitude of potential impacts to plants and animals would vary substantially based on the amount of habitat disturbed or lost, including the number, location, and type of trees removed during the initial construction phase, and the proximity of construction activities to suitable or occupied fish and wildlife habitat, sensitive plant species, and critical areas (i.e., wetlands and streams). 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.

3.4.4 Long-term Impacts: No Action Alternative

Long-term impacts of the No Action Alternative are the same as those described in the Phase 1 Draft EIS. Under the No Action Alternative, PSE would continue current line maintenance activities along the existing corridor as described in Chapter 2. As a result, the Phase 1 Draft EIS concluded that there would be a minor loss of vegetation or disturbance to animals from permanent structures. Therefore, the No Action Alternative would result in less-than-significant impacts to plants and animals.

While the No Action Alternative would be limited to maintaining the existing transmission lines, there is a potential for some minor direct and indirect impacts to plants and animals along the corridor, particularly from the periodic replacement of poles. These activities would include noise disturbance, habitat alteration or loss (temporary vegetation clearing), degradation of aquatic habitat from site runoff, and the potential spread of invasive plant species into areas disturbed by maintenance activities.

3.4.4.1 Disturbance from Noise and Human Activity

Increased noise and human activity associated with line maintenance activities could impact plants and animals, depending on the scale of such activities. As described above, animal species living in urban areas are generally tolerant of noise or disturbance activities. While some individuals could be temporarily displaced or relocate to surrounding habitats, most would likely return after the noise and activities associated with temporary maintenance activities cease. In addition, BMPs would be instituted to minimize or eliminate such impacts. These would include scheduling activities outside of critical periods (for example, breeding or nesting seasons) and minimizing maintenance activity noise levels. While the typical vegetation maintenance activities would elevate noise levels above background levels, no excessive noise levels would likely occur, such as from blasting or pile driving activities. Increased noise levels would be a significant adverse impact if listed species are harassed, lost, or permanently displaced. However, such protected species are not known to occupy habitat in the existing corridor. As a result, impacts would be less-than-significant.

3.4.4.2 Loss of Habitat

Maintenance activities would require limited grading or vegetation removal in areas that currently provide wildlife habitat. Impacts from the direct losses of terrestrial habitat would vary depending on the extent of the impact (how much area is affected), the recovery time for replanted areas, and if listed species, species of concern, or priority habitats are affected. However, typical maintenance activities associated with the No Action Alternative are expected to be infrequent (typically every 3 years) and of limited scale (typically trimming and isolated tree removal), which is expected to result in less-than-significant losses of habitat or species displacement.

PSE's existing policy is to restore vegetation other than trees within transmission corridors using plant communities composed of low-growing native ferns and shrubs and small-scale native trees, particularly those that resist disease and insect infestations (PSE, 2014). The resulting diverse plant community would be of increased value to resident wildlife. Slow-growing and low-profile native species that mature at heights compatible with established PSE guidelines would also limit maintenance requirements. Outside of the Managed Right-of-Way, tree and other vegetation replacement is coordinated with the property owners (in some cases, the owner may prefer tree removal with no replacement, or replanting with non-native ornamental species). Tree replacement would also comply with local code requirements (see Section 3.4.1 for a description of code requirements).

3.4.4.3 Sedimentation of Aquatic Habitats

As described in Section 3.3, sedimentation of aquatic habitats (streams and wetlands) due to runoff from disturbed areas or turbidity from in-water work is not expected to occur during maintenance activities. In compliance with state and local stormwater permit requirements, PSE would implement BMPs to control surface water runoff, minimizing the potential for uncontrolled runoff. In addition, the maintenance activities typically do not result in ground-disturbing activities, thereby limiting runoff from bare soil areas. In the event of any inadvertent discharge, corrective actions would be implemented in accordance with permit requirements and local clearing and grading requirements, such that less-than-significant impacts would occur.

3.4.4.4 Contamination of Aquatic Habitats

As described in Section 3.3, there is a potential for accidental spills of oils, fuels, solvents, and other chemicals from equipment used for maintenance activities. If not controlled, such spills could enter nearby surface waters and contaminate aquatic habitats and species. The potential for spills would be minimized by fulfilling permit requirements and implementing Spill Prevention and Control Plans. In addition, the limited and infrequent maintenance activities under the No Action Alternative are expected to result in less-than-significant impacts.

3.4.4.5 Invasive Plant Control

Under the No Action Alternative, PSE would continue to selectively use herbicides for vegetation management, in accordance existing permits and associated BMPs (PSE, 2016a). Therefore, less-than-significant impacts are expected.

3.4.5 Long-term Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

3.4.5.1 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 mature trees along the existing corridor and new 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. The potential new route options typically occur in areas that are much more developed than the existing corridor, or along existing roadways. As a result, the habitat along these new alignments typically consists of landscaped or maintained vegetated areas.

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 by segment or option, and the density of trees removed within a given segment or option. 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, the project alignment with the potential to remove the ***greatest number of trees*** (up to about 5,400 trees) is the combination of segments and options that include the following:

- Richards Creek Substation + Redmond Segment + Bellevue North Segment + Bypass Option 1 + Willow 2 Option + Newcastle Segment + Renton Segment) (The Watershed Company, 2016a).

The project alignment with the potential to remove the ***least number of trees*** (up to about 3,600 trees) is the combination of segments and options that include the following:

- Richards Creek Substation + Redmond Segment + Bellevue North Segment + Bellevue Central Existing Corridor + Willow 1 Option + Newcastle Segment + Renton Segment).

PSE's preferred project alignment has the potential to remove up to about 4,200 trees and includes the following combination of segments and options:

- Richards Creek Substation + Redmond Segment + Bellevue North Segment + Bellevue Existing Corridor + Willow 2 Option + Newcastle Segment + Renton Segment.

Considering the percentage of potential tree removal of the total trees surveyed by segment and option, the Redmond, Existing Corridor Option of the Bellevue Central Segment, Oak 1 Option of the Bellevue South Segment, Newcastle, and Renton Segments would experience the highest percentage removal of total surveyed trees (Figure 3.4-6). The lowest percentage of tree removal by segment and option (66 percent) occurs in the Bellevue North Segment. The number of trees removed could be lower than the estimates noted above because PSE could choose to trim or prune rather than completely remove trees in a manner that ensures compliance with NERC standards. Therefore, the estimate represents a worst-case assessment.

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 or option, with most segments/options ranging between 17 and 26 percent of trees removed per acre (Figure 3.4-7). In contrast, the number of significant trees removed per acre tends to be lower in the segments within the existing corridor, compared to the options with new corridors (Figure 3.4-7). Bypass Option 1 would have the highest number of trees removed per acre out of all the segments and options.

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 5,000 inventoried trees retained within the surveyed areas, many of which would be contiguous with trees on adjacent properties (The Watershed Company, 2016a). 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 Alternative 1 would result in a less-than-significant impact.

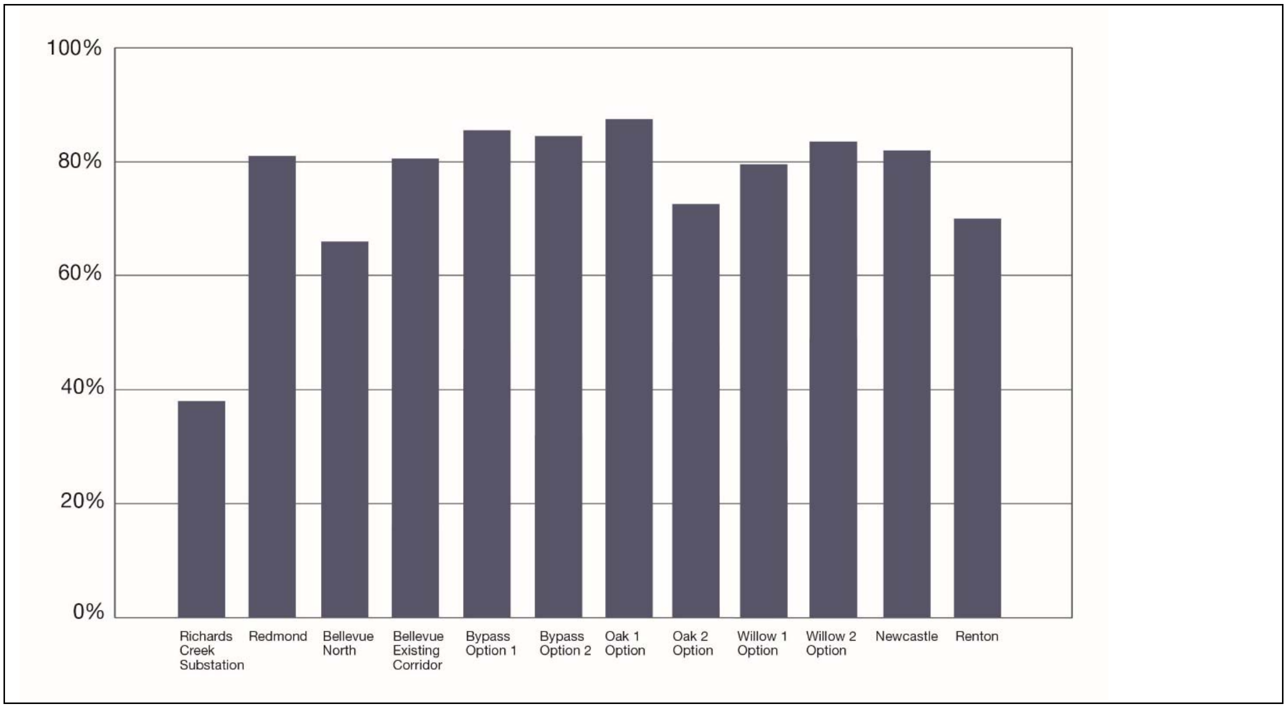


Figure 3.4-6. Percentage of Surveyed Trees Subject to Removal, by Segment and Option

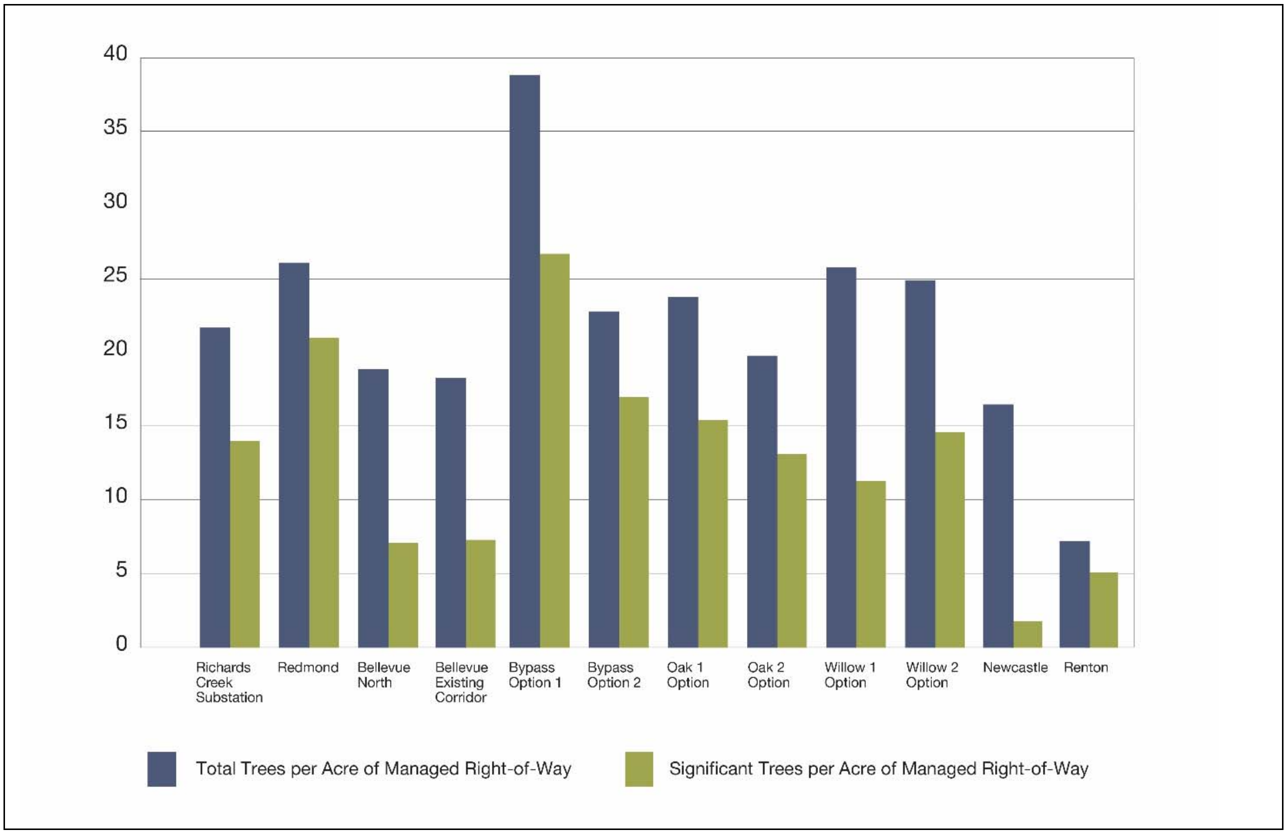
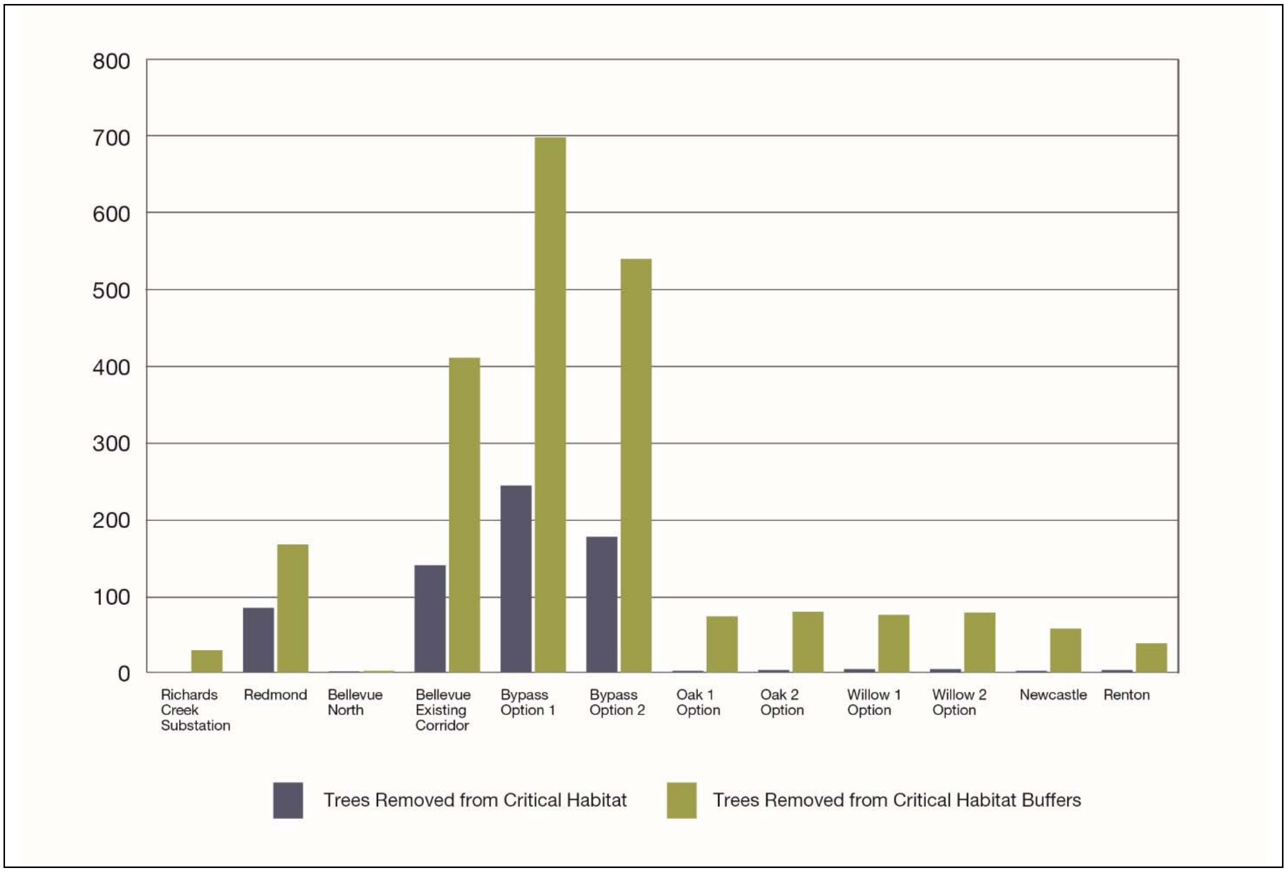


Figure 3.4-7. Total Trees and Significant Trees per Acre, Subject to Removal, by Segment and Option

Potential Impacts to Animals and Critical Habitat

Of the more than 5,400 trees that could potentially be removed, depending on the segment or option combination, about 340 of these trees (6 percent) occur in critical areas (primarily wetland habitat), and about 1,070 trees (20 percent) occur in wetland and stream buffer areas (Figure 3.4-8) (The Watershed Company, 2016c). This would increase the potential disturbance of these sensitive habitats and reduce the shading provided by the trees. These numbers are based on the strict application of PSE's vegetation management standards (see Section 3.4.1.2), and represent a conservatively high rate of tree removal. 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.



Source: The Watershed Company, 2016c.

Figure 3.4-8. Trees in Critical Habitats and Buffers, Subject to Removal, by Segment and Option

Poles would be replaced in about the same locations as the existing poles, with a small number within or near critical habitat areas. However, PSE has flexibility in the placement of new poles, making it possible to maximize avoidance of these areas. For general planning purposes, it was assumed that the new poles can be placed anywhere within approximately 25 feet of the locations of the existing poles. This means that a pole currently located in a wetland or floodplain, for example, may be replaced with a pole in the wetland buffer or outside of floodplain habitat, and in some cases outside of the buffer. Most of the new poles would be installed outside of 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.

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 or option). Route options in the new corridor would result in an increase in the number of poles (relative to the existing corridor). These locations occur along heavily traveled roadways, which would not encourage nesting behavior but could provide limited roosting habitat. Overall, the changes in the number of poles would have less-than-significant impacts because few protected wildlife species occupy the segments and route options, 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, replacing all of the 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.

The project would result in less-than-significant impacts to fish or fish habitat, as project activities would not result in 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 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 further 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 3.3.5.1, *Water Resources*.

Impacts specific to the project components (including the new substation, segments, and route options) are summarized below. The tree inventory numbers reflect PSE's inventory of trees within the surveyed area, depending on the segment and option (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.

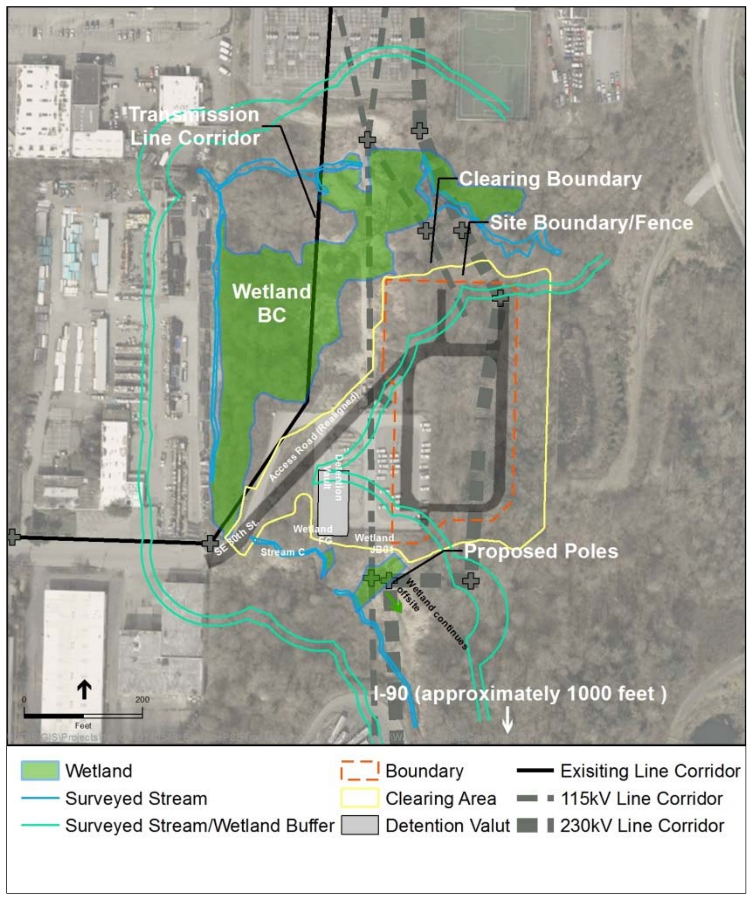
Consistency with Relevant Plans, Policies, and Regulations

As described above, 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.

3.4.5.2 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 170 large 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, but stream and riparian habitat would not be substantially affected. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

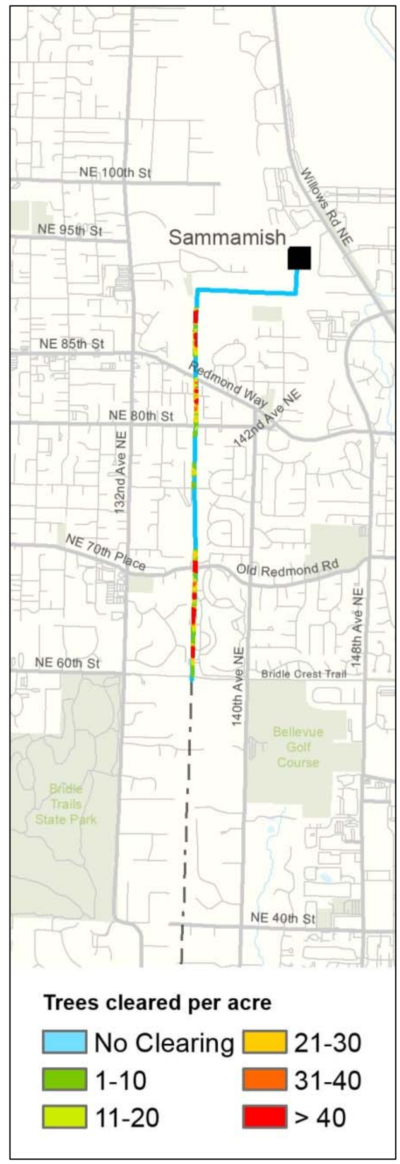
- **Vegetation Clearing:** About 170 (38 percent) of the more than 500 large trees on the parcel are within the proposed project clearing limits, including about 110 significant trees, three dead or dying trees, and 29 in a wetland buffer.
- **Wildlife Habitat:** The substation would occupy about 2 acres (26 percent) of the 7.8 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, but stream habitat would not be substantially affected by the project.



3.4.5.3 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 (81 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 Willow Creek drainage, but stream habitat is not expected to be affected by the project.



3.4.5.4 Bellevue North Segment

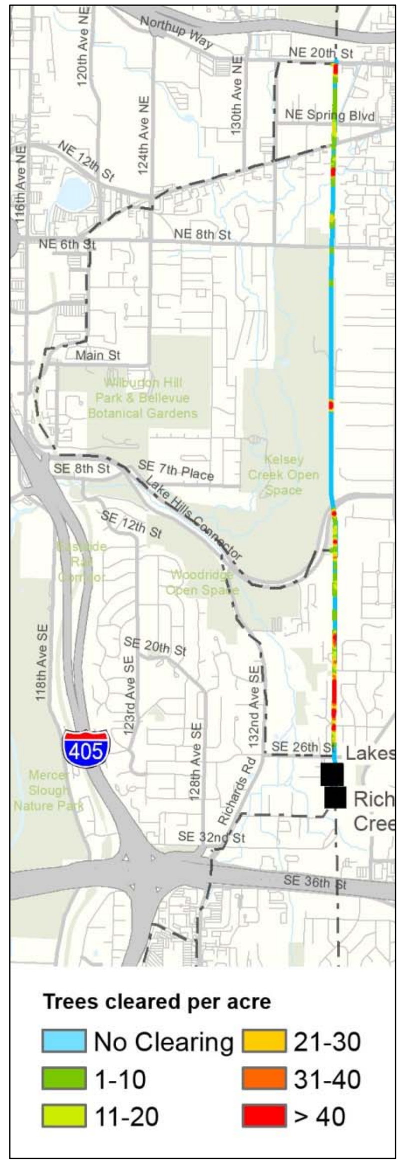
As described for the Redmond Segment, despite the amount of potential tree removal, habitat suitable for the urbanized species that typically occur in the area would remain. In addition, the number of trees removed from sensitive habitats would be minimized or avoided, and any removal would be mitigated 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 (66 percent of the total surveyed in the segment) could be removed, including the potential removal of about 190 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.

3.4.5.5 Bellevue Central Segment, Existing Corridor Option

Although the potential effects of tree removal in this option 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 option, stream and riparian habitat would not be substantially affected. Therefore, the impacts to fish, wildlife, and plants would be less-than-significant.

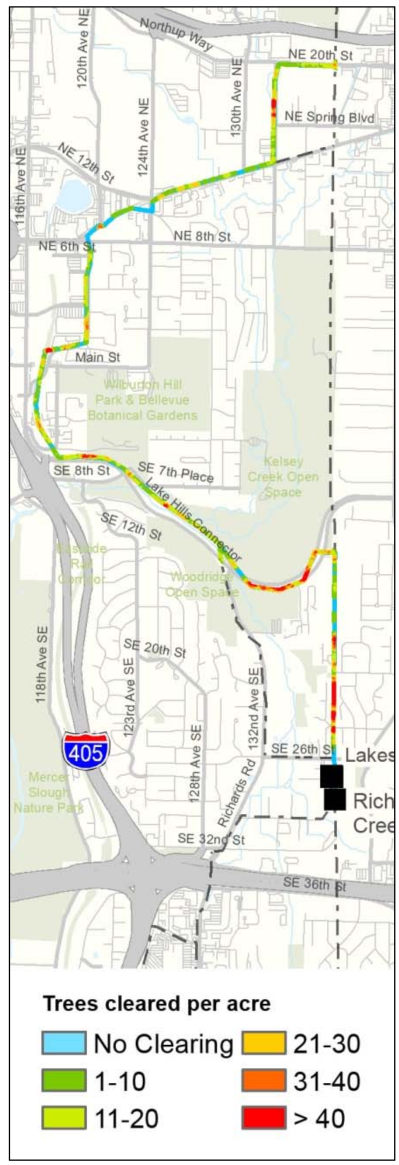
- **Vegetation Clearing:** About 620 trees (81 percent of the total trees surveyed in the option) could be removed, including the potential removal of about 250 significant trees, as well as about 140 trees from critical areas, and 411 trees from the buffers. In some cases removal may be avoided by trimming. Tree clearing per acre along the option 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 by the project.



3.4.5.6 Bellevue Central Segment, Bypass Option 1

The potential effects of tree removal in this corridor would be similar to those described for the Existing Corridor Option. However, a substantial portion of the alignment occurs along existing roadways, potentially limiting habitat, and adjacent areas would 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 option, 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 1,790 trees (86 percent of the surveyed trees along the option route) could be removed, including the potential removal of about 1,230 significant trees, as well as 244 trees from critical areas and about 699 trees from their buffers. In some cases removal may be avoided by trimming. Tree clearing per acre along the option is illustrated in the graphic to the right.
- **Wildlife Habitat:** Extensive tree removal would reduce the quality and quantity of wildlife habitat. This could be slightly offset by the installation of additional poles along this new alignment, particularly along the Kelsey Creek Park wetland complex, although PSE would continue the practice of discouraging nesting on the new poles. 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 wildlife species are not known to inhabit the study area. Although three protected fish species (Chinook salmon, steelhead, and lamprey) occur in Kelsey, Richards, and West Tributary of Kelsey creeks, stream habitat would not be substantially affected by the project.



3.4.5.7 Bellevue Central Segment, Bypass Option 2

Although the potential effects of tree removal in this corridor would be similar to those described for the Redmond Segment, a lower percentage of trees would be removed. However, much of the alignment occurs along existing roadways, potentially limiting wildlife use. While adjacent areas would continue to provide suitable habitat for the urbanized wildlife species, few protected wildlife species regularly occur in the corridor. 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 option, 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 1,240 trees (85 percent of the trees surveyed along the option route) could be removed, including potential removal of about 930 significant trees, and 177 trees from critical areas and 540 trees from critical area buffers. In some cases removal may be avoided by trimming. Tree clearing per acre along the option is illustrated in the graphic to the right.
- **Wildlife Habitat:** Extensive tree removal would reduce the quality and quantity of wildlife habitat. This could be slightly offset by the installation of additional poles along this new alignment, particularly along the Kelsey Creek Park wetland complex, although PSE would continue the practice of discouraging nesting on the new poles. 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 Kelsey, East, and Richards creeks, and the West Tributary of Kelsey Creek, stream habitat would not be substantially affected by the project.

DSD 010476

3.4.5.8 Comparison of Bellevue Central Options

All Bellevue Central Segment options contain biological resources that support fish and wildlife species. The potential impacts to these resources are compared below by option (Table 3.4-1).

In the Bellevue Central Segment, the Existing Corridor Option would result in the least overall tree removal, the removal of the least number of significant trees, and the removal of the least number of trees from critical areas and their buffers compared to the other two options.

Bypass Option 1 would remove almost three times as many trees and five times as many significant trees as the Existing Corridor Option. Bypass Option 1 would have the most impact on trees in critical areas and their buffers.

Bypass Option 2 would remove about twice as many trees overall, and almost four times as many significant trees as the Existing Corridor Option.

Table 3.4-1. Comparison of Bellevue Central Options

Segment / Option	Total Trees Removed[1]	Significant Trees Removed[1]	Trees Removed from Critical Areas	Trees Removed from Critical Area Buffers
Bellevue Central Segment				
Existing Corridor Option	620	250	140	411
Bypass Option 1	1,790	1,230	244	699
Bypass Option 2	1,240	930	177	540

[1] Total tree and significant tree numbers are rounded to the nearest 10, and typically represent conservatively high estimates of potential tree removal levels.

3.4.5.9 Bellevue South Segment, Oak 1 Option

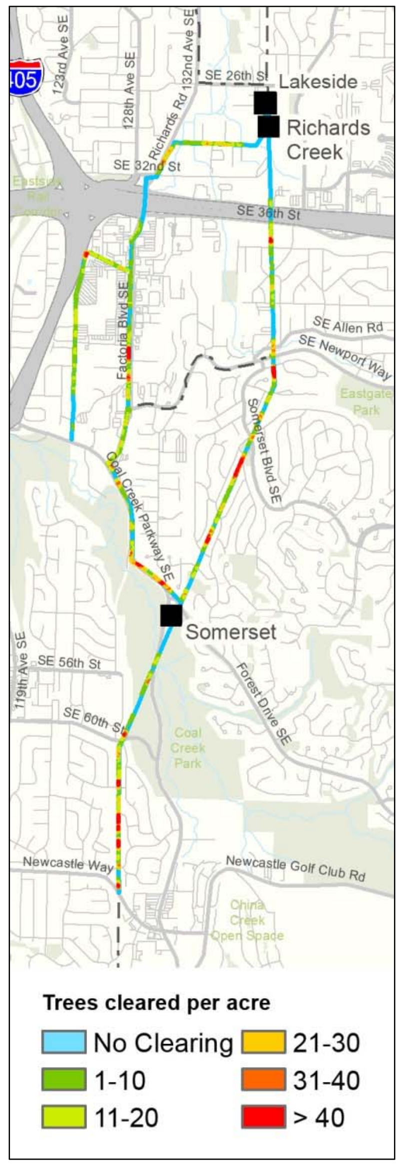
Although the potential effects of tree removal in this corridor would be similar to those described for the Redmond Segment, a lower percentage of trees would be removed. In addition, the Oak 1 Option alignment occurs primarily along existing roadways with extensive urban development, where tree removal is not likely to substantially change the suitability of the habitat for the urbanized wildlife species that typically occur in the area. As a result, few protected wildlife species are expected to occur in the corridor. The number of trees removed from sensitive habitats would also 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 option, 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 1,040 trees (88 percent of the trees surveyed along the option route) could be removed, including the potential removal of about 670 significant trees, two trees in critical areas, and about 73 trees from critical area buffers. In some cases removal may be avoided by trimming. Tree clearing per acre along the option is illustrated in the graphic to the right.
- **Wildlife Habitat:** Tree removal would reduce the quality and quantity of wildlife habitat. This would be slightly offset by the installation of additional poles along the new corridor, although PSE would continue the practice of discouraging nesting on the new poles. The limited number and footprint of poles that may be installed in wetland habitat 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, Richards, and Sunset creeks, stream habitat would not be substantially affected by the project.

3.4.5.10 Bellevue South Segment, Oak 2 Option

Although the potential effects of tree removal in this option would be similar to those described for the Redmond Segment, a lower percentage of trees would be removed. While a portion of the corridor occurs along existing roadways and commercially developed areas, as described for the Oak 1 Option, the remainder of the alignment occurs along the existing corridor. Therefore, tree removal is not expected to substantially change the basic character and functions of the habitat for supporting urbanized wildlife species. 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 option, 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 1,610 trees (73 percent of the surveyed trees along the option route) could be removed, including the potential removal of about 1,100 significant trees, three trees from critical areas, and about 79 from critical area buffers. In some cases removal may be avoided by trimming. Tree clearing per acre along the option is illustrated in the graphic to the right.
- **Wildlife Habitat:** Tree removal would reduce the quality and quantity of wildlife habitat. Although this would be slightly offset by the installation of additional poles along the new corridor, PSE would continue the practice of discouraging nesting on the new poles. The limited number and footprint of poles that may be installed in wetland habitat 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, Richards, Sunset, and Coal creeks, stream habitat would not be substantially affected by the project.



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3.4.5.11 Bellevue South Segment, Willow 1 Option

Effects of tree removal in this option would be similar to those described for the Redmond Segment, although the amount of potential tree removal would be lower. 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 option, 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 (80 percent of trees surveyed along the option route) could be removed, including the potential removal of about 450 significant trees, four trees from critical areas, and about 75 from critical area buffers. In some cases removal may be avoided by trimming. Tree clearing per acre along the option 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, Richards, Sunset, and Coal creeks, stream habitat would not be substantially affected by the project.

3.4.5.12 *Bellevue South Segment, Willow 2 Option (PSE's Preferred Alignment)*

Effects of tree removal in this option would be similar to those described for the Redmond Segment, although the amount of potential tree removal would be lower. 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, and few protected wildlife species regularly occur in the corridor. 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 option, 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 1,660 trees (84 percent of the trees surveyed along the option route) could be removed, including the potential removal of about 970 significant trees, four trees from critical areas, and about 78 trees from critical area buffers. In some cases removal may be avoided by trimming. Tree clearing per acre along the option 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 East, Richards, Sunset, and Coal creeks, stream habitat would not be substantially affected by the project.

3.4.5.13 Comparison of Bellevue South Options

All Bellevue South Segment options contain biological resources that support fish and wildlife species. The potential impacts to these resources are compared below by option (Table 3.4-2).

In the Bellevue South Segment, the Oak 2 and Willow 2 Options would remove the most trees overall; each would result in about 60 percent more trees removed than either the Oak 1 or Willow 1 Options. The Oak 2 and Willow 2 Options would also remove the most significant trees, with the Oak 2 Option resulting in the greatest number of significant trees removed. However, all four options would result in a similar number of trees removed from critical areas or buffers.

Table 3.4-2. Comparison of Bellevue South Options

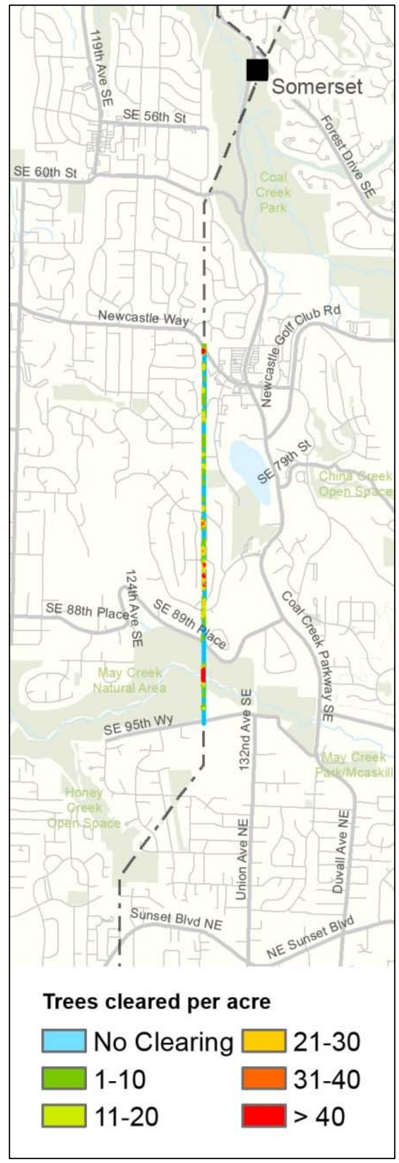
Segment / Option	Total Trees Removed[1]	Significant Trees Removed[1]	Trees Removed from Critical Areas	Trees Removed from Critical Area Buffers
Oak 1 Option	1,040	670	2	73
Oak 2 Option	1,610	1,066	3	79
Willow 1 Option	1,030	450	4	75
Willow 2 Option	1,660	970	4	78

[1] Total tree and significant tree numbers are rounded to the nearest 10, and typically represent conservatively high estimates of potential tree removal levels.

3.4.5.14 Newcastle Segment

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.

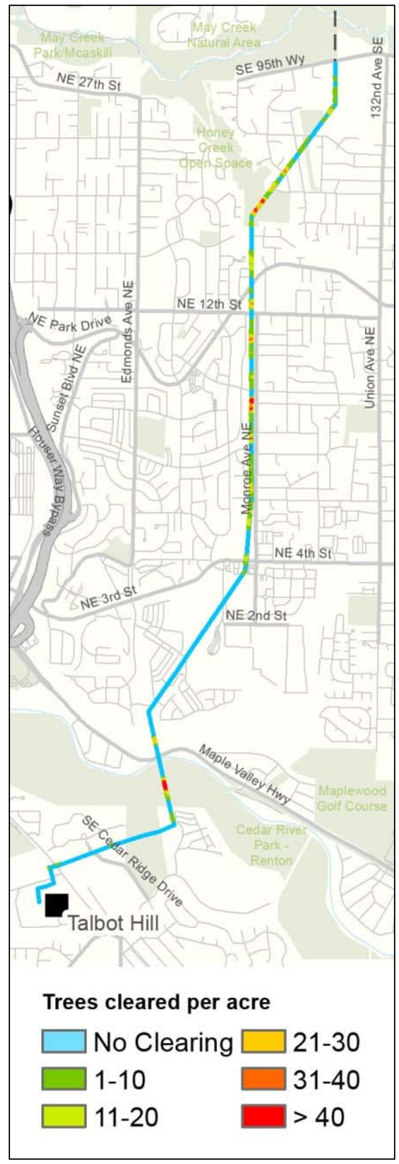
- **Vegetation Clearing:** About 300 trees (82 percent of the trees surveyed along the segment) could be removed, including the potential removal of about 35 significant trees, two trees from critical areas, and about 57 trees from critical area buffers. In some cases removal may be avoided by trimming. 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 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.



3.4.5.15 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 (70 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.



3.4.6 Mitigation Measures

Federal, state, and local regulations, policies, ordinances, and programs, established to protect natural resources regulations (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 appealable. 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.

3.4.6.1 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

During Operation

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

3.4.6.2 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

- On-site restoration or enhancement of habitat, disturbed during pole placement and clearing would occur, and no substantial impacts to fish and wildlife habitat are expected.
- In the Bridle Trails Subarea in the City of Bellevue, plant replacement trees as required under the City's Tree Retention and Replacement Code.
- 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.

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.
- Continue to implement the PSE 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 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 avian species by retrofitting existing structures with wire guards, flight diverter devices, and bird guards.

3.5 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 has been identified as 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 project.

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.

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 3.5.2).

3.5.1 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 23,500 times more potent than CO_2 (IPCC, 2013). The ability of these gases to trap heat is called global warming potential.

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 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.

3.5.2 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 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).

3.5.3 Relevant Plans, Policies, and Regulations

Air quality and GHG emissions in the Puget Sound region are regulated and enforced by federal and state agencies—the U.S. Environmental Protection Agency (EPA) and Ecology. The cities of Bellevue, Redmond, and Renton have plans or policies addressing GHG emissions (Newcastle has no plans or policies that specifically address GHGs). King County provides overarching guidance policy for the region on GHGs and climate change through implementation of its Strategic Climate Action Plan (King County, 2015). King County has committed to reducing countywide sources of GHG emissions, compared to a 2007 baseline, by 25 percent by 2020, 50 percent by 2030, and 80 percent by 2050 (King County, 2015). King County implemented the King County-Cities Climate Collaboration (K4C), of which Bellevue, Kirkland, Redmond, and Renton, among others, are members. They have partnered to coordinate and enhance the effectiveness of local government climate and sustainability actions by:

1. Collaborating through the Growth Management Planning Council, Sound Cities Association, and other partners to adopt countywide GHG emissions reduction targets, including mid-term milestones needed to support long-term reduction goals.

2. Building on King County's commitment to measure and report on countywide GHG emissions by sharing data between cities and partners, establishing a public dashboard for tracking progress, and using the information to inform regional climate action.

3. Developing and adopting near-term and long-term government operational GHG reduction targets that support countywide goals, and implementing actions to reduce each local government's GHG footprint.

Federal, state, and local regulations and plans are described in detail on pages 4-4 through 4-9 of the Phase 1 Draft EIS. This section of the Phase 1 Draft EIS also describes actions taken by the Partner Cities to reduce GHG emissions, such as campaigns to reduce the cost of solar electricity, pursuing natural resource conservation projects, reducing emissions associated with government operations, and implementing climate action implementation plans. Bellevue, Renton, and Redmond have also developed GHG inventories to track emissions.

Of particular applicability is Chapter 173-441 WAC – Reporting of Emissions of Greenhouse Gases, because the quantitative emission limits of this rule were used in the development of impact assessment criteria for the project. This rule institutes mandatory GHG reporting for facilities that emit at least 10,000 metric tons of GHGs per year in Washington or suppliers of liquid motor vehicle fuel, special fuel, or aircraft fuel that supply products equivalent to at least 10,000 metric tons of CO_2 per year in Washington.

In a recent development that has occurred since release of the Phase 1 Draft EIS, on August 2, 2016, the federal Council on Environmental Quality released final guidance for federal agencies on how to consider the impacts of their actions on global climate change in their National Environmental Policy Act (NEPA) reviews (CEQ, 2016). This final guidance does not recommend quantitative thresholds that would indicate a substantial impact related to GHG emissions but, rather, provides a framework for agencies to consider both the effects of a proposed action on climate change, as indicated by its estimated GHG emissions, and the effects of climate change on a proposed action. While this guidance applies to proposed federal agency actions that are subject to NEPA analysis, similar guidance does not currently exist at the state or local level, and consideration of GHG sources identified in the guidance was used in the impact assessment that follows.

In current state regulation developments, Ecology has adopted a Clean Air Rule to cap and reduce GHGs in Washington under the state's Clean Air Act. The Clean Air Rule addresses activities responsible for about two-thirds of carbon pollution in Washington, such as transportation, refining, and manufacturing. Under the Clean Air Rule, natural gas distributors, petroleum fuel producers and importers, large manufacturers, electricity generating plants, waste facilities, and other organizations that are responsible for more than 100,000 metric tons of GHGs are required to reduce their emissions or sponsor projects to offset those emissions beginning in 2017. Every 3 years, the threshold will be lowered and more emitters brought into the program, through 2035 (Ecology, 2016). Although PSE operates electricity generating plants, such infrastructure is not proposed in any of the alternatives. The newly adopted Clean Air Rule does not apply to the proposed alternatives and, given its relatively large threshold, is not applied in the following impact analysis.

3.5.4 Greenhouse Gases in the Study Area

Ecology estimated that in 2010, Washington produced about 96 million gross metric tons (about 106 million U.S. tons) of CO_2e (Adelsman, 2014). Sources of GHG emissions in the state are shown in Figure 3.5-1.

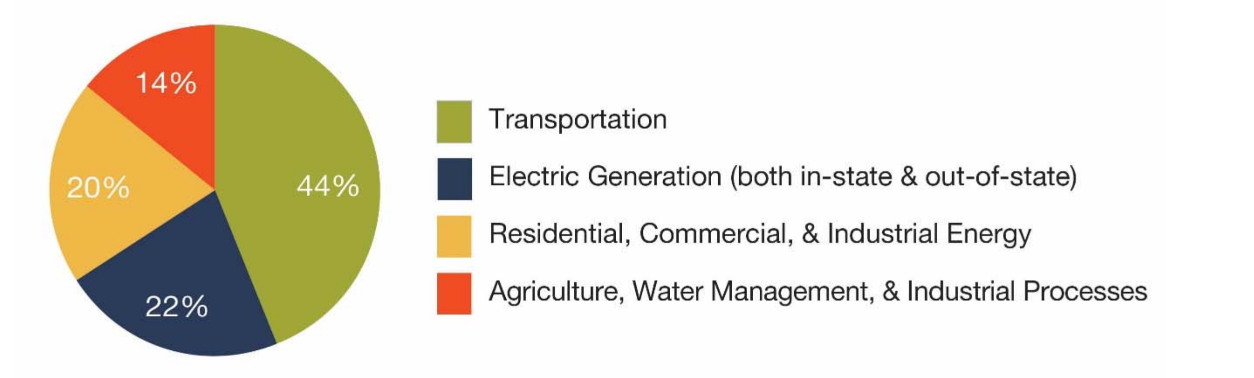


Figure 3.5-1. Sources of GHG Emissions in Washington State

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.

3.5.5 Long-term (Operation) Impacts Considered

3.5.5.1 Methods for Analyzing Long-term Impacts

The 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) for each project segment and option, and sequestration calculations using the iTree 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 (i-Tree, 2016). See Section 3.10, *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 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 greenhouse gas emissions associated with the project are considered, as warranted.

A quantitative assessment of GHG emissions of sulfur hexaflouoride (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 23,900 times more potent than carbon dioxide as a GHG. 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 predicted 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.

3.5.6 Long-term Impacts: No Action Alternative

Under the No Action Alternative, no infrastructure improvements, changes to vegetation management activities, or new or relocated maintenance 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.

3.5.7 Long-term Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

3.5.7.1 *Impacts Common to all Components*

Any combination of segment and option routes and the Richards Creek substation site would result in some level of sequestration losses due to tree removal. Additionally, Alternative 1 would result in fugitive SF_6 emissions from gas-insulated circuit breakers at the Richards Creek, Sammamish, and Talbot Hill substations. The least impactful combination would be the Existing Corridor Option of the Bellevue Central Segment combined with the Willow 1 Option in the Bellevue South Segment, which would result in a project-wide sequestration loss of 134 metric tons of CO_2e per year. The most impactful combination would be Bypass Option 1 of the Bellevue Central Segment combined with the Oak 2 Option in the Bellevue South Segment, which would result in a project-wide sequestration loss of 194 metric tons of CO_2e per year. In all cases, however, the emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant. Figure 3.5-2 presents the sequestration losses associated with each segment, and the following narrative describes the tree losses associated with each segment or option.

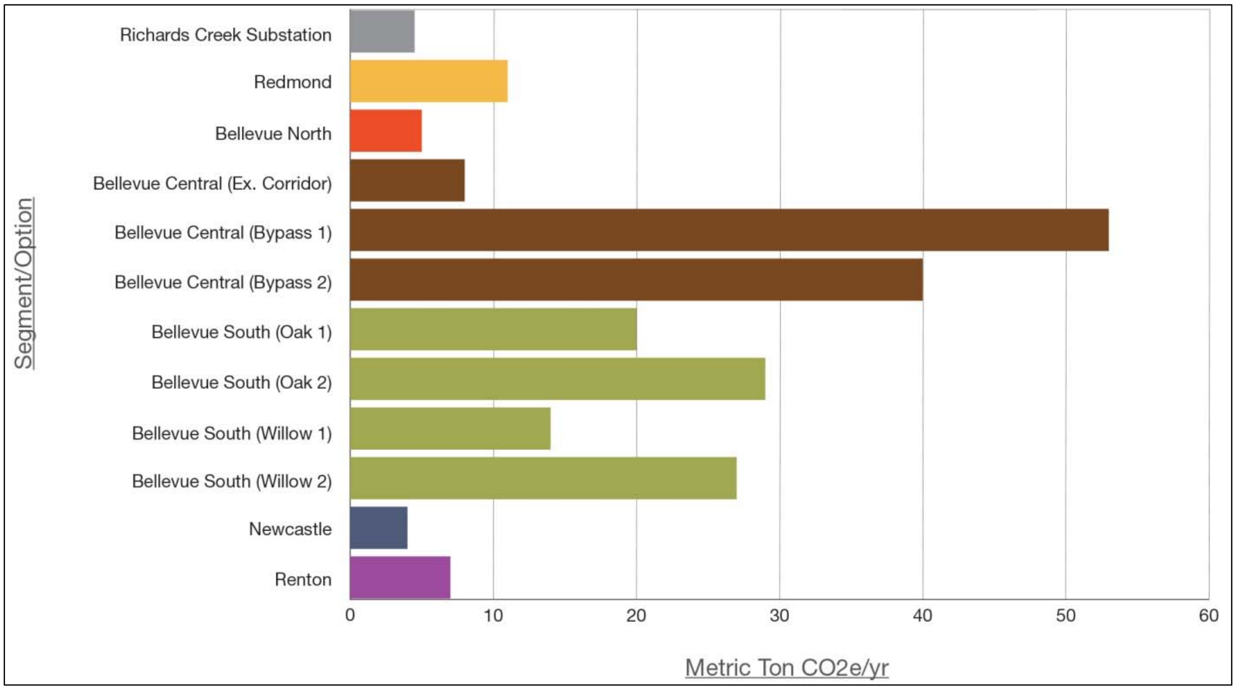


Figure 3.5-2. Estimated GHG Sequestration Losses in Project Segments

3.5.7.2 New Richards Creek Substation and other Substation Improvements

The total lot area for the substation site is 7.8 acres in size, and the substation yard would cover 1.9 acres within a fenced lot. Approximately 170 trees would be removed to allow for the installation of the substation and equipment (The Watershed Company, 2016). 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 4.03 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. Consequently, all new breakers would total an SF_6 load of approximately 1,416 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 7.08 pounds per year, which is equivalent to 75 metric tons of CO_2e per year.

[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.

3.5.7.3 Redmond Segment

Approximately 630 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 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.

3.5.7.4 Bellevue North Segment

Approximately 510 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 5.5 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.

3.5.7.5 Bellevue Central Segment, Existing Corridor Option

Approximately 600 trees would be removed to allow for the installation of power lines and poles along the Bellevue Central Segment, Existing Corridor Option (The Watershed Company, 2016). Tree removal along the Existing Corridor Option would result in 8.49 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.

3.5.7.6 Bellevue Central Segment, Bypass Option 1

Approximately 1,790 trees would be removed to allow for the installation of power lines and poles along the Bellevue Central Segment, Bypass Option 1 (The Watershed Company, 2016). Tree removal along the Bypass Option 1 alignment would result in 53 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.

3.5.7.7 Bellevue Central Segment, Bypass Option 2

Approximately 1,200 trees would be removed to allow for the installation of power lines and poles along the Bellevue Central Segment, Bypass Option 1 (The Watershed Company, 2016). Tree removal along the Bypass Option 2 alignment would result in 40 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.

3.5.7.8 Comparison of Bellevue Central Options

All options would result in GHG emissions from fugitive releases of SF_6 used as an electrical insulator in some high-voltage equipment at the Richards Creek, Sammamish, and Talbot Hill substations, while the amount of GHG sequestration losses from tree removal would vary depending on which option is selected. The potential impacts to these resources are compared below by option (Table 3.5-1).

In the Bellevue Central Segment, the Existing Corridor Option would avoid the most sequestration losses of GHGs although GHG emissions associated with all options in this segment would be well below State of Washington reporting thresholds and would result in minor adverse impacts.

Table 3.5-1. Comparison of Bellevue Central Options

Segment / Option	GHGs from Sequestration Loss of Segment Option (MT CO_2e/year)	GHGs from Sequestration Loss of Other non-optional Segments (MT CO_2e/year)	Fugitive Loss of SF(from New Gas-Insulated Substatio Equipment (MT CO_2e/year)	Total GHG Losses (MT CO_2e/year)
Existing Corridor Option	8.5	37	75	121
Bypass Option 1	53	37	75	165
Bypass Option 2	39	37	75	151

3.5.7.9 Bellevue South Segment, Oak 1 Option

Approximately 1,030 trees would be removed to allow for the installation of power lines and poles along the Bellevue South Segment, Oak 1 Option (The Watershed Company, 2016). Tree removal along the Oak 1 Option would result in 20 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.

3.5.7.10 Bellevue South Segment, Oak 2 Option

Approximately 1,600 trees would be removed to allow for the installation of power lines and poles along the Bellevue South Segment, Oak 2 Option (The Watershed Company, 2016). Tree removal along the Oak 2 Option would result in 29 metric tons of CO_2e per year in sequestration losses, the highest losses of any of the Bellevue South Segment options. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

3.5.7.11 Bellevue South Segment, Willow 1 Option

Approximately 1,030 trees would be removed to allow for the installation of power lines and poles along the Bellevue South Segment, Willow 1 Option (The Watershed Company, 2016). Tree removal along the Willow 1 Option would result in 14 metric tons of CO_2e per year in sequestration losses, the lowest losses of any of the Bellevue South Segment options. These emissions would be substantially below the State of Washington reporting threshold of 10,000 metric tons and, therefore, less-than-significant.

3.5.7.12 Bellevue South Segment, Willow 2 Option (PSE's Preferred Alignment)

Approximately 1,640 trees would be removed to allow for the installation of power lines and poles along the Bellevue South Segment, Willow 2 Option (The Watershed Company, 2016). Tree removal along the Willow 2 Option would result in 27 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.

3.5.7.13 Comparison of Bellevue South Options

All options would result in GHG emissions from fugitive releases of SF_6 used as an electrical insulator in some high-voltage equipment at the Richards Creek, Sammamish, and Talbot Hill substations, while the amount of GHG sequestration losses from tree removal would vary depending on which option is selected. The potential impacts to these resources are compared below by option (Table 3.5-2).

In the Bellevue South Segment, the Willow 1 Option would avoid the most sequestration losses of GHGs although GHG emissions associated with all options in this segment would be well below State of Washington reporting thresholds and would result in minor adverse impacts.

Table 3.5-2. Comparison of Bellevue South Options

Segment / Option	GHGs from Sequestration Loss of Segment Option (MT CO_2e/year)	GHGs from Sequestration Loss of Other non-optional Segments (MT CO_2e/year)	Fugitive Loss of SF(from New Gas-Insulated Substatio Equipment (MT CO_2e/year)	Total GHG Losses (MT CO_2e/year)
Oak 1 Option	20	37	75	132
Oak 2 Option	28	37	75	140
Willow 1 Option	14	37	75	126
Willow 2 Option	27	37	75	139

3.5.7.14 Newcastle Segment

Approximately 300 trees would be removed to allow for the installation of power lines and poles along the Newcastle Segment (The Watershed Company, 2016). Tree removal along the Newcastle Segment would result in 4.2 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.

3.5.7.15 Renton Segment

Approximately 350 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 7.1 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.

3.5.8 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 the applicant to adopt or the local jurisdictions to impose as a condition of project approval.

3.5.8.1 Regulatory Requirements

Although there are no regulations specifically limiting GHG emissions, all of the segments and options would need to comply with applicable federal, state, and local regulations, some of which would mitigate the potential for long-term adverse GHG impacts. Mitigation measures required for compliance with such regulations are not appealable.

As described in Section 3.4, *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 3.4, *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 cross-sectional diameter of trees removed, or on habitat functions lost due to trees removal, depending on applicable regulations.

3.5.8.2 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 BMPs 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.

3.6 RECREATION

This chapter 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 3.2, *Scenic Views and Aesthetic Environment*. The study area for recreation resources includes PSE's existing and new corridors, and road corridors and parcels adjacent to the segment and option routes (Figure 3.6-1).

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.

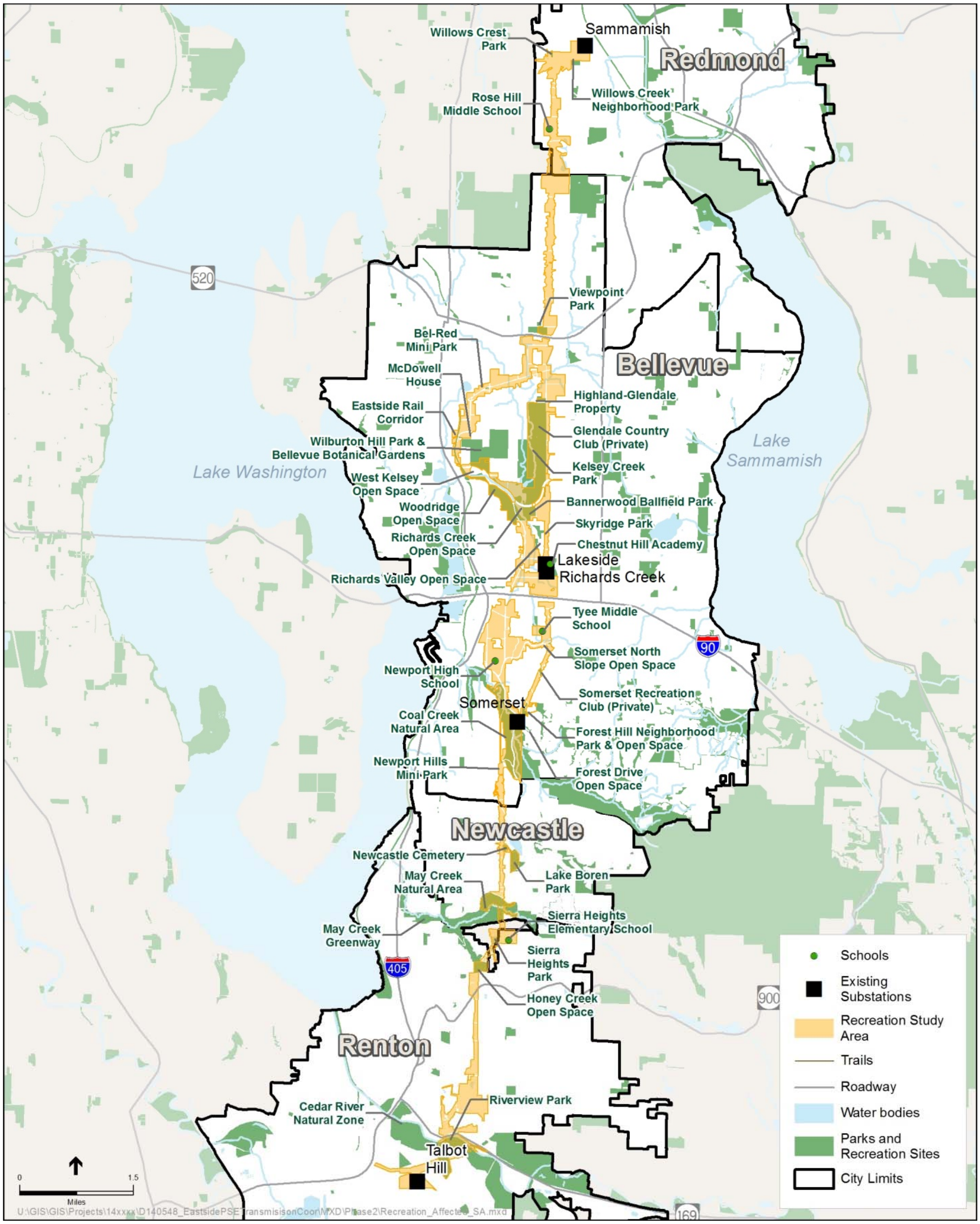
3.6.1 Relevant Plans, Policies, and Regulations

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. Since the publication of the Phase 1 Draft EIS, two additional plans have been prepared and adopted: the City of Bellevue Parks & Open Space System Plan (City of Bellevue, 2016a) and the Eastside Rail Corridor Regional Trail Final Master Plan (King County, 2016a). Redmond's Transportation Master Plan, which includes pedestrian and bicycle system plans (2013), was not originally included in Table 12-1.

The City of Bellevue's comprehensive plan has a policy to avoid placing overhead lines in greenbelts or open spaces, which are often recreation sites (City of Bellevue, 2015). The other Partner Cities' plans do not have specific policies regarding the placement of electric utilities in or near recreation sites, but they generally discourage the use of recreation sites for non-recreational uses. The cities of Bellevue, Newcastle, and Redmond all have similar policies to encourage the use of utility corridors for nonmotorized recreation (see Appendix F) (City of Bellevue, 2015; City of Newcastle, 2016a; City of Redmond, 2015).

Most recreation sites in the study area were acquired with federal, state, or local grants, bonds, or other funding sources. The funding usually comes with provisions that protect the land for recreation in perpetuity. The conversion of recreation land purchased with restricted funds for non-recreation purposes would need to meet parcel-specific requirements. Recreation sites are often made up of more than one parcel, and thus restrictions can differ within an individual park. The City of Bellevue's Comprehensive Plan (2015) also has a policy that requires a public review process for proposed conversions of park property to a non-recreational use. The other Partner Cities do not have specific policies regarding the potential conversion of recreation land.

In addition to parcel-specific requirements, recreation lands transferred from King County to a Partner City are subject to RCW 36.89.050, which stipulates that a county may transfer recreational sites to any other governmental agency, provided that the site continue to be used for the same purpose or that other equivalent sites be conveyed to the county if the site were converted to another use.



Source: King County, 2015; Ecology, 2014; Bellevue, 2015; Newcastle, 2015; Renton, 2015; Kirkland, 2015; Redmond, 2015.

Figure 3.6-1. Recreation Sites in the Study Area

3.6.2 Recreation Resources in the Study Area

The study area contains approximately 27 recreation sites plus many miles of trails, shown on Figure 3.6-1. This encompasses approximately 633 acres in recreation sites owned and operated primarily by local governments, and includes five 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. Table 3.6-1 lists the recreation sites in each segment and their amenities, as well as any planned improvements and the owner/manager of the site.

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. Five schools in the study area have outdoor sports fields, courts, or playground equipment that are used by students: Rose Hill Middle School, Chestnut Hill Academy, Newport High School, Tyee Middle School, and Sierra Heights Elementary. Public school facilities may also be available to the public during non-school hours. Bannerwood Ballfield Park, Willows Creek Neighborhood Park, Willows Crest Park, and Lake Boren Park also offer sports fields or courts. Two privately owned recreation clubs offer tennis, swimming, or golf through paid membership (Table 3.6-1).

A number of the recreation sites in the study area are within PSE's existing corridor and are crossed by wires or have a pole located within the site. These include small parks entirely within the easement, large parks that were created around the existing transmission line corridor after it was first constructed in the late 1920s, and a number of trails along the corridor (Table 3.6-1).

Recreation sites also provide valuable natural habitat, an important aspect of their function as recreation resources. The greenspaces of Kelsey Creek, Coal Creek, May Creek, and Cedar River in particular are large areas made up of a number of parks and natural areas that are important for habitat (see Section 3.4, *Plants and Animals*).

Table 3.6-1. Recreation Sites in the Study Area

Recreation Sites	Recreation Opportunities	Owner/Manager
Richards Creek Substation		
Chestnut Hill Academy	Multi-use field, basketball court, and playgrounds.	Private
Redmond Segment		
Willows Crest Park	Children's play area, picnic area, and a basketball hoop.	Private
Willows Creek Neighborhood Park	Children's play area, basketball half court, and open space.	Redmond

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Recreation Sites	Recreation Opportunities	Owner/Manager
Trails on the corridor (unnamed, on corridor, between the Sammamish substation and where the corridor turns south)	Running and walking.	Redmond
Rose Hill Middle School	Tennis courts, track, soccer field, and baseball field.	Lake Washington School District
Bellevue North Segment		
Bridle Crest Trail	Two miles of trails, for running, walking, horseback riding, and mountain biking. Crosses the study area and connects to Bridle Trails State Park.	Redmond and Kirkland
Unnamed Trail (crosses corridor in NE 52nd Ln right-of-way)	Running, walking, horseback riding, and mountain biking. Crosses the study area and connects to Bridle Trails State Park.	Redmond
Viewpoint Park	A 13.5-acre natural area with trails.	Bellevue
SR 520 Trail	Regional multi-use trail (running walking, and cycling) that crosses the study area.	Washington State Department of Transportation (WSDOT)
Bellevue Central Segment		
Unnamed Trail (on corridor at Bel-Red Rd and NE Spring Blvd)	Bicycling and walking.	Bellevue
Bel-Red Mini Park	Picnic area and greenspace in urban area.	Bellevue
Highland-Glendale Property	Forested and undeveloped. Recommended for improvement in Bellevue Parks & Open Space Systems Plan (2016a).	Bellevue
Glendale Country Club	Membership-based golf club and clubhouse.	Private
Unnamed Trails along the corridor (between SE 10th St and SE 20th St) and SE 3rd Trail	Trail connecting Kelsey Creek Park along corridor south to Skyridge Park. This trail is part of the Lake to Lake Greenway, which connects Lake Sammamish to Lake Washington. Portion on SE 3rd Pl is along a sidewalk.	Bellevue

Recreation Sites	Recreation Opportunities	Owner/Manager
Kelsey Creek Park	Large natural area (150 acres) with trails, forest, meadows, wetlands, picnic areas, children's play area, farm, historic barns, and farm-themed programs. Portion of park in study area includes natural area and trails. Part of network of parks along the Lake Hills Connector and part of the Lake to Lake Greenway, which connects Lake Sammamish to Lake Washington.	Bellevue
McDowell House	Houses the administrative offices of the Eastside Heritage Center, located on land owned by the City of Bellevue Parks & Community Services Department.	Bellevue
Eastside Rail Corridor (ERC)	Proposed regional multi-use trail section, part of a larger regional trail. The section of trail in the study area is not developed (the railroad tracks still remain) but is part of the preferred ERC route. Adjacent to the network of parks along the Lake Hills Connector.	King County
Wilburton Hill Park and Bellevue Botanical Gardens	Large natural area (106 acres) with the Botanical Gardens, a picnic area, a children's play area, baseball fields, and a soccer field. The portion of park in the study area includes natural area and trails. It is part of a network of parks along the Lake Hills Connector and part of the Lake to Lake Greenway.	Bellevue
West Kelsey Open Space	Undeveloped area adjacent to Woodridge Open Space; the West Tributary of Kelsey Creek crosses through the park. Part of a network of parks along the Lake Hills Connector and part of the Lake to Lake Greenway.	Bellevue
Woodridge Open Space and Richards Creek Open Space	Approximately 30 acres of forested open space with a stream and trails. Part of the Richards Valley Greenway and the network of parks along the Lake Hills Connector and part of the Lake to Lake Greenway.	Bellevue
Bannerwood Ballfield Park	Baseball stadium with stands and concession. Part of network of parks along the Lake Hills Connector and part of the Lake to Lake Greenway.	Bellevue School District

Recreation Sites	Recreation Opportunities	Owner/Manager
Skyridge Park	Trails and picnic and children's play area. Connected to Richards Valley Open Space, Richards Valley Trail and Parkland Estates Trail, and a trail along PSE's corridor.	Bellevue
Richards Valley Greenway	Planned greenway between SE 8th St and Lake Sammamish, along Lake Hills Connector, Richards Rd, along the south side of Bannerwood Ballfield Park, through Skyridge Park, and east along SE 24th Street.	Bellevue
Richards Valley Open Space	Primarily undeveloped park. Part of the Richards Valley Greenway and the network of parks along the Lake Hills Connector.	Bellevue
Bellevue South Segment		
Mountains to Sound Greenway I-90 Trail	Regional multi-use trail (running, walking, and cycling) that crosses the study area.	Washington State Department of Transportation
Tyee Middle School	Ballfields, tennis courts, soccer field, and a track.	Bellevue School District
Somerset North Slope Open Space	Fenced and partially forested.	Bellevue
Somerset Recreation Club	Membership-based club with tennis courts, swimming pool, water slide, and toddler pool.	Private
Newport High School	Ballfields, tennis courts, soccer, lacrosse, football field, and a track.	Bellevue School District
Forest Hill Neighborhood Park & Open Space	Children's play area, picnic tables, and trails.	Bellevue
Forest Drive Open Space	Undeveloped, forested greenspace along Forest Drive.	Bellevue
Coal Creek Natural Area	Large natural area (446 acres) and includes Coal Creek, 4.5 miles of trails, and connects to Cougar Mountain Regional Wildland Park.	Bellevue
Newport Hills Mini Park	Trail and open space.	Bellevue

Recreation Sites	Recreation Opportunities	Owner/Manager
Waterline Trail	Trail along corridor, south from SE 60th St and continuing into Newcastle parallel to PSE's existing corridor. Adjacent to Newport Hills Mini Park.	Seattle Public Utilities
Newcastle Segment		
Waterline Trail	Continues from Bellevue south into Newcastle crossing PSE's existing corridor just south of Newport Way.	Seattle Public Utilities
China Creek Trail (proposed)	Proposed trail that crosses the study area north of the Cross Town Trail.	Newcastle
Lake Boren Park	Community park with walking paths, children's play area, picnic shelters, fishing dock, tennis courts, a basketball court, and a sand volleyball court.	Newcastle
Cross Town Trail	Primarily east-west trail that crosses the study area, through the northern edge of Newcastle Cemetery[1]. It is part of a large network of trails connecting to Cougar Mountain and the Coal and May Creek Natural Areas.	Newcastle
Olympus Trail	North-south trail along the corridor. Part of a large network of trails connecting to Cougar Mountain and the Coal and May Creek Natural Areas.	Newcastle
May Creek Natural Area	Large natural area (almost 200 acres) and complex of parks; includes May Creek and May Creek Trail. Connects Lake Washington Blvd to Cougar Mountain as well as to the Honey Creek Open Space.	Newcastle, Renton, and King County

Recreation Sites	Recreation Opportunities	Owner/Manager
Renton Segment		
Sierra Heights Park	Forested park and trail north of NE 25th St between PSE and SCL corridors. South of NE 25th St, the park follows both the PSE and SCL corridors; there is a trail along the SCL corridor, whereas the PSE corridor is vegetated with limited access.	Renton
Sierra Heights Elementary School	Ballfields, open play field, and play areas.	Renton School District
May Creek Greenway	Portion of the May Creek Natural Area in Renton.	Renton
Honey Creek Open Space/Greenway	Natural area with a creek and trail. Connected to May Creek Natural Area (36 acres).	Renton
Cedar River Natural Zone	Large (550 acres) complex of parks includes Cedar River and Cedar River Trail (17.3 miles long). Portion in the study area is natural areas and trail.	Renton
Riverview Park	Picnic tables, shelter, parking, restrooms, open space, and launch area for kayaks and canoes.	Renton

[1] The Newcastle Cemetery is described in Section 3.7, *Historic and Cultural Resources*.

Source: King County, 2016b; City of Bellevue, 2016b; City of Newcastle, 2016b; City of Redmond, 2016; City of Renton, 2016; Lake Washington School District, 2016; Bellevue School District, 2016a,b; Glendale Country Club, 2016; Somerset Recreation Club, 2016; and Google Earth, 2016.

3.6.3 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 and route options 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 for easements within a recreation site was also considered.

3.6.4 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.

3.6.5 Long-term Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

3.6.5.1 Impacts Common to all Components

Recreation sites are located within and adjacent to PSE's existing corridor, as well as near roads in the new corridor for the options. For the existing corridor, including portions that pass through recreation sites, PSE has easements or owns the parcels outright. PSE would not acquire new easements along the existing corridor. Within PSE's existing corridor, poles would be replaced in generally the same location as the existing poles. The existing H-frame poles are typically 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.

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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, Alternative 1 would require a substantial number of trees to be removed (see *Vegetation Management* in Section 3.4.1.3, *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 site and thus no change would be perceived.

The segment options that place the transmission line outside of PSE's existing corridor would mostly run along road right-of-way. Wherever possible, PSE would place the transmission poles on adjacent property or, if not possible on adjacent property, on the outermost portion of the road right-of-way. This is to minimize the possibility of having to relocate the poles in the event of future road improvements or other utility-related work in the road right-of-way. Whether the poles would be placed on adjacent property or on the outermost portion of the road rights-of-way, PSE would have to obtain easements on properties adjacent to the transmission line to allow for their use, such as tree removal and vegetation management, consistent with NERC requirements. In some cases, easements would be needed on recreation properties. Many recreational sites have been purchased with federal, state, or local grants, bonds, or other funding sources. The funding usually comes with provisions that protect the land for recreation in perpetuity. The conversion of recreation land purchased with restricted funds for non-recreation purposes would need to meet parcel-specific requirements. PSE's ability to acquire an easement or purchase a recreation site for non-recreation use would require an evaluation process that would be contingent on approval from the property owner and grant agency or agencies (personal communication, L. Peterson, 2016). Conversion to a non-recreation use would require mitigation as agreed upon with the agencies involved. The City of Bellevue's Comprehensive Plan (2015) also has a policy that requires a public review process for proposed conversions of park property to a non-recreational use. The other Partner Cities do not have specific policies regarding the potential conversion of recreation land. The restrictions, and therefore the possibility of conversion, would be different for each parcel. Bypass Option 1 and Bypass Option 2 in the Bellevue Central Segment, and in the Bellevue South Segment with the Oak 1, Oak 2, and Willow 2 Options may require the acquisition of easements in publicly owned recreation sites. This would only be possible if the acquisition complies with covenants set out on the property title. Even if there is no restriction on the property, acquisition of easements in publicly owned recreation sites would be a significant impact because it would not be in compliance with City of Bellevue recreation plans and policies (Appendix F).

Other potential impacts under Alternative 1 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.

3.6.5.2 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 200 feet to the north). The new substation would not be visible from recreation facilities at the school because a forested area between the school and the proposed substation site would remain.

3.6.5.3 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.

- **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 one 100-foot steel monopole. 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-frames (two poles) would be replaced with one 100-foot monopole. 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. Impacts would be less-than-significant. The existing 115 kV lines and monopoles to the east of the project would not change.

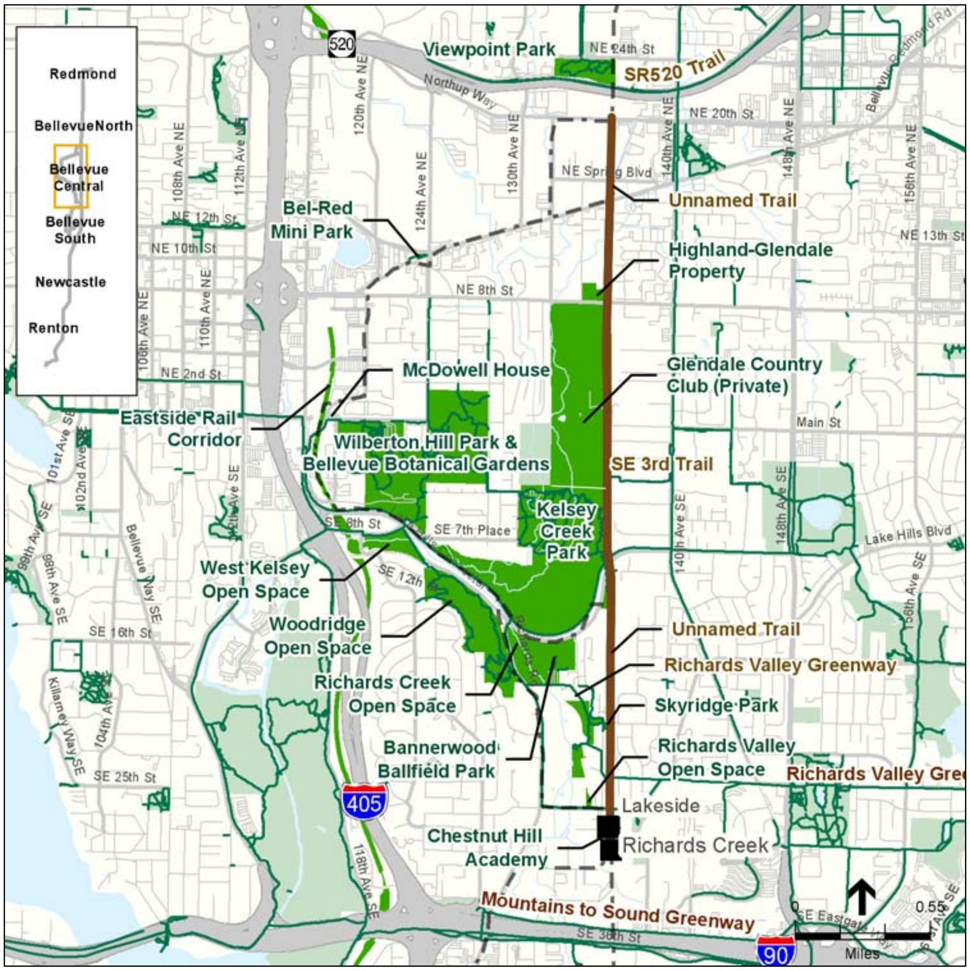
3.6.5.4 Bellevue North Segment

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.

- **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 one 100-foot monopole (there would be one pole in the park). 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.

3.6.5.5 Bellevue Central Segment, Existing Corridor Option

Impacts to recreation from the Existing Corridor Option 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.



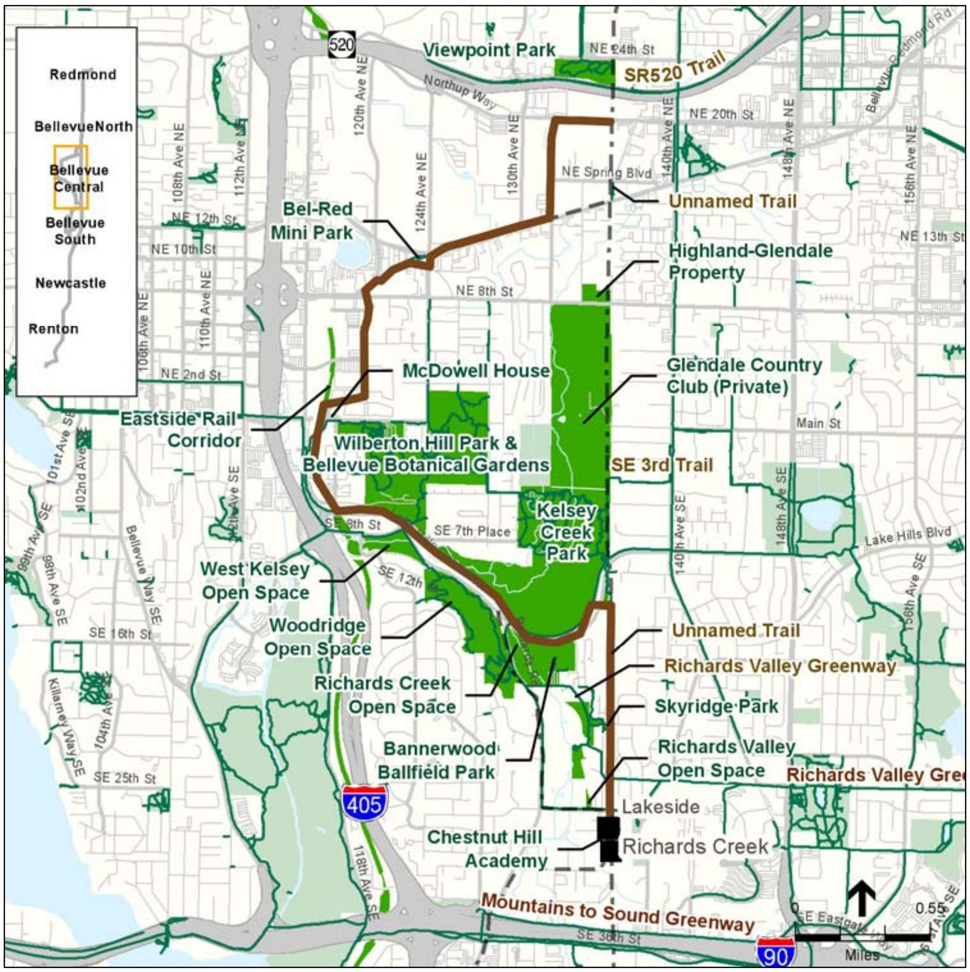
- **Unnamed Trail (on Corridor at Bel-Red Road and NE Spring Boulevard):** There would be no change to this segment of trail, and thus no impact.
- **Highland-Glendale Property:** The existing corridor crosses the east edge of the park, but no poles are located within the park and no new poles are proposed. 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 95-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) and SE 3rd Trail:** There would be fewer poles (one 95-foot monopole at each location instead of two H-frames) and more vegetation cleared. 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 95-foot monopoles placed near existing poles. 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 a 95-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, four 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.
- **Bel-Red Mini Park, Eastside Rail Corridor, Wilburton Hill Park & Bellevue Botanical Gardens, McDowell House, West Kelsey Open Space, Woodridge Open Space, Richards Creek Open Space, Bannerwood Ballfield Park, and Richards Valley Open Space**: The Existing Corridor Option is not adjacent to these recreation sites. Thus, they would not be affected and there would be no impacts.

3.6.5.6 Bellevue Central Segment, Bypass Option 1

Impacts to recreation from Bypass Option 1 would be 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. Easements may need to be obtained in the following recreations sites along the new corridor: Wilburton Hill Park and Bellevue Botanical Gardens, Kelsey Creek Park, Eastside Rail Corridor, Richards Creek Open Space, and Bannerwood Ballfield Park. Potential impacts are summarized below, by recreation site.



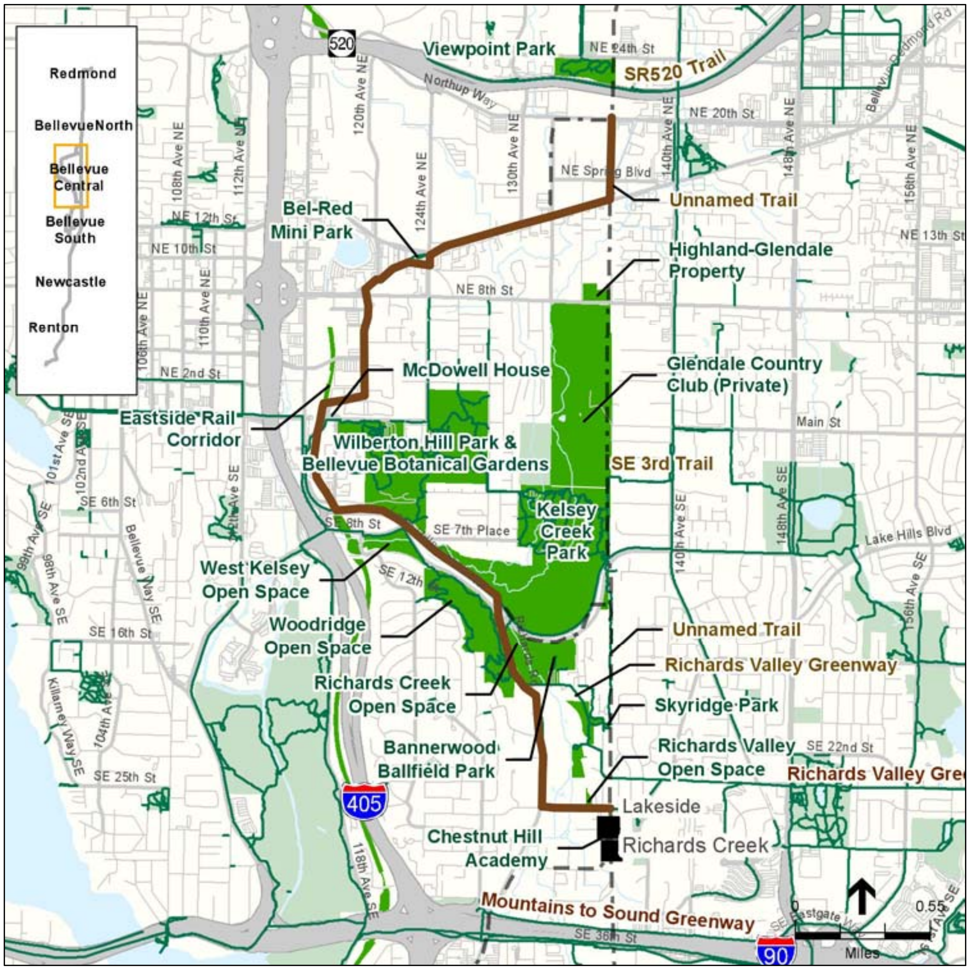
- **Bell-Red Mini Park:** The new corridor would not be adjacent to the park; the new corridor would jog south along 124th Avenue NE to Bel-Red Road, avoiding the park. It would not be affected (no impact).
- **McDowell House:** Bypass Option 1 would be located along the ERC on the opposite side of SE 1st Street from McDowell House. Due to vegetation, the option would not be visible from McDowell House, and there would be no impact.
- **Wilburton Hill Park and Bellevue Botanical Gardens, and Kelsey Creek Park:** These parks are on the north side of the Lake Hills Connector where the majority of the poles would be placed. PSE may need to acquire an easement within these parks, adjacent to the road, which would be a significant impact because it is not in agreement with Bellevue Park policies

(Appendix F). In the new easements within the new corridor, 50–55 trees would be removed at Wilburton Hill Park, and 100–105 trees would be removed in Kelsey Creek Park. The vegetation clearing and view of the poles and wires would diminish the enjoyment of recreationists along the Lake Hills Connector. However, these changes would not limit informal recreation use along the road.

- **Eastside Rail Corridor:** Poles and wires would follow approximately a ½-mile segment of the ERC. PSE would need to obtain an easement from King County, which would be a significant impact because it is not in agreement with Bellevue Park policies or King County Objectives (Appendix F). Having poles and wires along this option (where none currently exist) would change the expected look of the trail, and may diminish the enjoyment of the proposed trail. Vegetation would also need to be cleared within the managed right-of-way, including 65–70 trees.
- **West Kelsey Open Space and Woodridge Open Space:** These two parks are on the opposite (south) side of the Lake Hills Connector from the new corridor, and there would be no impact. Easements would not be acquired, no trees would be removed, and poles and wires would not be visible from within the parks.
- **Richards Creek Open Space and Bannerwood Ballfield Park:** PSE would need to acquire an easement within these parks, adjacent to the road along the new corridor, which would result in a significant impact because it is not in agreement with Bellevue Park policies (Appendix F). If allowed, vegetation would be cleared within the easement. Ten trees would be removed in Richards Creek Open Space and 45 from Bannerwood Ballfield Park. Clearing vegetation and view of the poles and wires would diminish the enjoyment of recreationists along the Lake Hills Connector. However, these changes would not limit informal recreation use along the road.
- **Skyridge Park:** Impacts to Skyridge Park would be the same as the Existing Corridor Option; they would be less-than-significant.
- **Richards Valley Greenway:** Having poles and wires along the Lake Hills Connector (where none currently exist) would change the look of the greenway, and would diminish the enjoyment of users of the proposed greenway. Vegetation would also need to be cleared within the managed right-of-way, including 148 trees. Additionally, the proposed greenway would cross the existing corridor along SE 24th Street. The new monopole in this location would be taller, but there would be fewer poles than existing. The taller pole would not change the experience of users. Bypass Option 1 would not preclude the development proposed greenway; thus, impacts would be less-than-significant.
- **Unnamed Trail (on Corridor at Bel-Red Road and NE Spring Boulevard), Highland-Glendale Property, Glendale Country Club, SE 3rd Trail, and Richards Valley Open Space:** Bypass Option 1 is not adjacent to these recreation sites; thus, they would not be affected (no impact).

3.6.5.7 Bellevue Central Segment, Bypass Option 2

Impacts to recreation from Bypass Option 2 would be 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. Easements may need to be obtained in the following recreations sites along the new corridor: Wilburton Hill Park and Bellevue Botanical Gardens, Kelsey Creek Park, Eastside Rail Corridor, Richards Creek Open Space, and Woodridge Open Space. Potential impacts are summarized below, by recreation site.



- **Bell-Red Mini Park:** There would be no impacts to Bel-Red Mini Park. See Bypass Option 1 for details.
- **McDowell House and West Kelsey Open Space:** Impacts would be the same as for Bypass Option 1; see the discussion above (no impacts).
- **Wilburton Hill Park and Bellevue Botanical Gardens and Eastside Rail Corridor:** Impacts would be the same as for Bypass Option 1; see the discussion for Bypass Option 1 (significant impacts).
- **Kelsey Creek Park:** The wires and poles would be along the north side of the Lake Hills Connector until Richards Road. PSE would need to acquire an easement within the park, adjacent to the road along the new corridor, which would be a significant impact because it is

not in agreement with Bellevue park policies (Appendix F). In the new easement within the park, 35–40 trees are proposed to be removed. Vegetation clearing and view of the poles and wires would diminish the enjoyment of recreationists along the Lake Hills Connector. However, these changes would not limit informal recreation use along the road.

- **Woodridge Open Space and Richards Creek Open Space:** For Bypass Option 2, the new corridor would follow Richards Road. PSE would need to acquire an easement within both open spaces, adjacent to the road along the new corridor, which would result in a significant impact because it is not in agreement with Bellevue Park policies (Appendix F). Vegetation would be cleared in the easements, including 25–30 trees in Woodridge Open Space and 37 in Richards Creek Open Space. A pole is proposed at the trailhead for the Woodridge Trail and the trailhead may need to be moved. Additionally, the cleared area at the trailhead may be visible from other locations along the trail and may decrease the scenic nature of the trail and visitor enjoyment. However, these changes would not prevent people from using the park or limit recreational uses. Mitigation for moving the trailhead is described in Section 3.6.6, *Mitigation Measures*.
- **Bannerwood Ballfield Park:** The new corridor would follow Richards Road and not go past Bannerwood Ballfield Park. There would be no impacts to the park.
- **Richards Valley Open Space:** Bypass Option 2 would be adjacent to the south edge of Richards Valley Open Space, but the poles and wires would not be visible from inside the park and no trees would be removed. Users would not be affected, and there would be no impact.
- **Richards Valley Greenway:** Having poles and wires along the Lake Hills Connector and Richards Road (where none currently exist) would change the look of the greenway, and would diminish the enjoyment of users of the proposed greenway. Vegetation would also need to be cleared within the managed right-of-way, including 240 trees. However, Bypass Option 2 would not preclude the development proposed greenway; thus, impacts would be less-than-significant.
- **Unnamed Trail (on corridor Bel-Red Road and NE Spring Boulevard), Highland-Glendale Property, Glendale Country Club, SE 3rd Trail, and Skyridge Park**: Bypass Option 2 is not adjacent to these recreation sites. Thus, they would not be affected (no impact).

3.6.5.8 Comparison of Bellevue Central Options

In the Bellevue Central Segment, there would be potentially significant impacts with Bypass Option 1 and Bypass Option 2. This is because PSE may need to acquire easements through the public recreation sites along the new corridor. If PSE is restricted from purchasing easements on recreation parcels purchased with dedicated funds, the poles and vegetation clear zone (i.e., the managed right-of-way) would need to be placed within the roadway right-of-way, as stipulated in Section 3.6.6, *Mitigation Measures*. Public recreation sites along the new corridor where new easements would be required include the following:

- **Bypass Option 1**: Wilburton Hill Park and Bellevue Botanical Gardens, Kelsey Creek Park, Eastside Rail Corridor, Richards Creek Open Space, and Bannerwood Ballfield Park.
- **Bypass Option 2:** Wilburton Hill Park and Bellevue Botanical Gardens, Kelsey Creek Park, Eastside Rail Corridor, Richards Creek Open Space, and Woodridge Open Space.

Bypass Options 1 and 2 would place new poles and wires in recreation sites where transmission facilities are not currently located. All other segments and options would locate poles and wires within recreation sites where poles and wires are already located.

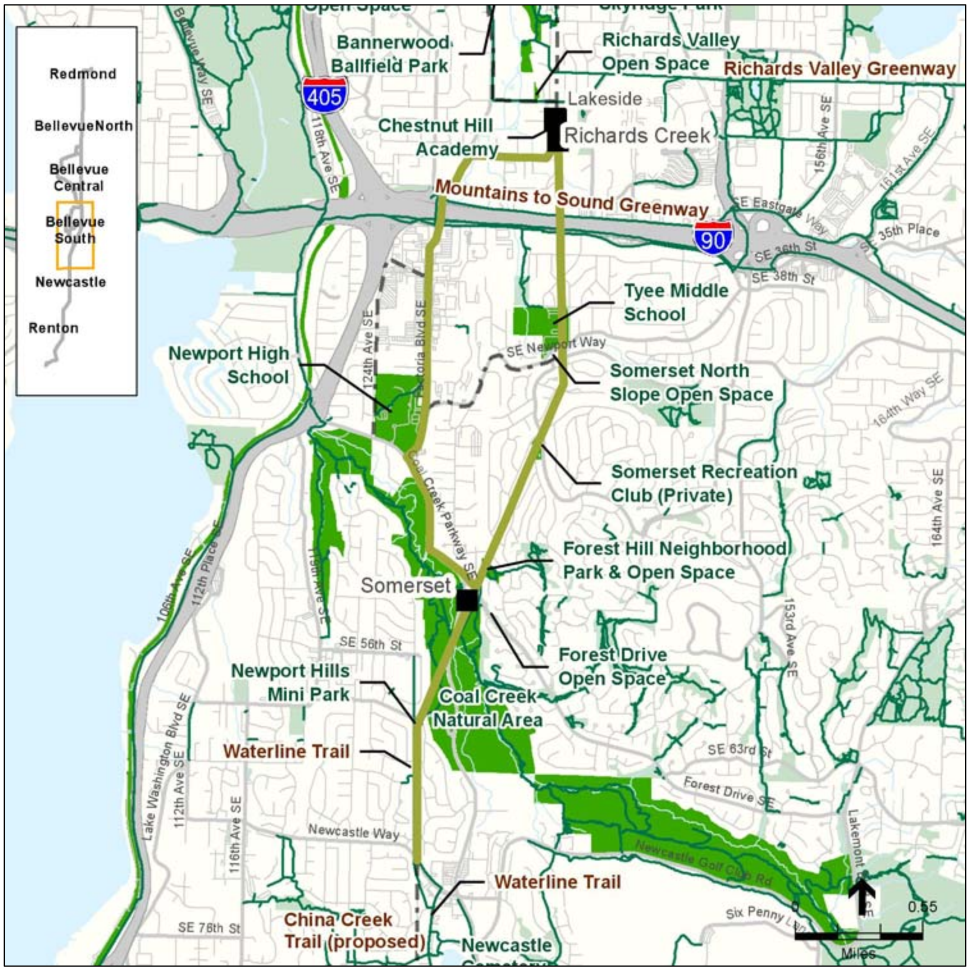
All options would involve the removal of trees in recreation sites (see Table 3.6-2). Bypass Option 1 would involve the highest number of trees removed for the Bellevue Central Segment. For tree removal outside of recreation sites, see Section 3.4, *Plants and Animals*.

Table 3.6-2. Trees Removed at Recreation Sites by Bellevue Central Option

Segment/Option	Approximate Number of Trees Removed in Recreation Sites	New Easement Required in Recreation Site
Existing Corridor Option	45	No
Bypass Option 1	430	Yes
Bypass Option 2	310	Yes

3.6.5.9 Bellevue South Segment, Oak 1 Option

Impacts to recreation from the Oak 1 Option would be significant because PSE would need to obtain easements in Coal Creek Natural Area along the new corridor, which is not in agreement with City of Bellevue park plans and policies. Potential impacts are summarized below, by recreation site.

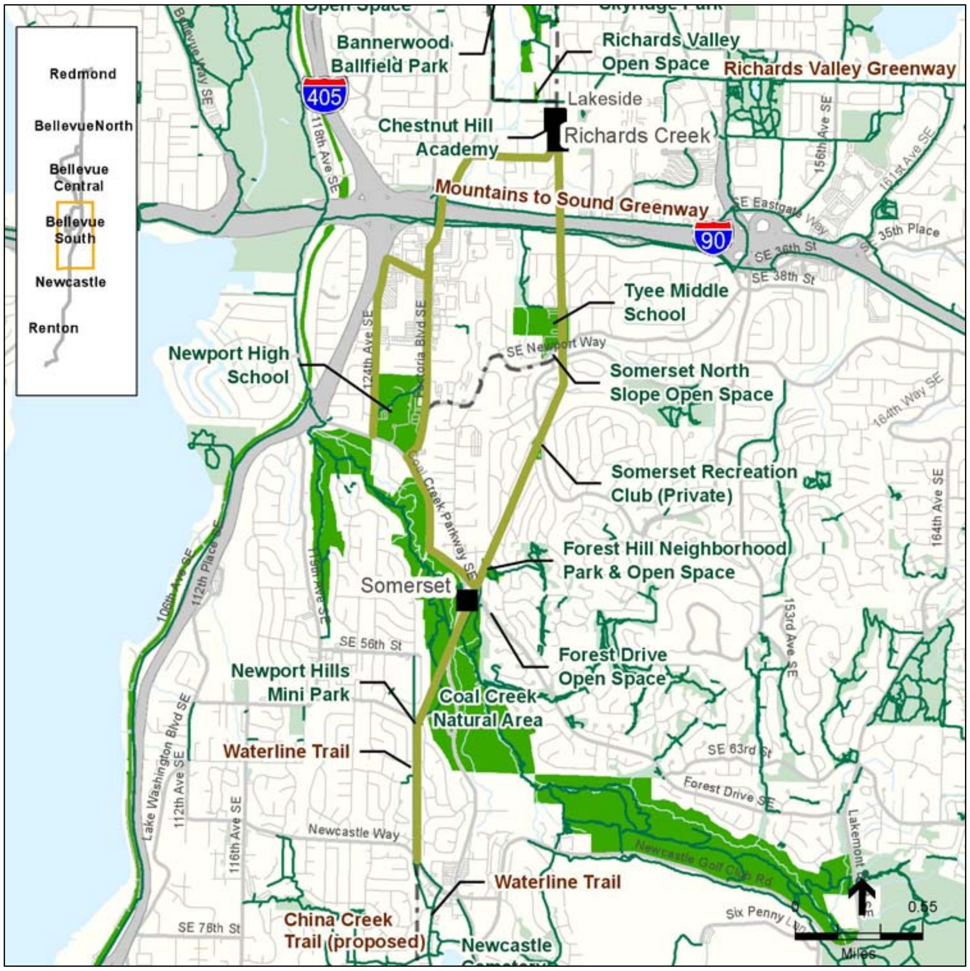


- **Mountains to Sound Greenway I-90 Trail:** The Oak 1 Option would cross the trail perpendicularly along Factoria Boulevard SE, and poles and wires may be visible to trail users as they approach the crossing. However, this change would be small relative to the overall trail experience, and trail use would be maintained; thus the impact would be less-than-significant. The transmission lines in PSE's existing corridor (which cross the greenway) would not change under Oak 1.
- **Newport High School:** Eighty- to 85-foot monopoles and wires would replace the existing 115 kV lines along Factoria Boulevard SE, and the existing distribution and telecommunications lines would be placed underground. At the south end of Factoria Boulevard SE, the poles would be on the opposite side of the road from the school sports fields; except one pole would be placed on the corner of Factoria Boulevard SE and Coal Creek Parkway SE. Approximately 45–50 trees along Factoria Boulevard SE would be removed. The removal of trees and new poles would be visible from the school sports fields but would not affect recreation opportunities and uses at the school. The Oak 1 and Willow 2 Options would result in a similar impact (less-than-significant).

- **Coal Creek Natural Area:** Along Coal Creek Parkway, 80-foot poles would be installed and existing distribution and telecommunications lines would be placed underground. Poles and lines would be on the opposite side of Coal Creek Parkway (north side) from the natural area, except for one pole. This pole would be in the west bending curve where the existing distribution line pole is. PSE would need to acquire an easement adjacent to Coal Creek Parkway along the new corridor, which would result in a significant impact because it is not in agreement with Bellevue park policies (Appendix F). Trees would be removed on the west and south sides of the road, even though the poles and wires would be on the opposite side of the road from the natural area. The cleared vegetation, new poles and wires would be visible from trailheads at the edge of the natural area and decrease the experience of users; however, the opportunities and uses would be maintained, and impacts would be less-than-significant. South of Coal Creek, the natural area is on both sides of Coal Creek Parkway, 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. The new poles would be placed in similar locations to the existing poles. This would result in three monopoles within the natural area, plus four poles along Coal Creek Parkway north of the Coal Creek. Trees would be cleared within the existing corridor. Trail users along or crossing the corridor would notice less vegetation and a change in pole configuration (the change from four poles to a taller monopole). Within the two areas described, 70–80 trees would be removed. These changes would change the experience of trail users along the corridor; however, the impact would be less-than-significant because the opportunities and uses available within the natural area would be maintained. (Impacts would be the same for the Oak 1, Oak 2, and Willow 2 Options.)
- **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 85-foot tall poles. Vegetation would be cleared to PSE standards and five to 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. (Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)
- **Waterline Trail:** The trail runs parallel to PSE's existing corridor in SPU's 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 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.
- **Tyee Middle School, Somerset North Slope Open Space, Somerset Recreation Club, Forest Hill Neighborhood Park & Open Space, and Forest Drive Open Space:** There would be no changes to PSE's existing corridor with the Oak 1 Option; thus, these recreation sites would not be affected and there would be no impact.

3.6.5.10 Bellevue South Segment, Oak 2 Option

Impacts to recreation from the Oak 2 Option would be significant because PSE would need to obtain easements in Coal Creek Natural Area along the new corridor, which is not in agreement with City of Bellevue park plans and policies. Potential impacts are summarized below, by recreation site.



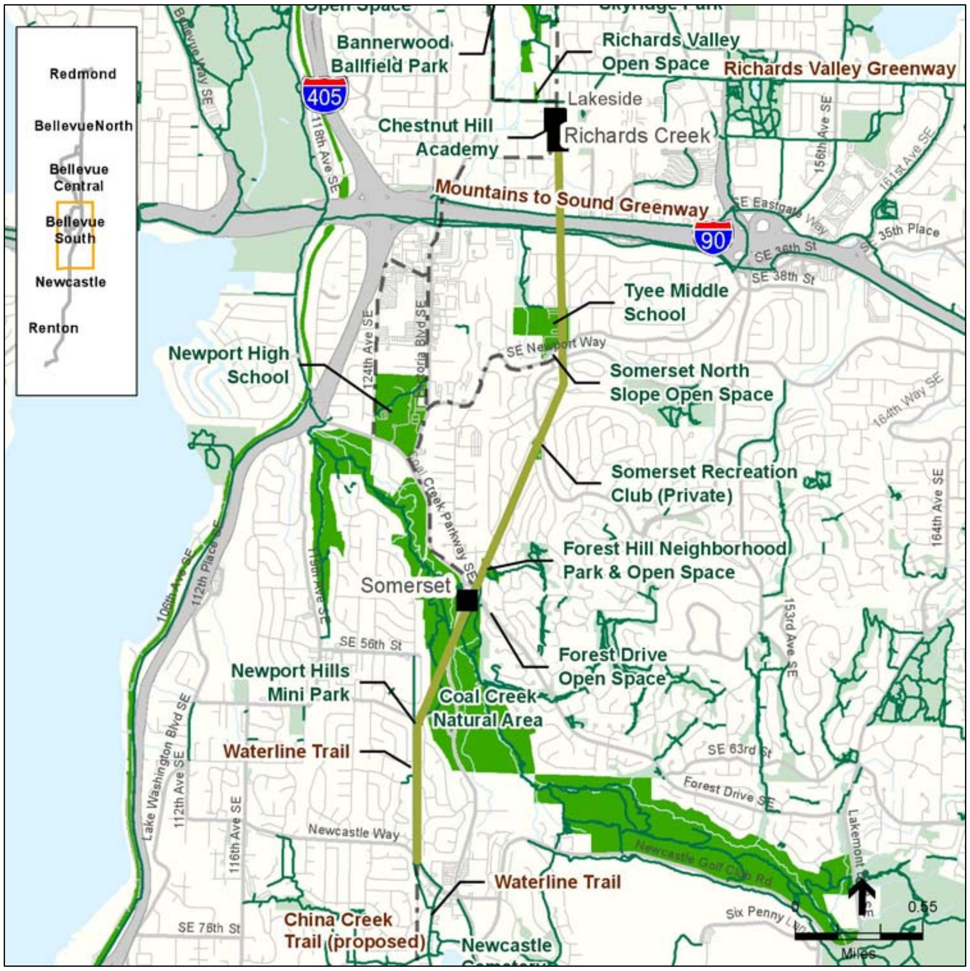
- **Mountains to Sound Greenway I-90 Trail:** The Oak 2 Option would cross the trail perpendicularly along Factoria Boulevard SE and in the existing corridor. Poles and wires may be visible to trail users as they approach the crossing. However, this change would be small relative to the overall trail experience, and trail use would be maintained; thus, the impact would be less-than-significant.
- **Tyee Middle School:** The two 60-foot H-frames would be replaced with one 65-foot H-frame, in similar locations to the existing poles. Most of the area is already maintained with low-growing vegetation, and vegetation clearing would be similar to existing conditions. However, approximately 10–15 trees near SE Allen Road may need to be removed. These changes would not affect recreation opportunities and uses, and impacts would be less-than-significant.
- **Somerset North Slope Open Space:** No poles are currently located within the existing easement through the park. Under the Oak 2 Option, one 65-foot H-frame would be placed within the park. Vegetation would be removed 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. (Impacts would be similar for the Oak 2, Willow 1, and Willow 2 Options.)

- **Somerset Recreation Club:** One 65-foot H-frame would replace the two existing H-frames in a similar location. The poles would look different and five to 10 trees would be removed, but there would be no change to recreation uses. For this reason, impacts would be less-than-significant. (Impacts would be the same for the Oak 2 and Willow 2 Options.)
- **Newport High School:** In addition to the description of impacts under the Oak 1 Option, poles would be located on the east side of 124th Avenue SE adjacent to the school. There are no existing poles or wires in this location, and 15–20 trees (both street trees and on school property) would be cleared on the east side of 124th Avenue SE. Thus, including the 45–50 trees along Factoria Boulevard SE, a total of 60–65 trees would be removed with this option. Additionally, lighting structures for the track may need to be relocated. The new poles and the change in vegetation would be visible from the sports fields. However, they would not affect recreation opportunities and uses and thus impacts would be less-than-significant.
- **Forest Hill Neighborhood Park & Open Space:** The four 60-foot tall poles would be replaced with one 65-foot tall steel H-frame (two poles). Only one pole site would be located within the park. Vegetation clearing would be more than existing conditions; including the removal of 10–15 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. (Impacts would be the same for the Oak 2 and Willow 2 Options.)
- **Forest Drive Open Space:** There would be no change to the open space and thus no impacts.
- **Coal Creek Natural Area:** See the Oak 1 Option for description (significant impact). (Impacts would be the same as the Oak 1 and Willow 2 Options.)
- **Newport Hills Mini Park and the Waterline Trail***:* See the Oak 1 Option for description (less-than-significant impacts). (Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)

3.6.5.11 Bellevue South Segment, Willow 1 Option

Impacts to recreation from the Willow 1 Option 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.



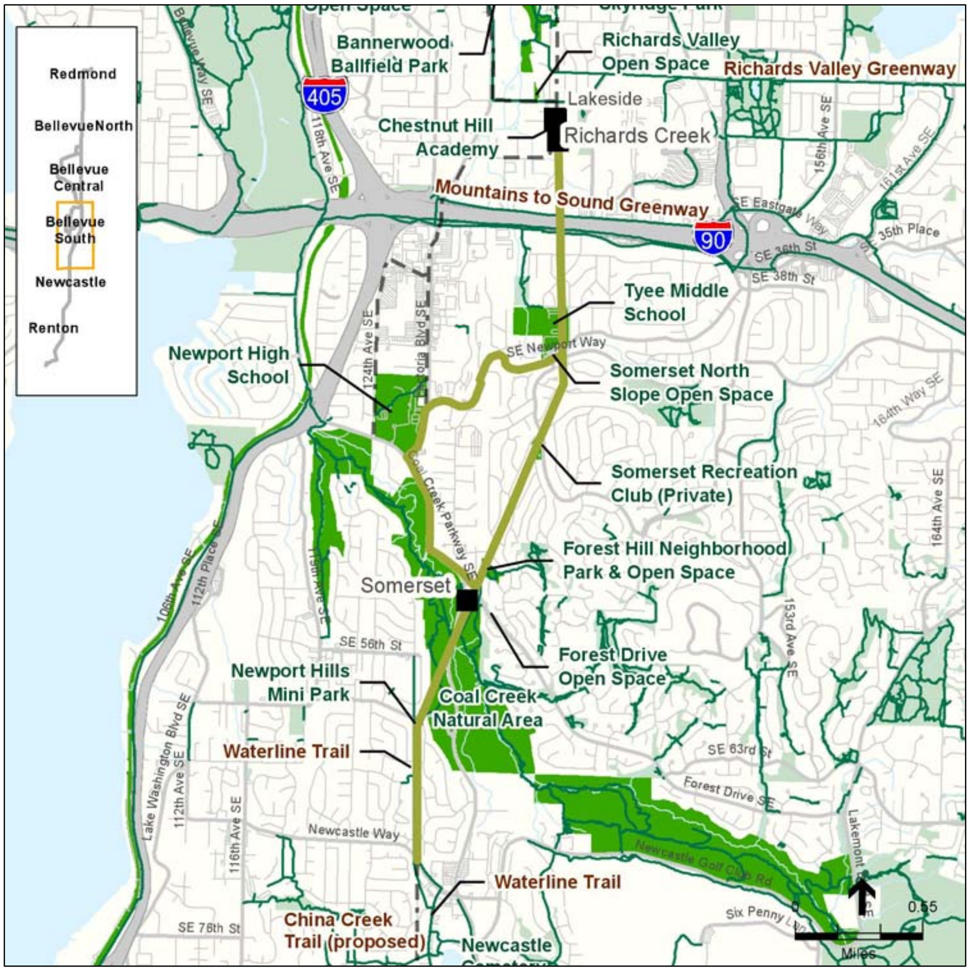
- **Mountains to Sound Greenway I-90 Trail:** The Willow 1 Option crosses the trail perpendicularly. Poles and wires may be visible to trail users as they approach the crossing. However, trail users would not likely perceive a change, and the impact would be less-than-significant. (Impacts would be the same for the Willow 1 and Willow 2 Options.)
- **Tyee Middle School:** The two 60-foot H-frame structures would be replaced with a 100-monopole. Most of the area is already maintained with low-growing vegetation, and vegetation management would be similar to existing conditions. However, approximately 20–25 trees near SE Allen Road may need to be removed. These changes would not affect recreation opportunities and uses, and impacts would be less-than-significant. (Impacts would be the same for the Willow 1 and Willow 2 Options.)
- **Somerset North Slope Open Space:** No poles are currently located within the existing easement through the park. Under the Willow 1 Option, one 85-foot pole would be placed within the park (and a second pole on the adjacent parcel). Vegetation would be removed 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. (Impacts would be similar for the Oak 2, Willow 1, and Willow 2 Options.)

- **Somerset Recreation Club:** Two 85-foot poles would be placed in a similar location to the existing two H-frame structures on the site, and approximately five to 10 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.
- **Newport High School:** The Willow 1 Option is not adjacent to Newport High School and it would not be affected (no impact).
- **Forest Hill Neighborhood Park & Open Space:** The two 60-foot H-frame structures would be replaced with two 85-foot tall monopoles. There would be more vegetation clearing than existing conditions; including the removal of 10–15 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 85-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. Thirty to 35 trees would be cleared, 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 and the Waterline Trail:** See the Oak 1 Option for description (less-than-significant impacts). (Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)

3.6.5.12 Bellevue South Segment, Willow 2 Option

Impacts to recreation from the Willow 2 Option would be significant because PSE would need to obtain easements in Coal Creek Natural Area along the new corridor, which is not in agreement with City of Bellevue park plans and policies. Potential impacts are summarized below, by recreation site.



- **Mountains to Sound Greenway I-90 Trail:** The Willow 2 Option 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. (Impacts would be the same for the Willow 1 and Willow 2 Options.)
- **Tyee Middle School:** Impacts would be the same for the Willow 1 and Willow 2 Options (less-than-significant). See Willow 1 for description.
- **Somerset North Slope Open Space and Forest Drive Open Space:** See the Oak 2 Option for descriptions (less-than-significant impacts and no impact, respectively). (Impacts would be similar for the Oak 2, Willow 1, and Willow 2 Options.)
- **Somerset Recreation Club:** Impacts would be less-than-significant, the same as the Oak 2 Option.

- **Forest Hill Neighborhood Park & Open Space:** Impacts would be less-than-significant and the same for the Oak 2 and Willow 2 Options; see the Oak 2 Option description.
- **Newport High School:** Impacts would be less-than-significant and similar to the Oak 1 Option; see the Oak 1 Option description.
- **Coal Creek Natural Area:** See the Oak 1 Option for description (significant impact). (Impacts would be the same for the Oak 1 and Willow 2 Options.)
- **Newport Hills Mini Park and the Waterline Trail:** See the Oak 1 Option for descriptions (less-than-significant impacts). (Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)

3.6.5.13 Comparison of Bellevue South Options

In the Bellevue South Segment, there would be potentially significant impacts associated with the Oak 1, Oak 2, and Willow 2 Options because PSE may need to acquire an easement in the Coal Creek Natural Area along Coal Creek Parkway. If PSE is restricted from purchasing easements on recreation parcels purchased with dedicated funds, the poles and vegetation clear zone (i.e., the managed right-of-way) would need to be placed within the roadway right-of-way, as stipulated in Section 3.6.6, *Mitigation Measures*.

Additionally, the Oak 2 Option would place new poles adjacent to Newport High School where transmission facilities are not currently located. The Oak 2, Willow 1, and Willow 2 Options would place a new pole in the Somerset North Slope Open Space where transmission poles are not currently located (although wires cross the open space and there are poles on an adjacent parcel). All other segments and options would locate poles and wires within recreation sites where poles and wires are already located.

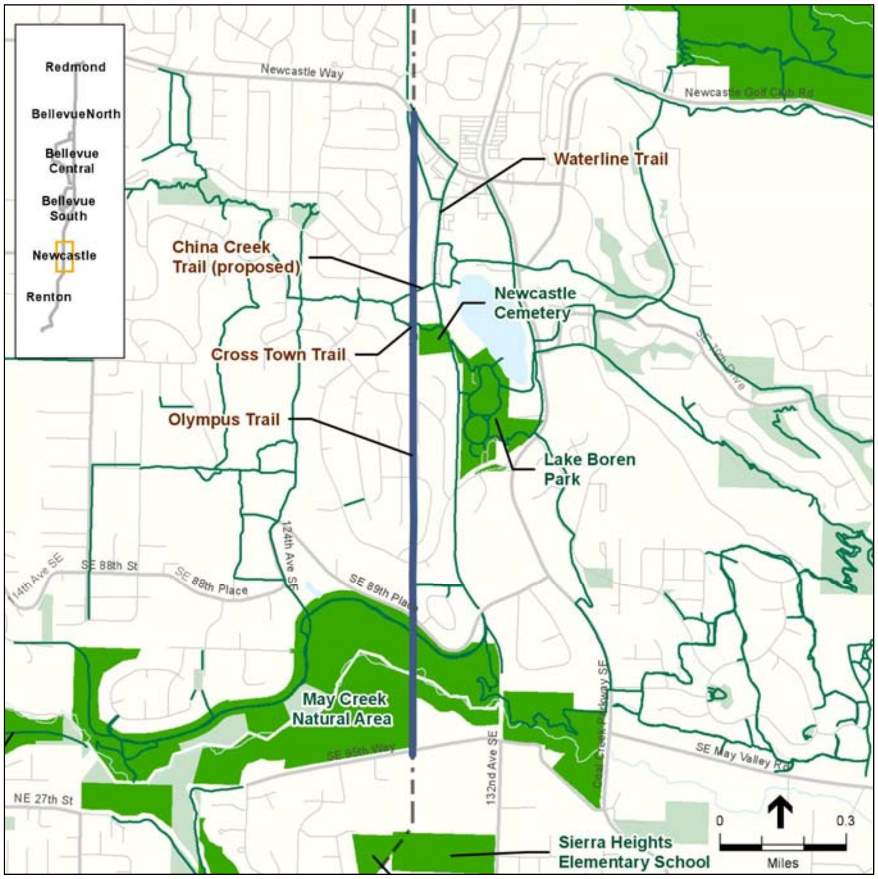
All options would involve the removal of trees in recreation sites (see Table 3.6-3). The Oak 2 Option would have the highest number of trees for the Bellevue South Segment.

Table 3.6-3. Trees Removed at Recreation Sites by Bellevue South Option

Segment/Option	Approximate Number of Trees Removed in Recreation Sites	New Easement Required in Recreation Site
Oak 1 Option	140	Yes
Oak 2 Option	195	Yes
Willow 1 Option	95	No
Willow 2 Option	190	Yes

3.6.5.14 Newcastle Segment

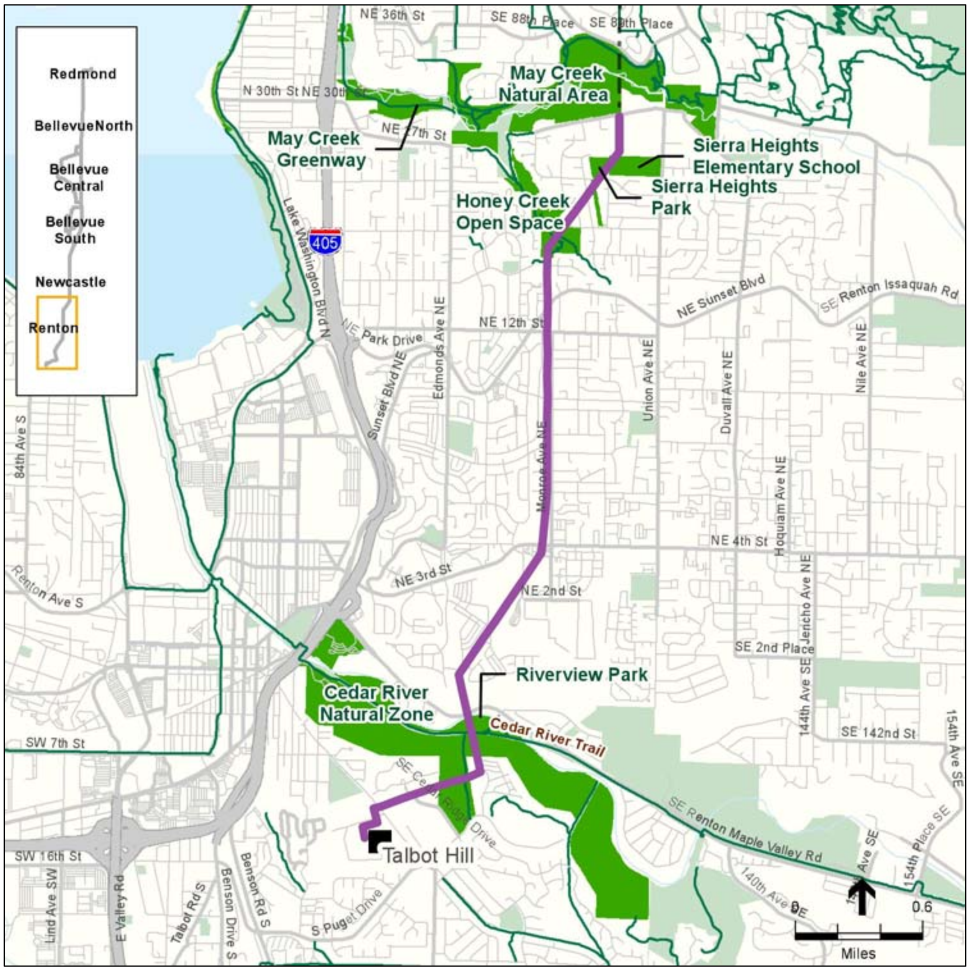
Impacts to recreation in the Newcastle Segment would be less-than-significant because vegetation clearing and changes to poles and wires would not affect the use of recreation sites. Potential impacts are summarized below, by recreation site.



- **Waterline, Cross Town, China Creek (proposed), and Olympus Trails:** At each pole site, the existing two H-frames would be replaced with two 85-foot tall poles. 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 85-foot tall monopoles in the corridor through the May Creek Natural Area. 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 80–85 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.

3.6.5.15 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.



- **Sierra Heights Park:** Three pairs of H-frames are currently located in the park. The H-frame in the north part of the park would be replaced with two 85-foot tall poles, and the other two would be replaced with one 100-foot tall monopole at each pole site. There would be a total of four poles in the park, less than existing conditions, but the poles would be taller than existing. 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. The SCL poles and wires that also cross the park would not be changed.
- **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 would be replaced with one 100-foot tall monopole. The pole would be taller, but there would be fewer poles than existing conditions. 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 100-foot tall monopole, with four poles located 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.

3.6.6 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.

3.6.6.1 Regulatory Requirements

None of the Partner Cities have regulations that would mitigate project-related impacts to recreational resources. However, many public recreation sites in the study area were acquired with federal, state, or local grants, bonds, or other funding sources. The funding comes with provisions that protect the land for recreation in perpetuity. The conversion of public recreation land purchased with restricted funds for non-recreation purposes would need to meet site-specific agency requirements and would be contingent on approval from the grant agency or agencies. Conversion to a non-recreation use would require an equivalent replacement as agreed upon with the agencies involved. Compliance with these requirements is not appealable.

Prior to Construction

- Avoid placement of infrastructure within or adjacent to recreation sites where there is none currently to the extent possible.
- Meet site-specific agency requirements regarding acquisition of easements that require conversion of recreation land to a non-recreation use.

3.6.6.2 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

- Undergo a public review process for the conversion to non-recreational use of public park lands and facilities (City of Bellevue Plan Policy PA-37).
- Design the project so that poles would be placed farther into the road right-of-way and supports would extend farther over the road so that new easements would not be required for the pole placement or the associated vegetation clear zone (i.e., the managed right-of-way).
- Use vegetation outside of any required clear zone (i.e., the managed right-of-way) to screen poles and wires where transmission infrastructure is placed within a recreation site.
- Work with the City of Bellevue to relocate the trailhead at Woodridge Open Space, if needed under Bypass Option 2.
- Work with Newport High School (Bellevue School District) to relocate lighting structures for the track, if needed under the Oak 2 Option.
- Work with each Partner City to determine mitigation for tree removal within recreation sites in its jurisdiction.

3.7 HISTORIC AND CULTURAL RESOURCES

This chapter provides a project-level analysis of potential impacts to known and probable historic and cultural resources in the study area. 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."

Methods for Studying the Affected Environment

The EIS Consultant Team reviewed information available from Washington State, King County, the Partner Cities, and PSE to describe existing significant historic and cultural resources within the study area, and potential for encountering unevaluated historic resources or unidentified archaeological resources.

The EIS Consultant Team reviewed the Washington Information System for Architectural and Archaeological Records Data (WISAARD); the Statewide Predictive Model; national, state, and local historic registers; existing cultural resources assessments; geological data, historical maps; local histories; and published *ethnographic* resources within the study area. Information was also obtained from preliminary cultural resources assessments prepared for PSE specifically for the project (Beckner and Gilpin, 2015; Dellert et al., 2016a, 2016b; Gilpin et al., 2014). These assessments did not include field work to test for unidentified archaeological sites or record and evaluate potential impacts to unevaluated or significant historic resources in the study area. Additional information was obtained from the Washington State Department of Archaeology and Historic Preservation (DAHP), King County Historic Preservation Program (KCHPP), the City of Bellevue, the City of Renton, the King County Assessor, local libraries, and Environmental Science Associates' research library.

The study area for unevaluated historic resources follows that established in the cultural resources assessments prepared for this project (Dellert et al., 2016b; Gilpin et al., 2014); this includes adjacent parcels of land on both sides of the center of each transmission line segment and option (see Figure 3.7-1 and Figure 3.7-2).

For the identification of significant historic resources and protected archaeological resources, the study area includes all resources within 0.5 mile of the existing and new corridors (see Figure 3.7-1). This study area differs from that used by Dellert et al. (2016b) to account for the topography and potential for visual impacts.

The methodology for analyzing unevaluated historic resources in the study area is being developed by PSE. PSE is conducting a historic property inventory and will conduct an archaeological survey prior to construction, once all specific excavation locations are known.

3.7.1 Relevant Plans, Policies, and Regulations

Since publication of the Phase 1 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, Renton, and unincorporated King County (see Section 13.2 in the Phase 1 Draft EIS). However, the preliminary cultural resources assessments prepared for this project since the Phase 1 Draft EIS (Dellert et al., 2016a, 2016b) identified three new unofficial historical lists. These lists are the City of Renton's Centennial Markers, the Eastside Heritage Center's Bellevue Historic Sites, and a historical inventory reviewed at the request of the City of Bellevue (City of Renton, 2016; Eastside Heritage Center, 2016; Tobin and Pendergrass, 1993). These lists were not created through DAHP's Certified Local Government program, and are therefore not considered to be official historic registers by the EIS Consultant Team.

King County and the cities of Redmond, Bellevue, Newcastle, and Renton have comprehensive plans; some of these have been finalized since the Phase 1 EIS. The plans generally outline goals and policies for the identification and preservation of historic and cultural resources and consideration of potential impacts to historic and cultural resources (City of Bellevue, 2015; City of Redmond, 2015; City of Newcastle, 2016; City of Renton, 2015; King County, 2014). The comprehensive plans do not specify what actions are required to identify potential impacts and preserve historic and cultural resources. The cities of Redmond and Newcastle follow procedures of the King County Historic Preservation Program for identifying potential impacts to and preservation of historic and cultural resources. The cities of Renton and Bellevue do not follow King County Historic Preservation Program procedures; municipal code does not specify what actions are required to identify potential impacts and preserve historic and cultural resources (BCC Chapter 22.02).

Buildings and structures included in historic registers are considered important to national, state, or local heritage. Historic registers applicable to the study area include the following:

- National Register of Historic Places (NRHP)
- Washington Heritage Register (WHR)
- Washington Heritage Barn Register (WHBR)
- King County and Local Landmarks List (KC Landmarks)

Historic and Cultural Resource Key Terms

Protected archaeological resource – historic sites determined eligible for listing in the National Register of Historic Places and any precontact archaeological resource, regardless of eligibility status.

Significant historic resource – a resource that is either register-listed, recommended eligible for listing, or determined eligible for listing.

Register-listed – resource is on a national, state, or local historic register, or is a King County Landmark.

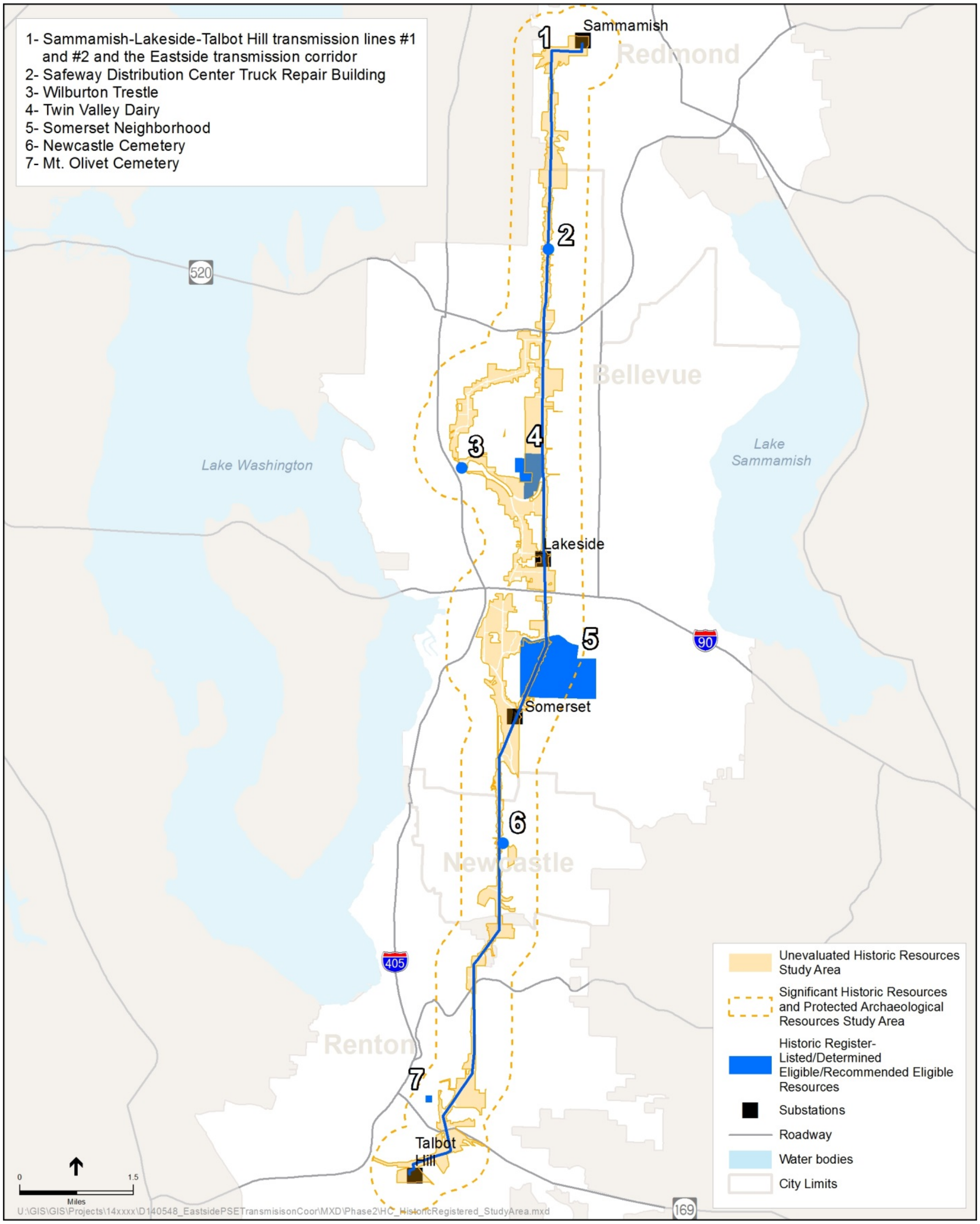
Determined eligible for listing – resource has been officially determined eligible by DAHP but has not yet been listed.

Recommended eligible for listing – resource has been recommended eligible for listing.

Unevaluated historic resource – resource meets minimum age threshold for listing but has not been evaluated for its historic significance.

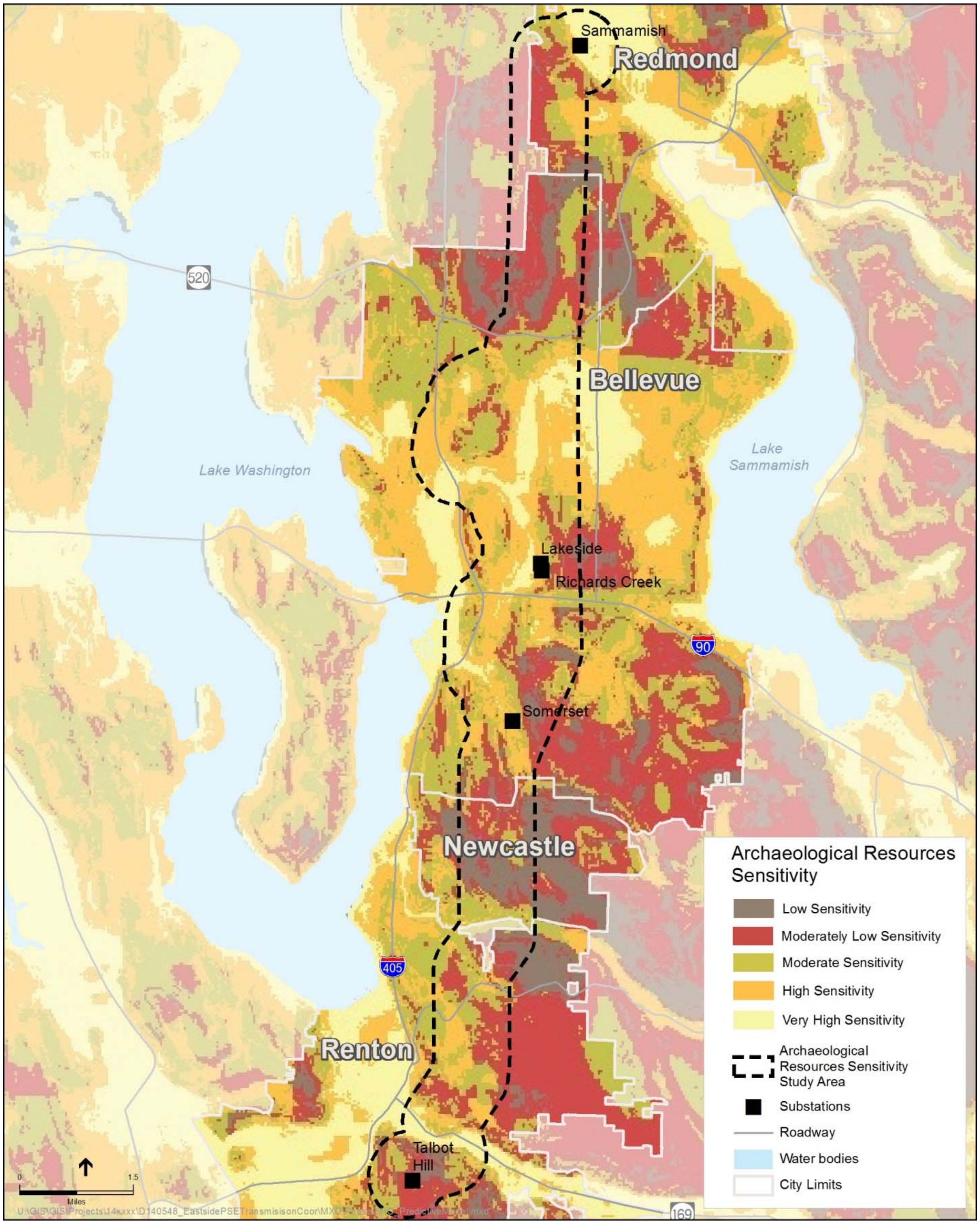
Precontact Cultural Resource – resource that dates prior to the point of contact between European-American peoples (including explorers, fur traders, and military personnel) with Native American peoples. In King County, the precontact period is considered to have ended with the arrival of the Denny Party in 1851.

Traditional cultural properties – a property that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community.



Source: King County, 2015; Ecology, 2014; HRA, 2016.

Figure 3.7-1. Study Area for Historic and Cultural Resources.



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

Figure 3.7-2. Statewide Predictive Model for Archaeological Sensitivity.

Resources listed on the NRHP, WHR, and WHBR are managed by DAHP. Resources on the KC Landmarks register are managed jointly by KCHPP and the cities where the resources are located (KCHPP, 2015).

Redmond and Newcastle are members of DAHP's Certified Local Government program and as such have an inter-local management agreement with KCHPP regarding historic preservation; KCHPP has established criteria for evaluating potential KC Landmarks. DAHP delegates management responsibilities to Certified Local Governments for unevaluated historic resources and significant historic resources within their jurisdictions. For cities that do not participate in the Certified Local Government program (Bellevue and Renton), the EIS Consultant Team identified resources 45 years or older, per a modified age criterion used by the NRHP (50-year threshold with 5 years subtracted in case the project is delayed). For resources within Redmond, Newcastle, and unincorporated King County, the EIS Consultant Team identified resources 40 years or older, per the age criterion used by King County Landmarks (see Table 3.7-1). A resource that has achieved exceptional significance within a shorter timespan can also be considered eligible for the NRHP and King County Landmarks (based on age alone), although this is rare.

Table 3.7-1. Age Thresholds Used for Identifying Unevaluated Historic Resources

Local Government	Participates in Certified Local Government Program	Minimum Age Threshold Applied
Redmond	Yes – King County Landmarks	40
Bellevue	No	45
Newcastle	Yes - King County Landmarks	40
Renton	No	45
Unincorporated King County	Yes - King County Landmarks	40

Historic and cultural resources can be eligible for listing in the NRHP if they meet the minimum age threshold, and have integrity of location, design, setting, materials, workmanship or feeling, and meet at least one of the following criteria (NPS, 1997):

- *Criterion A. That are associated with events that have made a significant contribution to the broad patterns of our history;*
- *Criterion B. That are associated with the lives of significant persons in our past;*
- *Criterion C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;*
- *Criterion D. That have yielded or may be likely to yield, information important in history or prehistory.*

Under state law (Chapter 27.53 RCW), *historic archaeological resources* must be determined eligible for listing in the NRHP before they are considered protected, while all *precontact cultural resources* are protected regardless of eligibility determinations. DAHP will make a final determination whether a resource is eligible or not eligible for listing in the NRHP. Resources meeting these definitions are hereafter referred to as "protected archaeological resources." Isolated (single) artifacts, either precontact or historic, are not protected under state law because they do not meet the definition of a "site" (WAC 25-48-020(9)).

3.7.2 Historic and Cultural Resources in the Study Area

Archaeological evidence indicates human activity in the Pacific Northwest and Puget Sound since at least 12,500 years ago (see Section 13.3 in the Phase 1 Draft EIS). An archaeological site within 2 miles of the Redmond Segment dates to the earliest known time period of human occupation in the region (Kopperl, 2009). Based on an analysis of published ethnographies, local histories, historical maps, and the Statewide Predictive Model, the entire study area has a high sensitivity for containing unevaluated historic and cultural resources (Dellert et al., 2016b).

All segments and options are situated mostly or entirely on upland landforms composed of glacial deposits, including till, outwash, and drift, that were laid down approximately 17,400 to 16,400 years ago during the last Ice Age (Troost and Booth, 2008), which is prior to the earliest evidence for people in western Washington. Since the end of the last Ice Age, these upland locations have not experienced substantial natural deposition. The lack of deposition has two implications for the archaeological sensitivity of these landforms. First, cultural remains would tend to remain at or near the ground surface, rather than becoming deeply buried; therefore, if archaeological sites are present, they would not be expected to be deeply buried. Second, prolonged surface exposure of any cultural resources would lead to decomposition of organic materials, as well as the erosion of artifacts and features.

The study area contains one protected archaeological site (the Columbia & Puget Sound Railroad), seven significant historic resources, and hundreds of unevaluated historic resources (Table 3.7-2). These resources are under the jurisdiction of DAHP, King County, City of Bellevue, City of Newcastle, City of Redmond, or City of Renton (see Appendix G-1 – Historic Register Resources). Three cemeteries are within the study area (Newcastle Cemetery, Greenwood Memorial Park, and Mt. Olivet Cemetery); this analysis classifies cemeteries as a type of historic resource. All segments and options contain portions of the existing Sammamish-Lakeside-Talbot Hill Transmission Lines #1 and #2 and the Eastside Transmission Corridor (hereafter referred to as the "Eastside Transmission System"); this resource has been recommended eligible for listing in the NRHP. Other types of historic and cultural resources in the study area include buildings, structures, cemeteries, farms, and railroad features. The locations of historic register-listed resources, determined eligible for listing historic resources, and resources recommended eligible for listing are shown on Figure 3-7-1; archaeological site locations have been redacted from this map as these locations are exempt from public disclosure (RCW 42.56.300). However, the probability for encountering archaeological resources within the study area is shown on Figure 3-7-2. A description of each significant historic resource is provided below in Table 3.7-2. No traditional cultural properties were identified.

Table 3.7-2. Historic and Cultural Resources in the Study Area

Unevaluated Historic Resources*	Significant Historic Resources: Recommended-Eligible Historic Resources	Significant Historic Resources: Determined Eligible Historic Resources	Significant Historic Resources: Register-Listed Historic Resources	Arch. Resources
Richards Creek Substation				
Included in Bellevue South Segment counts, below	Eastside Transmission System	-	-	-
Redmond Segment				
118	Eastside Transmission System	-	-	-
Bellevue North Segment				
58	Eastside Transmission System	-	-	-
Bellevue Central Segment (all Options)				
133 total unique resources **In Existing Corridor:** *In Existing Corridor Option:* 64 (16 are shared with Bypass Option 1) *In Bypass Option 1*: 62 (16 are shared with Existing Corridor Option, 35 are shared with Bypass Option 2) *In Bypass Option 2*: 50 (35 shared with Bypass Option 1) **In New Corridor**: *Bypass Option 1*: 2 (both are shared with Bypass Option 2) *Bypass Option 2*: 8 (2 are shared with Bypass Option 1)	Eastside Transmission System	Safeway Distribution Center Truck Repair Building Wilburton Trestle (NRHP)	Wilburton Trestle (WHR) Twin Valley Dairy Barn at Kelsey Creek Farm Park (WHBR)	-

Unevaluated Historic Resources*	Significant Historic Resources			Arch. Resources
	Recommended-Eligible Historic Resources	Determined Eligible Historic Resources	Register-Listed Historic Resources	
Bellevue South Segment (all Options)				
217 total unique resources **In Existing Corridor:** *125 are shared with all options* *13 are shared with Oak 1 & Oak 2* *12 are shared with Oak 1, Oak 2, and Willow 2* *18 are in Oak 2* *36 are in Willow 2* **In New Corridor:** *Oak 1 & Oak 2*: 5 (all are shared) *Willow 2*: 8	Eastside Transmission System Somerset Neighborhood	-	-	-

Unevaluated Historic Resources*	Significant Historic Resources			Arch. Resources
	Recommended-Eligible Historic Resources	Determined Eligible Historic Resources	Register-Listed Historic Resources	
Newcastle Segment				
31	Eastside Transmission System Newcastle Cemetery (NRHP)	-	Newcastle Cemetery (WHR, KC Landmark)	-
Renton Segment				
83	Eastside Transmission System Mt. Olivet Cemetery	-	-	Columbia & Puget Sound Railroad (Recommended Eligible Historic Archaeological Resource)

*Number of unevaluated historic resources within 50 feet of the new corridor or within or adjacent to the existing corridor, following applicable age thresholds. Counts were identified using King County Assessor construction year data.
Source: DAHP, 2016; KCHPP, 2015.

3.7.2.1 Eastside Transmission System

A recent preliminary cultural resources assessment prepared for PSE by Historical Research Associates evaluated the existing Eastside Transmission System (see Figure 3.7-1); analysts recommended it eligible for listing in the NRHP as a historic district (Beckner and Gilpin, 2015). PSE is conducting further evaluation of the resource and will consult with DAHP to obtain an eligibility determination for it as part of a historic property inventory report.

A historic district is a group of resources that "*possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development*" (NPS, 1997). When evaluating the significance of a potential historic district, the district "*must be important for historical, architectural, archeological, engineering, or cultural values. Therefore, districts that are significant will usually meet the last portion of Criterion C plus Criterion A, Criterion B, other portions of Criterion C, or Criterion D*" (NPS, 1997; see Section 3.7.1). Historic districts can include resources that are contributing or noncontributing to the district's historic significance. Historical Research Associates recommended that the Eastside Transmission System meets NRHP Criterion A for its contributions to the broad patterns of history regarding the expansion of the electrical system in central King County, enabling farms and homes to utilize electricity for new and innovative purposes, and industrial expansion of the electrical system in the mid-twentieth century; the transmission lines retain their integrity of setting and location, and the line retains its integrity of feeling and association (for the full evaluation, see Beckner and Gilpin [2015]). This evaluation followed criteria developed specifically for evaluating potential NRHP eligibility of transmission lines (Kramer, 2012).

Historical Research Associates recommended that the contributing elements to this potential historic district are the transmission corridor itself, the wood H-frame structures, and associated substations (Sammamish, Lakeside, and Talbot Hill). Historical Research Associates recommended the noncontributing elements are the portions that have been upgraded (i.e., steel poles, conductors, insulators, and connectors). The transmission corridor was recommended the most significant contributing element, for it still retains a connection with the original 1920s Beverly Park-Renton transmission line design. The lines were rebuilt and connected to new substations in the 1960s; this minimized the original look, feel, and association of the lines with their original destination points (Beckner and Gilpin, 2015). If determined eligible as a historic district, management of the Eastside Transmission System would be the responsibility of King County, following the Cities' interlocal agreement with the KCHPP.

3.7.2.2 Safeway Distribution Center Truck Repair Building

Bypass Option 1 and Bypass Option 2 are adjacent to and within view of the Safeway Distribution Center Truck Repair Building on parcel 0671000000, which is on the northwest corner of the intersection of 124th Avenue NE, Bell-Red Road, and NE 12th Street. The Truck Repair Building is a detached building constructed in 1958 on the north edge of the parcel, farthest from the bypass routes. It was determined eligible for listing in the NRHP in 2011.

3.7.2.3 Wilburton Trestle

Bypass Option 1 and Bypass Option 2 are adjacent to and within view of the Wilburton Trestle, which spans the Mercer Slough at SE 8th Street. The trestle is part of the abandoned Burlington Northern Santa Fe Railroad, first constructed in 1904 as part of the Lake Washington Beltline. It is listed on the WHR and is one of six wooden trestles along the Lake Washington Beltline. The Lake

Washington Beltline has been determined eligible for listing in the NRHP (Allen and O'Brien, 2007; Dellert et al., 2016b).

3.7.2.4 Twin Valley Dairy Barn/Kelsey Creek Farm

All options within the Bellevue Central Segment are within view of the Twin Valley Dairy Barn/Kelsey Creek Farm. The barn, constructed in 1933, is listed in the WHBR. Historically, the farmstead extended south, across today's Lake Hills Connector Trail (the proposed route of Bypass Option 1 and Bypass Option 2), and east to the existing corridor. Documentation of the historical significance of the barn states that when the farm was sold to the city, the owners "*believed in preserving the beauty and legacy of the agricultural buildings and the land*" (WHBR, 2010).

3.7.2.5 Somerset Neighborhood

All options of the Bellevue South Segment (Oak 1, Oak 2, Willow 1, and Willow 2) would pass through the Somerset neighborhood. This neighborhood has been described as a "cohesive midcentury neighborhood" constructed in the 1950s and 1960s around the pre-existing 1929 transmission corridor (Dellert et al., 2016b). The neighborhood has not been inventoried or fully evaluated for its potential eligibility for listing in a historic register. Preliminary cultural resources assessments prepared for PSE by Historical Research Associates recommended further evaluation of the Somerset neighborhood to evaluate its potential eligibility for listing in the NRHP as a historic district (Dellert et al., 2016b). PSE is conducting further evaluation of this potential historic district and will consult with DAHP to obtain an eligibility determination.

3.7.2.6 Newcastle Cemetery

The Newcastle Segment study area contains the inactive Newcastle Cemetery, also known as the International Order of Odd Fellows Cemetery, Newcastle Odd Fellows Cemetery, Lake Boren Cemetery, Coal Creek Cemetery, or Coal Miners' Cemetery (hereafter referred to as the Newcastle Cemetery). It is located on parcel 2824059018 and buffered by parcel 6388901430. The cemetery was established in 1880, and the earliest known grave dates to 1879. Approximately 100 known graves are located within the Newcastle Cemetery, the majority of which date to the mid-1880s; individuals buried here were coal miners and their associated families. The cemetery is segregated by race, with African-American and Chinese buried in the southwest portion (Gilpin et al., 2014). In 2008, the Seattle Genealogical Society mapped the locations of identifiable graves and transcribed the names of the deceased, where possible. Grave plots extend uphill to the western edge where they occur at intervals; this is immediately adjacent to the existing corridor (Neurath, 1980). The cemetery has been subject to vandalism and fire, the latter of which destroyed the wooden grave markers and left some plots unmarked. This cemetery has the potential of containing unmarked graves beyond its current dedicated boundaries.

The City of Newcastle acquired the cemetery from the International Order of Odd Fellows Grand Lodge of Washington. Under state law definitions, the cemetery does not qualify as a "historical cemetery" because it is managed by the City of Newcastle (Chapter 68.60.010(2)). However, the cemetery is a designated KC Landmark and listed in the WHR, and therefore meets the state law definition of a significant historic resource. When inventoried in 1999 and 2010, the cemetery was recommended eligible for listing in the NRHP, but no determination has been made (MacIntosh, 1999; Sundberg, 2010a). The eligibility recommendation states that the cemetery derives its historic significance from the diverse ethnicity of buried individuals and its association with the history of mining in the Newcastle area.

Newcastle Cemetery is listed in the WHR and is a KC Landmark. Being listed on the WHR, it meets the definition of a protected historic archaeological resource under state law (Chapter 27.53.30(9)). It is also protected under Chapters 27.44 RCW, 68.60 RCW, and 68.50 RCW. Knowingly disturbing a protected historic archaeological resource or historic grave on private or public lands in Washington State without a written permit from DAHP is a class C felony (Chapter 27.53.060(1)).

3.7.2.7 Mt. Olivet Cemetery

The Renton Segment is adjacent to and within view of the active Mt. Olivet Cemetery, located at 100 Blaine Avenue NE on parcels 1723059085, 1723059106, 1723059125, 1723059127, 1723059128, 1723059143, and 1723059149. It was platted in 1891; however, the earliest known burial was in 1875. Significant individuals buried here include Duwamish Chief William; other well-known Indians and local pioneers; Mrs. Jennie Moses; and Dr. James, who was nephew to Chief Sealth. In a county-wide survey of cemeteries, Mt. Olivet Cemetery was noted as one of several cemeteries believed to occupy the general locations of preexisting Native American cemeteries (Sundberg, 2011). This cemetery has the potential of containing unmarked graves beyond its current dedicated boundaries.

The cemetery is not listed in a historic register, nor has it been determined eligible for listing in a historic register. When inventoried in 2010 as part of a county-wide cemetery survey, it was recommended eligible for listing in the NRHP, but no determination has been made (Sundberg, 2010c, 2011). Until determined eligible, it is not considered a protected historic archaeological resource, but is still subject to protection as a cemetery under state law (Chapters 68.60 RCW and 68.50 RCW).

Graves found outside of the boundaries of a dedicated cemetery are subject to protection under state law (Chapter 27.44 RCW and 68.60.050). As is common with cemeteries of the late 1800s, there is a moderate probability for identifying graves outside of the boundaries of the dedicated cemetery (Dellert el al., 2016b). Newcastle Cemetery, Mt. Olivet Cemetery, and Greenwood Memorial Park fall into this time period. Any graves outside of a dedicated cemetery that are discovered prior to 1990, except Native American graves and burial cairns, are considered “historic graves” under state law and are protected (Chapter 68.60.010(3)). Native American graves and burial cairns located outside of a dedicated cemetery are protected under state law (Chapter 27.44 RCW).

3.7.2.8 Greenwood Memorial Park

The Greenwood Memorial Park, also known as Tachell’s Greenwood Cemetery and Greenwood Cemetery (referred to hereafter as Greenwood Memorial Park), is located at 3401 NE 4th Street in the southeast corner of the intersection of NE 4th Street and Monroe Avenue NE, on parcel 1623059079. It was platted in 1917; however, the earliest known grave dates to 1910. Significant individuals buried here include Jimi Hendrix and cemetery founder James Tachell. It is currently owned by Service Corporation International and does not meet the definition of a “historical cemetery” under state law (Chapter 68.60.010(2)). This cemetery has the potential of containing unmarked graves beyond its current dedicated boundaries. The cemetery is not listed in a historic register, nor has it been determined eligible for listing in a historic register. When inventoried in 2010 as part of a county-wide cemetery survey, Greenwood Memorial Park was recommended not eligible for listing in the NRHP (Sundberg, 2010b, 2011).

3.7.2.9 Columbia & Puget Sound Railroad

The Renton Segment passes over the former grade of the Cedar River branch line of the Columbia & Puget Sound Railroad (C&PSRR). The section of this branch line is now part of the developed Cedar River Trail Walk. It was constructed in 1891 to connect the towns of Renton, Newcastle, and Coal Creek (Robertson, 1995) and is a recorded historic archaeological site (45KI538; this is the Smithsonian number format assigned to recorded archaeological and historic resources). It is recommended eligible for listing in the NRHP based on its contribution to the broad patterns in history (Dellert et al. 2016b). Because it recommended eligible, PSE will request an eligibility determination from DAHP.

3.7.3 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.

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.

3.7.3.1 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.

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.

3.7.3.2 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 Code of Federal Regulations [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.

3.7.4 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 some 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 (see Section 3.7.2.1). 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.

3.7.5 Long-term Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

3.7.5.1 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 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, one steel H-frame structure, or two steel monopoles, depending on the segment and option (see Section 2.1.2.2, and Table 2.1-1). Poles would be replaced in generally the same location as the existing poles (i.e., within 25 feet up or down the line). Where poles would be replaced in the existing corridor, 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. Steel poles would also be used in the new corridors, except for the portion of the Oak 2 Option along 124th Avenue.

Alternative 1 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 (see Section 3.7.2.1). 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. The Redmond, Bellevue North, Bellevue Central Existing Corridor Option, Newcastle, and Renton Segments, and the Bellevue South Segment Oak 2, Willow 1, and Willow 2 Options would remove portions of the existing H-frame structures; this would have significant impacts to the Eastside Transmission System, if impacts cannot be mitigated. The Bellevue Central Segment Bypass Option 1, Bypass Option 2, and the Bellevue South Segment Oak 1 Option propose retaining portions of the existing wood H-frame structures. PSE will evaluate this resource during a historic property inventory and 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 Alternative 1 study area. The Newcastle Segment would construct poles approximately 30 feet southwest and 300 feet northwest of the Newcastle Cemetery. The Renton Segment would construct poles approximately 750 feet southeast and 900 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 Alternative 1 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. In the new corridor, ancillary structures that are unevaluated historic resources could be directly impacted by demolition or relocation to make room for the proposed project. Impacts to unevaluated historic resources will be known when the historic property inventory is completed and eligibility is determined by DAHP, which is 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 634 unique unevaluated historic resources within the study area 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-2 – Unevaluated

Historic Resources by Segment/Option). Because portions of the options follow the same routes, some resources are associated with more than one option (see Section 3.7.2).

All segments and options in Alternative 1 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. All segments and options propose ground disturbance 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 removal and replanting of vegetation also has the potential to disturb archaeological sites.

With a few exceptions described below, 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, several segments and options cross younger Holocene-aged landforms with a higher sensitivity for archaeological resources.

3.7.5.2 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.

3.7.5.3 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.

3.7.5.4 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.

3.7.5.5 Bellevue Central Segment, Existing Corridor Option

In the Bellevue Central Segment, Existing Corridor Option, 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 Ave 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 option; some are shared with those in Bypass Option 1. 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 option. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

3.7.5.6 Bellevue Central Segment, Bypass Option 1

In the Bellevue Central Segment, Bypass Option 1, the project would replace a portion of the existing H-frame structures of the Eastside Transmission System. In addition to the Eastside Transmission System, there are two additional significant historic resources adjacent to the proposed pole locations (the Safeway Distribution Center Truck Repair Building, and the Wilburton Trestle), and one significant historic resource is within 0.5 mile (the Twin Valley Dairy Barn). There are no known protected archaeological sites either at or adjacent to the proposed pole locations.

Installation of monopoles within the viewshed of the Safeway Distribution Center Truck Repair Building, Wilburton Trestle, and Twin Valley Dairy Barn could result in less-than-significant impacts because alterations to their integrity of setting, place, and feeling would not reduce their ability to convey their historic significance, which is instead associated with contributions to broad patterns in history (Criterion A; see Section 3.7.1) and architectural style.


Existing transmission line, looking northwest at 134th PL SE and 135th PL SE


Safeway Distribution Center Truck Repair Building.
Source: DAHP, 2016.


Wilburton Trestle.


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.

- **Safeway Distribution Center Truck Repair Building:** 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.
- **Wilburton Trestle:** 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.
- **Twin Valley Dairy Barn:** 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 62 unevaluated historic resources along this option (including resources in both the existing and new corridors); many are shared with those in the Existing Corridor Option and Bypass Option 2. These are primarily commercial buildings constructed in the 1960s. Of these, two of the unevaluated historic resources are within the new corridor (these are both shared with those in Bypass Option 2); there is a potential for direct impacts if ancillary structures associated with these are demolished or relocated. Impacts to the unevaluated 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 option. Based on geology and soils conditions, the sensitivity for archaeological resources is very low, except within the Kelsey Creek area, which has a very high sensitivity.

3.7.5.7 Bellevue Central Segment, Bypass Option 2

In the Bellevue Central Segment, Bypass Option 2, the project would replace a portion of the existing H-frame structures of the Eastside Transmission System. In addition to the Eastside Transmission System, there are two additional significant historic resources adjacent to the proposed pole locations (the Safeway Distribution Center Truck Repair Building, and the Wilburton Trestle), and one significant historic resource is within 0.5 mile (the Twin Valley Dairy Barn). No protected archaeological sites are known to be at or adjacent to the proposed pole locations.

Installation of monopoles within the viewshed of the Safeway Distribution Center Truck Repair Building, Wilburton Trestle, and Twin Valley Dairy Barn could result in less-than-significant impacts because alterations to their integrity of setting, place, and feeling would not reduce their ability to convey their historic significance, which is instead associated with contributions to broad patterns in history (Criterion A; see Section 3.7.1) and architectural style.

Existing transmission line, looking northwest at 134th PL SE and 135th PL SE

Safeway Distribution Center Truck Repair Building.
Source: DAHP, 2016.

Wilburton Trestle.

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.

- **Safeway Distribution Center Truck Repair Building:** 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.
- **Wilburton Trestle:** 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.
- **Twin Valley Dairy Barn:** 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 50 unevaluated historic resources along this option (including resources in both the existing and new corridors); many are shared with those in Bypass Option 1. These are primarily commercial buildings constructed in the 1950s and 1960s. Of these, eight of the unevaluated historic resources are within the new corridor (two of these are shared with those in Bypass Option 1); there is a potential for direct impacts if ancillary structures associated with these are demolished or relocated. Impacts to the unevaluated 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 option. Based on geology and soils conditions, the sensitivity for archaeological resources is very low, except within the Kelsey Creek area which has a very high sensitivity.

3.7.5.8 Comparison of Bellevue Central Options

All options contain historic and cultural resources. The potential impacts to these resources are compared below by option (Table 3.7-3). Comparisons are presented based on the option's sensitivity for unrecorded archaeological resources, proposed retention of existing H-frame structures in the Eastside Transmission System, potential for demolition or relocation of unevaluated historic resources, and proposed ground disturbance from undergrounding existing distribution and communication lines. Each category can have lower, moderate, or higher potential for impacts to historic and cultural resources.

The Existing Corridor Option has the least potential for impacts; however, this option would not retain the existing H-frame structures of the Eastside Transmission System, which have been recommended as contributing elements to the historic district.

In the Bellevue Central Segment, two of the three options would retain a portion of the existing H-frame structures, which were recommended as contributing to the historic register eligibility of the resource. Retention of the H-frame structures could minimize potential direct impacts to the Eastside Transmission System. As described above, it is probable that these potential impacts could be mitigated by other means as well. In general, the sensitivity for unrecorded archaeological sites is very low in the Bellevue Central Segment, except where Bypass Options 1 and 2 pass near the Kelsey Creek area (which has a very high sensitivity). Bypass Options 1 and 2 would also involve a new corridor, which would require new easements in areas with unevaluated historic resources.

Table 3.7-3. Comparison of Bellevue Central Options

Scale:	Lower Potential for Impact	Moderate Potential for Impact	Higher Potential for Impact

Segment / Option	Sensitivity for Unrecorded Archaeological Resources	Portions of Existing H-frame Structures Retained	New Easements Proposed for New Corridor	Undergrounding Existing Distribution and Communication Lines Proposed
Existing Corridor Option	Very Low	No	No	No
Bypass Option 1	Predominately Very Low Very High within the Kelsey Creek area	Yes	Yes	No
Bypass Option 2	Predominately Very Low Very High within the Kelsey Creek area	Yes (longest continuous section)	Yes	No

3.7.5.9 Bellevue South Segment, Oak 1 Option

In the Bellevue South Segment, Oak 1 Option, the project would replace a portion of the existing H-frame structures of the Eastside Transmission System. The Oak 1 Option would cross through the Somerset neighborhood, but the existing poles within this neighborhood would remain unchanged; therefore, no impacts to the Somerset Neighborhood are anticipated.

No protected archaeological sites are known to be at or adjacent to the Oak 1 Option. The Oak 1 Option proposes placing the existing communication and distribution lines underground along Factoria Blvd SE; this would require ground disturbance and has the potential for impacts to archaeological resources, if present.

- **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

- **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; however, because no poles would be replaced in the Somerset Neighborhood, impacts are not anticipated.
- **Unevaluated Historic Resources:** There are 150 unevaluated historic resources along this option (including resources in both the existing and new corridors); many are shared with those in the Oak 2 Option, Willow 1 Option, and the Willow 2 Option. These are primarily detached single-family residences constructed in the 1950s and 1960s. Of these, five of the unevaluated historic resources are within the new corridor (these are shared with those in the Oak 2 Option); there is a potential for direct impacts if these are demolished or relocated. 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 option. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

3.7.5.10 Bellevue South Segment, Oak 2 Option

In the Bellevue South Segment, Oak 2 Option, the project would replace existing H-frame structures of the Eastside Transmission System and would cross through the Somerset neighborhood. Poles within this potential historic district would be replaced.

No protected archaeological sites are known to be at or adjacent to the Oak 2 Option. The Oak 2 Option proposes placing the existing distribution lines underground along Factoria Blvd SE and Coal Creek Parkway; this would require ground disturbance and has the potential for impacts to archaeological resources, if present. The Willow 2 Option and Bypass Option 2 routes within the new corridor contain the highest number of ancillary structures (8) with the potential to be demolished or relocated.

- **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 (see Section 3.7.2.1).
- **Unevaluated Historic Resources:** There are 168 unevaluated historic resources along this option (including resources in both the existing and new corridors); many are shared with those in Oak 1 Option, Willow 1 Option, and Willow 2 Option. These are primarily detached single-family residences constructed in the 1950s and 1960s. Of these, five of the unevaluated historic resources are within the new corridor (these are shared with those in the Oak 1 Option); there is a potential for direct impacts if these are demolished or relocated. 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 option. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

3.7.5.11 Bellevue South Segment, Willow 1 Option

In the Bellevue South Segment, Willow Option 1, the project would replace existing H-frame structures of the Eastside Transmission System and would cross through the Somerset neighborhood. Proposed poles within this potential historic district would be replaced. No protected archaeological sites are known to be at or adjacent to the Willow 1 Option.

- **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 (see Section 3.7.2.1).
- **Unevaluated Historic Resources:** There are 125 unevaluated historic resources along this option; many of these are shared with those in the Oak 1, Oak 2, and Willow 2 Options. 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 option. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

3.7.5.12 Bellevue South Segment, Willow 2 Option (PSE's Preferred Alignment)

In the Bellevue South Segment, Willow 2 Option, the project would replace existing H-frame structures of the Eastside Transmission System and would cross through the Somerset neighborhood. Proposed poles within this potential historic district would be replaced. No protected archaeological sites are known to be at or adjacent to the proposed pole locations.

- **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 (see Section 3.7.2.1).
- **Unevaluated Historic Resources:** There are 173 unevaluated historic resources along this option (including resources in both the existing and new corridors); many of these are shared with those in the Oak 1, Oak 2, and Willow 1 Options. These are primarily detached single-family residences constructed in the 1950s and 1960s. Of these, eight of the unevaluated historic resources are within the new corridor; there is a potential for direct impacts if ancillary structures associated with these are demolished or relocated. 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 option. Based on geology and soils conditions, the sensitivity for archaeological resources is very low.

3.7.5.13 Comparison of Bellevue South Options

All Bellevue South Options contain historic and cultural resources. The potential impacts to these resources are compared below by option (Table 3.7-4), using the methodology described in Section 3.7.5.8.

In the Bellevue South Segment, all four options are in areas with very low sensitivity for unrecorded archaeological resources. One option (the Oak 1 Option) would retain a portion of the existing H-frame structures, which were recommended as contributing to the historic register eligibility of the Eastside Transmission System. All but the Willow 1 Option would involve a new corridor, which would require new easements in areas with unevaluated historic resources. Similarly, all but the Willow 1 Option would involve undergrounding existing distribution and communication lines, with potential impacts associated with ground disturbance.

The Willow 1 Option has the least potential for impacts; however, this option would not retain the existing H-frame structures of the Eastside Transmission System, which have been recommended as contributing elements to the historic district. The Oak 2 Option and Willow Option 2 have the greatest potential for impacts; these would replace the H-frame structures, require new corridor easements that could impact unevaluated historic resources, and require ground disturbance for undergrounding existing distribution and communication lines.

Table 3.7-4. Comparison of Bellevue South Options

Scale:	Lower Potential for Impact	Moderate Potential for Impact	Higher Potential for Impact

Segment / Option	Sensitivity for Unrecorded Archaeological Resources	Portions of Existing H-frame Structures Retained	New Easements Proposed for New Corridor	Undergrounding Existing Distribution and Communication Lines Proposed
Oak 1 Option	Very Low	Yes	Yes	Yes (along Factoria Blvd SE)
Oak 2 Option	Very Low	No	Yes	Yes (along Factoria Blvd SE and Coal Creek Parkway)
Willow 1 Option	Very Low	No	No	No
Willow 2 Option	Very Low	No	Yes	Yes (along Factoria Blvd SE, Coal Creek Parkway, and Newport Way)

3.7.5.14 *Newcastle Segment*

In the Newcastle Segment, 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 300 feet northwest and 30 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 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.

3.7.5.15 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 750 feet southeast and 900 feet southeast of Mt. Olivet Cemetery, and approximately 250 feet northwest and 220 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.

- **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. No operational or construction activities are proposed for the very high sensitivity areas.

3.7.6 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, KCHPP, and any other stakeholders. Such potential mitigation measures can be adopted voluntarily by the applicant or imposed as conditions as part of the permit process. These would need to be implemented prior to and during construction of the project.

Typically, mitigation measures seek 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.

3.7.6.1 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).

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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.

3.7.6.2 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.

Prior to Construction

- Conduct a historic property inventory.
- Conduct archaeological resource surveys for the selected route that include subsurface testing.
- Prepare an Inadvertent Discovery Plan (IDP) for the project and discuss the IDP during pre-construction meeting(s).
- 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.

[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)).

3.8 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 study area for this analysis is consistent with the study area used by Power Engineers (2017) (see the *Methods for Studying the Affected Environment*, to the right), and includes the areas immediately under and adjacent to the transmission lines, including areas within 250 feet from the centerline of the transmission line corridor (Figure 3.8-1). 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.

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 that would occur as a result of the project, PSE retained Power Engineers to calculate existing magnetic fields at locations along the transmission line corridor (Power Engineers, 2017). Methodologies used by Power Engineers were reviewed by the EIS Consultant Team to verify compliance with industry standards (Enertech Consultants, 2017a and 2017b). Measured magnetic fields were compared to expected magnetic field levels described in the Phase 1 Draft EIS.

As described in Section 8.6.1.4 of the Phase 1 Draft EIS, extensive health studies have not found a causal link between adverse health effects and EMF from electrical transmission lines. However, while it does not appear that EMF from the project would pose an environmental health hazard, it is analyzed in this document due to public concerns raised during EIS scoping. See the Phase 1 Draft EIS for a full discussion of environmental health studies related to EMF.

Typical magnetic field levels associated with transmission lines for the Energize Eastside project are described in the Phase 1 Draft EIS, but no information was provided for existing conditions because of the programmatic nature of that analysis. This Phase 2 analysis describes both existing conditions for representative areas along the segments and options, and projected magnetic field levels for representative areas.

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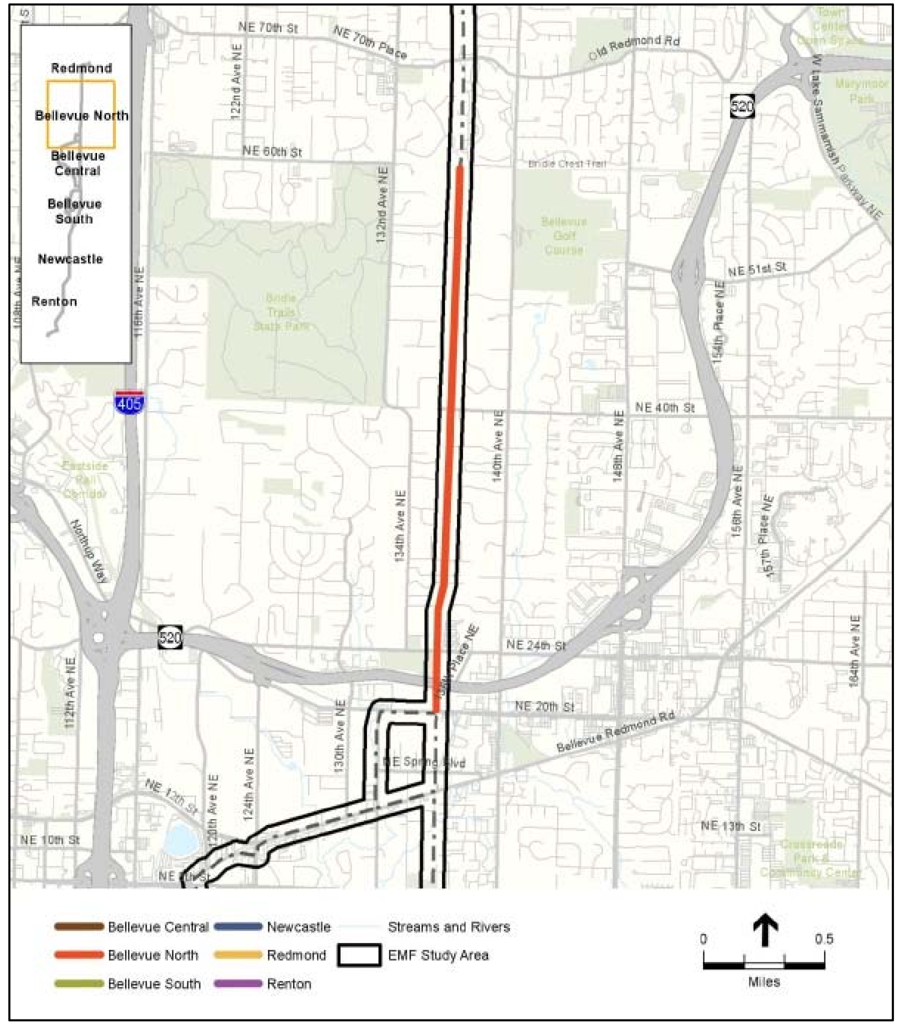
[1] The term EMF in this section refers to electric and magnetic fields at extreme low frequencies (ELF). EMF can be used in a much broader sense as well, encompassing electromagnetic fields with low or high frequencies. In the ELF range, electric and magnetic fields are not coupled or interrelated the 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).

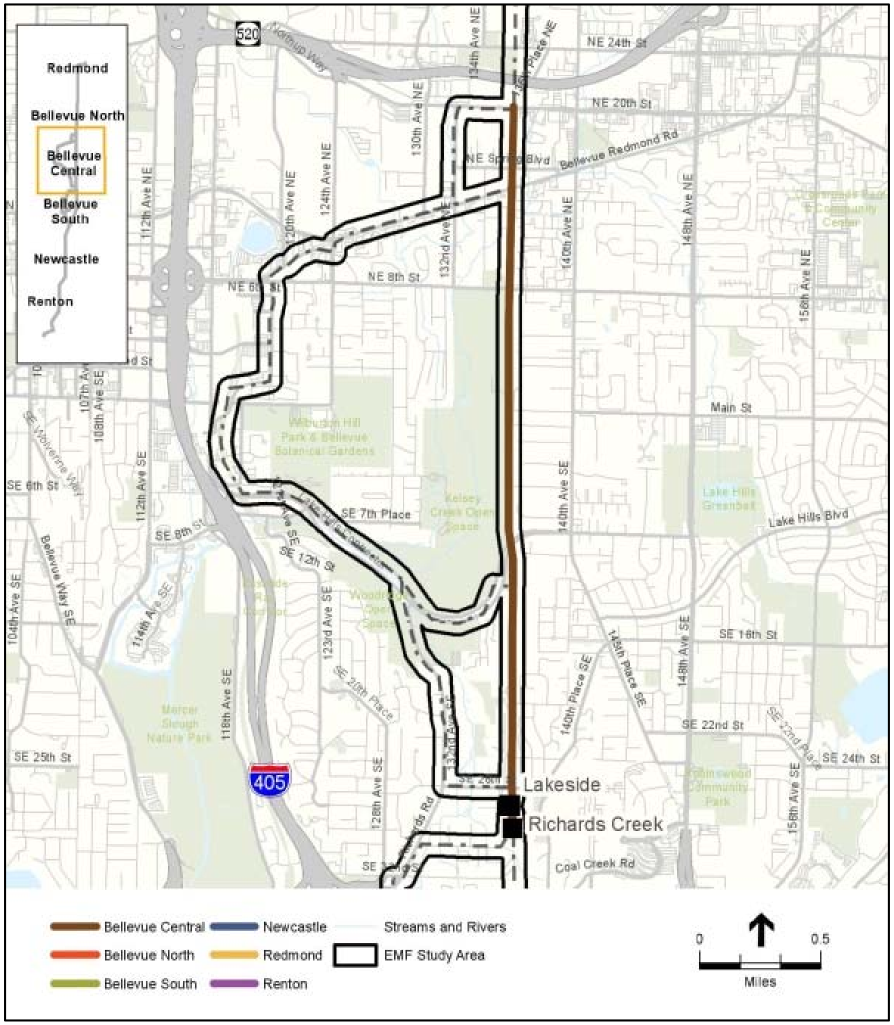
Redmond Segment



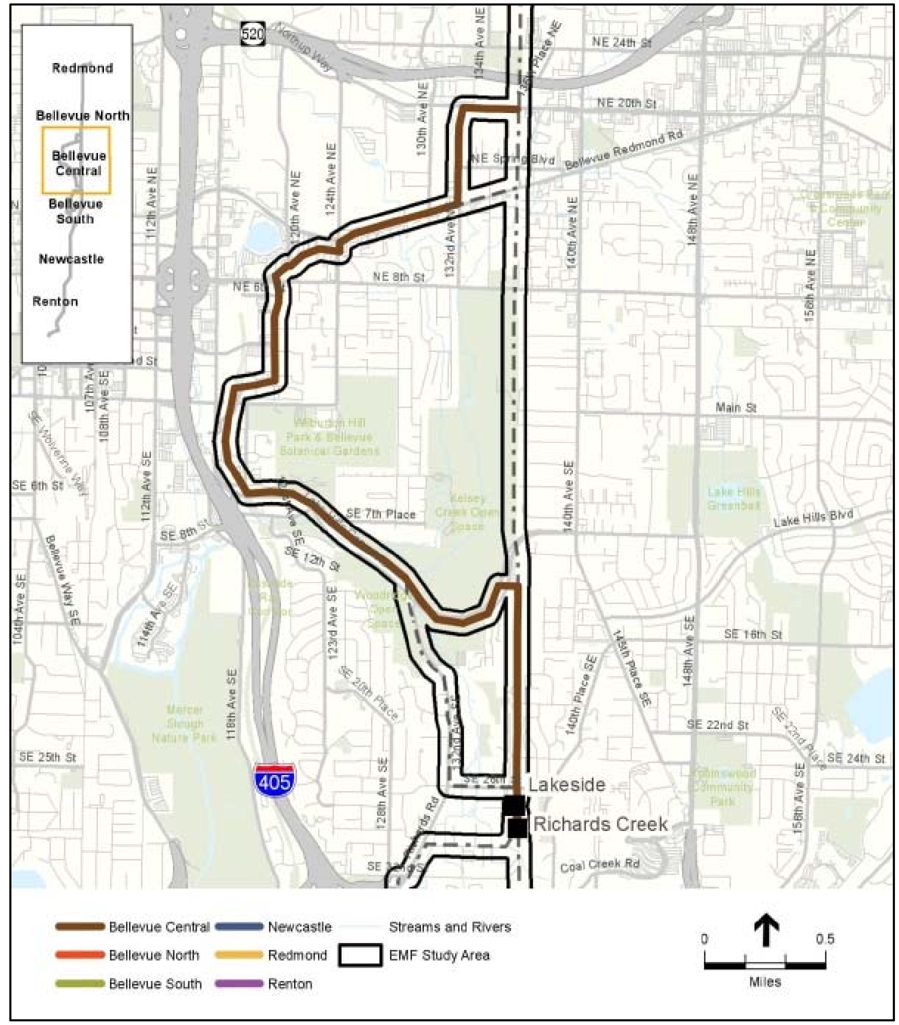
Bellevue North Segment

Sources: King County, 2015; Ecology, 2014

Figure 3.8-1. Study Area for the EMF Analysis



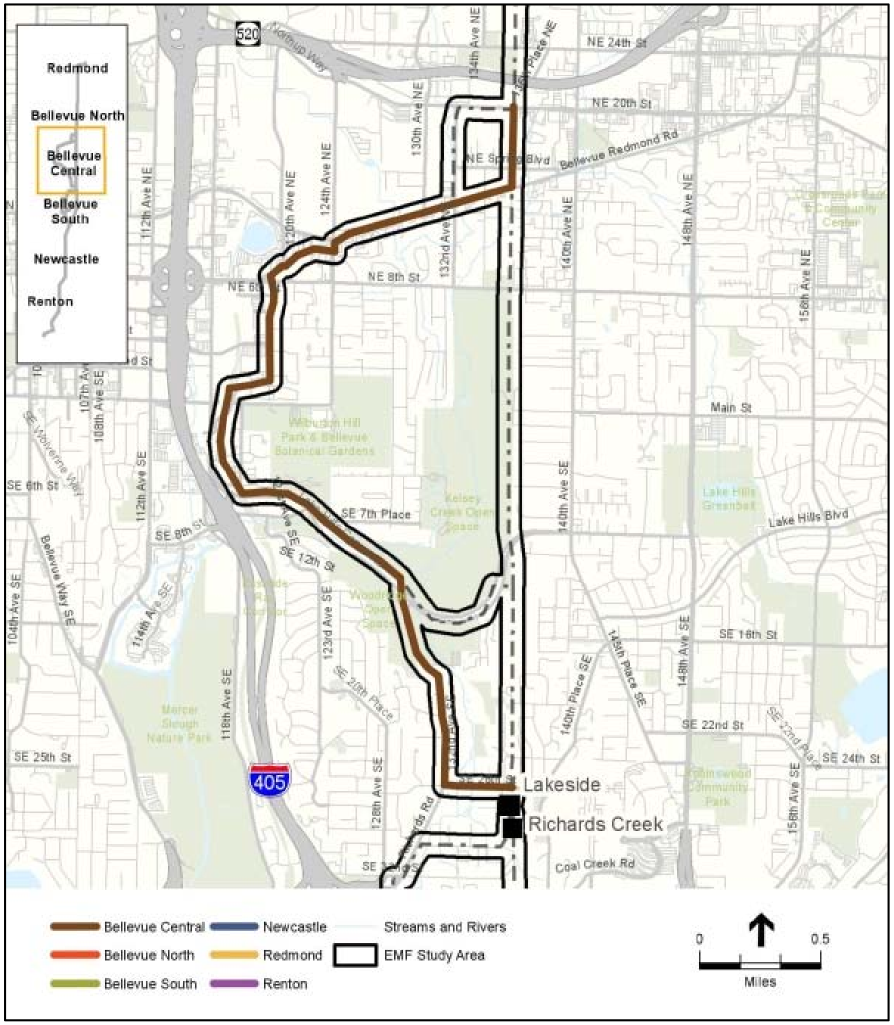
Bellevue Central Segment, Existing Corridor Option



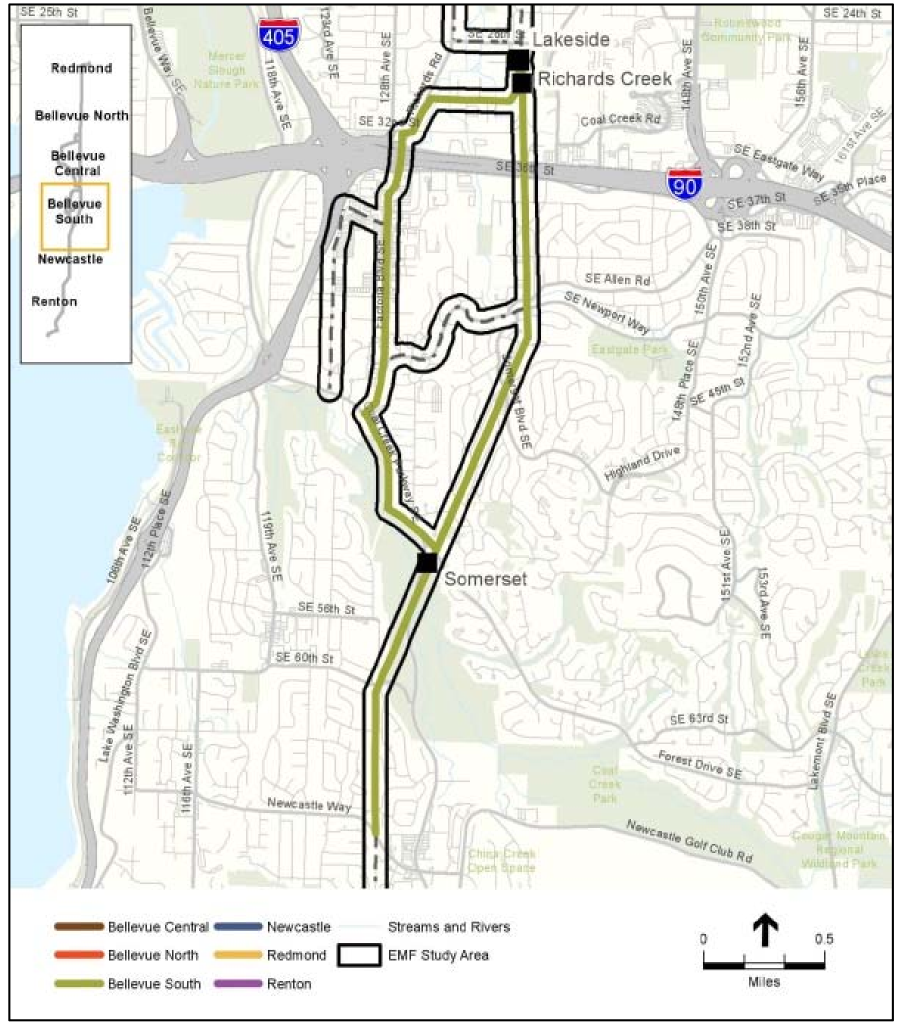
Bellevue Central Segment, Bypass Option 1

Sources: King County, 2015; Ecology, 2014

Figure 3.8-1. Study Area for the EMF Analysis (continued)



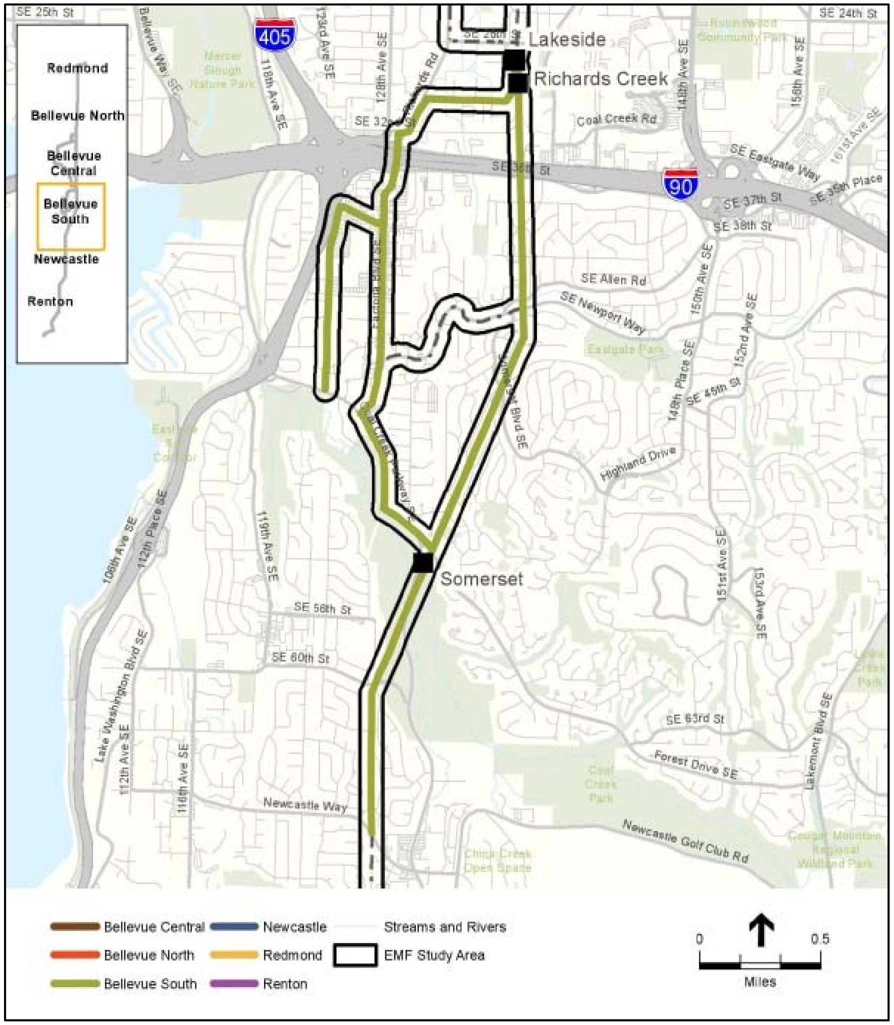
Bellevue Central Segment, Bypass Option 2



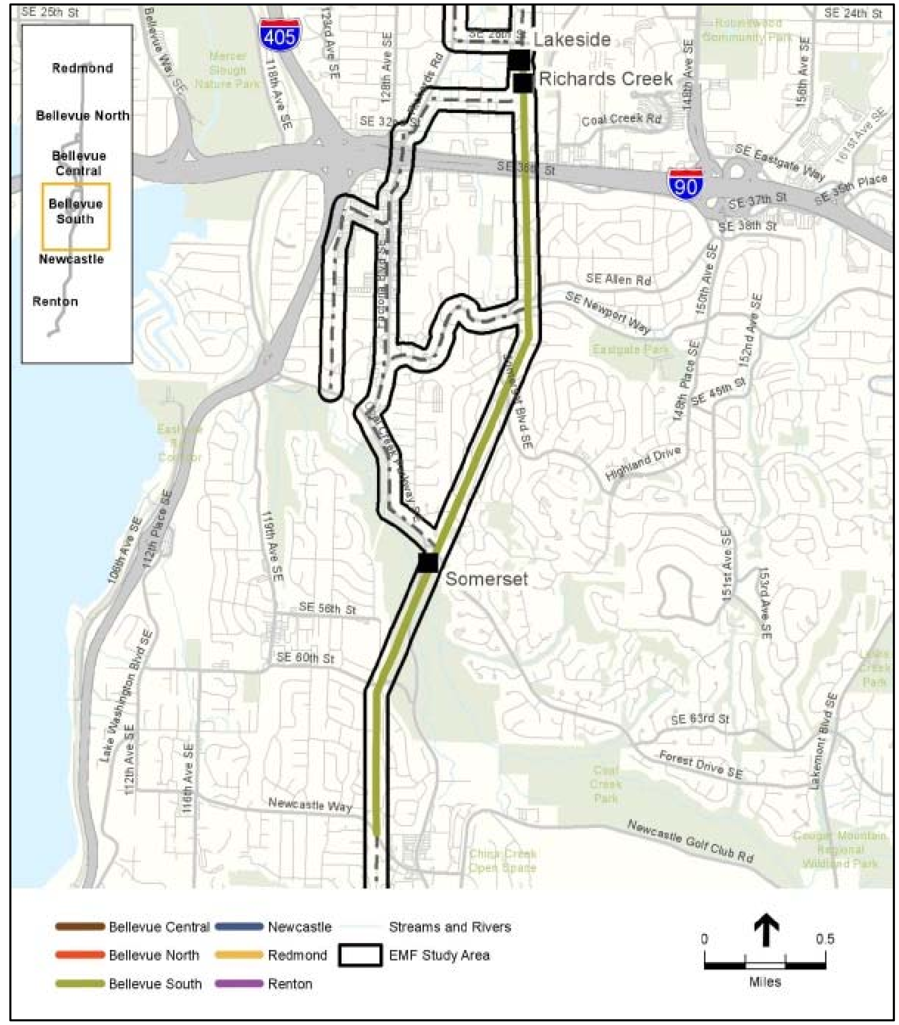
Bellevue South Segment, Oak 1 Option

Sources: King County, 2015; Ecology, 2014

Figure 3.8-1. Study Area for the EMF Analysis (continued)



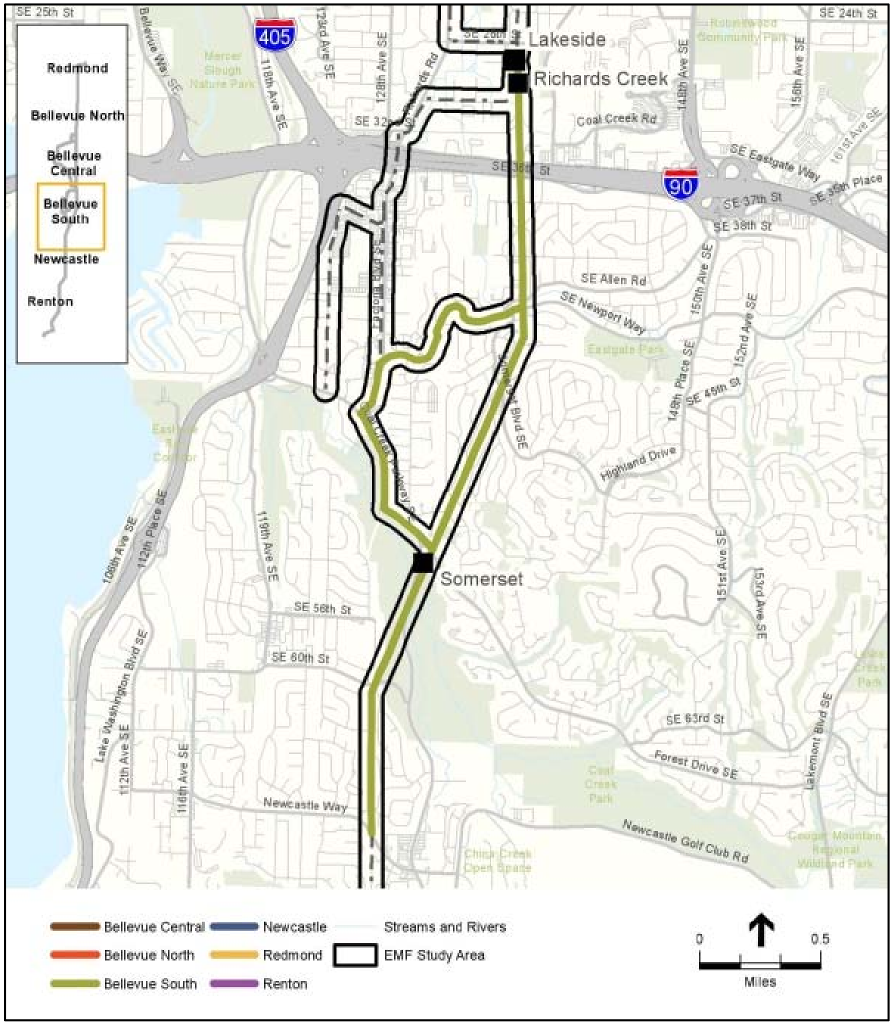
Bellevue South Segment, Oak 2 Option



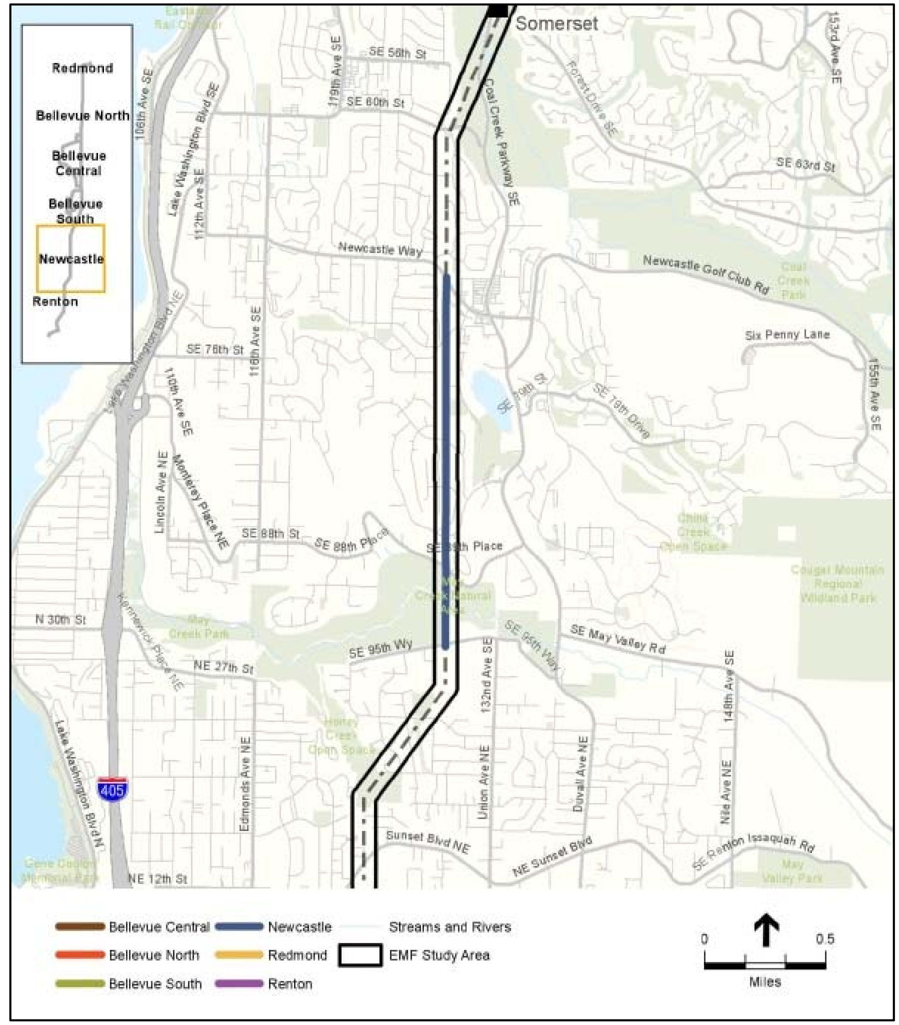
Bellevue South Segment, Willow 1 Option

Sources: King County, 2015; Ecology, 2014

Figure 3.8-1. Study Area for the EMF Analysis (continued)



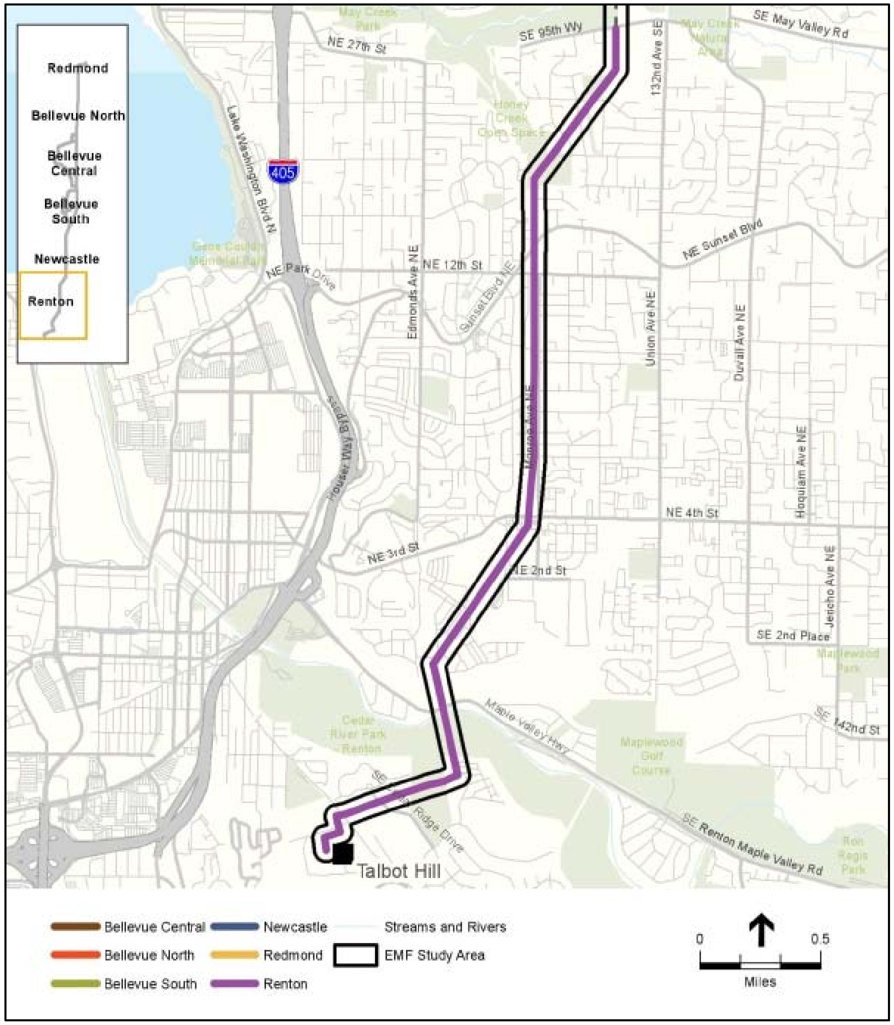
Bellevue South Segment, Willow 2 Option



Newcastle Segment

Sources: King County, 2015; Ecology, 2014

Figure 3.8-1. Study Area for the EMF Analysis (continued)



Renton Segment

Sources: King County, 2015; Ecology, 2014

Figure 3.8-1. Study Area for the EMF Analysis (continued)

3.8.1 Relevant Plans, Policies, and Regulations

As described in Section 8.2.3 of the Phase 1 Draft EIS, policies addressing EMF exposure are established locally in the City of Bellevue Comprehensive Plan (City of Bellevue, 2015). The City of Redmond also has adopted policies in their Comprehensive Plan related to EMF reduction, which were not identified in the Phase 1 Draft EIS. The policies recommend requiring designs that incorporate known and accepted low-cost technological methods to reduce magnetic fields or the exposure to them, such as line configurations that reduce field strength, sufficient right-of-way widths, and sufficient height of lines from the ground, when siting high-voltage electrical facilities. The policies also recommend a periodic review of the state of scientific research on power frequency EMF and to modify policies and regulations, if warranted, by changing knowledge or new state or federal regulations requiring such changes (Policies UT-67 and UT-68) (City of Redmond, 2011). Section 8.2.3 of the Phase 1 Draft EIS also identifies the only two states in the U.S. that have enacted their own standards for magnetic fields from overhead transmission line: Florida and New York (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.

There are industry 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 by 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 Tables 3.8-1 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 3.8-1. 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.

3.8.2 Magnetic Fields in the Study Area

Magnetic fields in the study area are associated with existing transmission lines and substations. This includes areas immediately under and adjacent to PSE's existing corridor with overhead 115 kV transmission lines, as well as the Sammamish, Lakeside, Somerset, and Talbot Hill substations. It also includes areas under and adjacent to existing transmission and distribution lines on the route options in the Bellevue Central and Bellevue South Segments.

Power Engineers, Inc., performed an EMF investigation for the proposed project, titled *Puget Sound Energy, 230 kV Energize Eastside Project, EMF Calculations and Report* in March 2017 (Power Engineers, 2017). The report identified magnetic field strength at 35 representative locations along the project segments based on computer modeling. The analysis compared electric and magnetic fields between the existing and proposed transmission lines.

Magnetic field strength is dependent on the arrangement and spacing of the lines, distance of the lines above ground, and amount of current (amperes) or loading. Certain conductor (wire) arrangements and spacing can reduce or cancel magnetic field levels. Magnetic fields can also be reduced by increasing the operating voltage and reducing the amperage to deliver the same amount of electrical power.

Table 3.8-2 shows calculated magnetic field levels based on 2013–2014 load data for the existing 115 kV transmission lines within the study area. The values presented are based on summer peak and winter peak load data, which, although rare in occurrence, present the highest potential magnetic field levels. This ensures that the “worst-case” information is used for purposes of this analysis. 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 calculated magnetic field levels would typically occur within the transmission line corridor and drop in value at the edge of the transmission ROW. As shown in Table 3.8-2, the calculated magnetic field levels within the existing corridor are well below industry guidelines. They are also within the range of magnetic field levels presented in Section 8.3.5 of the Phase 1 Draft EIS (see overhead peak loads in Figure 8-5). Calculated magnetic field levels are highest in the Renton Segment because of the following two reasons: (1) portions of the segment have three conductors within the corridor, while other segments only have two conductors; and (2) transmission line loads are typically higher between the Talbot Hill and Lakeside substations than between the Sammamish and Lakeside substations, and would continue to be so in the future.

Table 3.8-2. Calculated Magnetic Fields along the Existing Transmission Line Corridor based on 2013–2014 Loading

	Maximum		At Edge of Right-of-Way	
Segment	Summer Peak (mG)	Winter Peak (mG)	Summer Peak (mG)	Winter Peak (mG)
Redmond	87	83	55	51
Bellevue North	87	83	55	51
Bellevue Central, Existing Corridor	87	83	55	51
Bellevue South, Existing Corridor	102	123	69	83
Newcastle	102	123	69	83
Renton	126	152	90	108

[1]Load data for 2013/2014 were used to be consistent with the study years considered in the initial reports prepared for the Eastside to assess electrical needs.
Source: Power Engineers, 2017.

The study area for EMF contains approximately 4,665 acres of land within King County and the cities of Bellevue, Newcastle, Redmond, and Renton.

Potential EMF exposure levels depend on how long a person is in the vicinity of the existing transmission lines. Land uses in the area generally indicate what population groups are most likely to be exposed to magnetic fields from the existing and proposed transmission lines. In areas with commercial and industrial land uses, exposure would typically be workers, whose exposure limits are subject to occupational safety and health standards based on a standard work week. In residential areas, parks, schools, and other institutions open to the public, the general public is more likely to be

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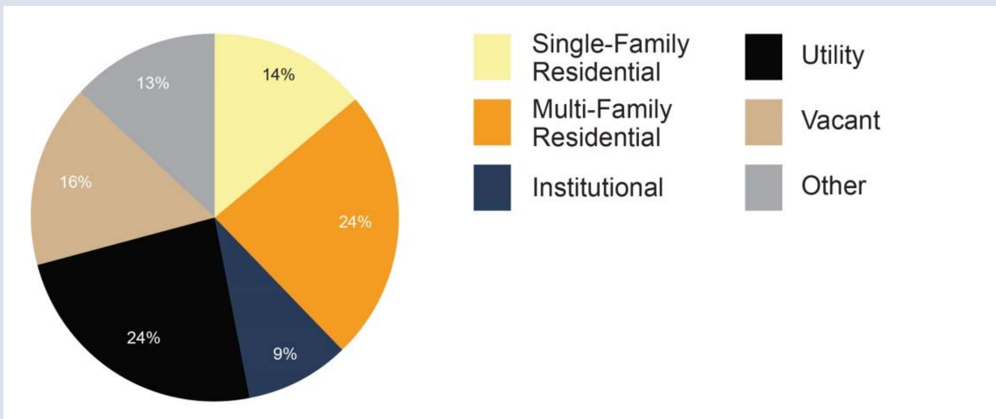
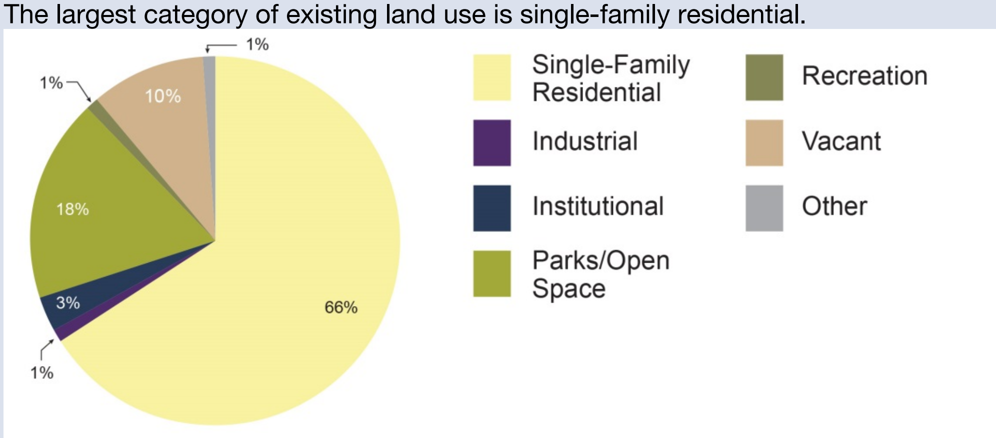
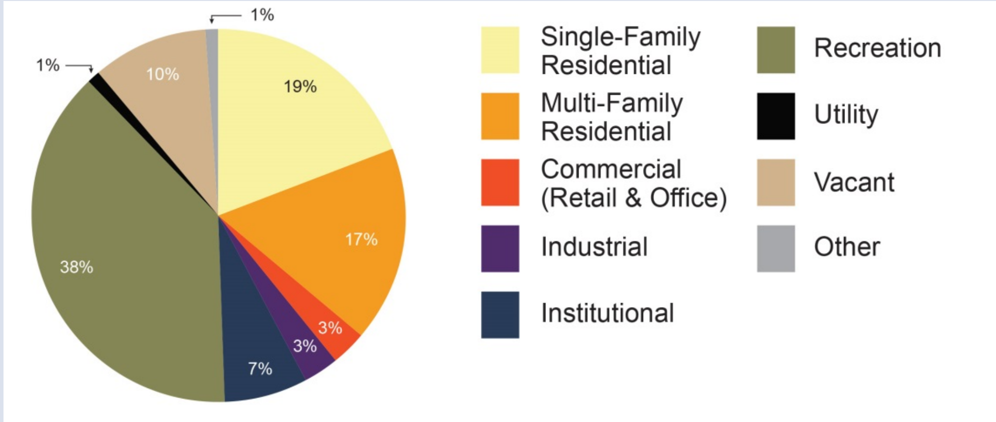
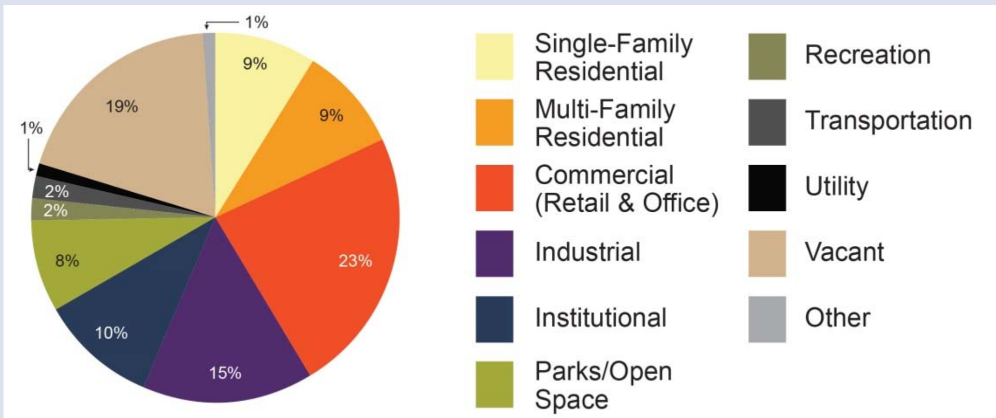
present. The potential length of exposure is greater among the general public in these areas than in an occupational setting. For purposes of this analysis, it was assumed that people in residential settings could be exposed 24 hours a day, 365 days per year. Residential is the most common land use found in the study area, and accounts for 35 percent.

The mix of land uses by segment and option is shown in Table 3.8-3. The table includes pie charts that present each land use as a percentage of the total study area within each segment or option.

Table 3.8-3. Existing Land Uses in the Study Area

Segment/Option	Existing Land Uses
Richards Creek Substation	Existing land use in the Richards Creek substation study area is a mix of industrial, institutional, single-family residential, vacant lands, and utility (PSE's Lakeside substation), and includes a private school (Chestnut Hill Academy) located north of the substation site, adjacent to (and just east of) the Lakeside substation.
Redmond	The largest categories of existing land use are utility and multi-family. 
Bellevue North	The largest category of existing land use is single-family residential. 

<table>
<tr><th>Segment/Option</th><th>Existing Land Uses</th></tr>
<tr><td>Bellevue Central, Existing Corridor Option</td><td>The largest category of existing land use is recreation.

</td></tr>
<tr><td>Bellevue Central, Bypass Option 1</td><td>The largest category of existing land use is commercial.

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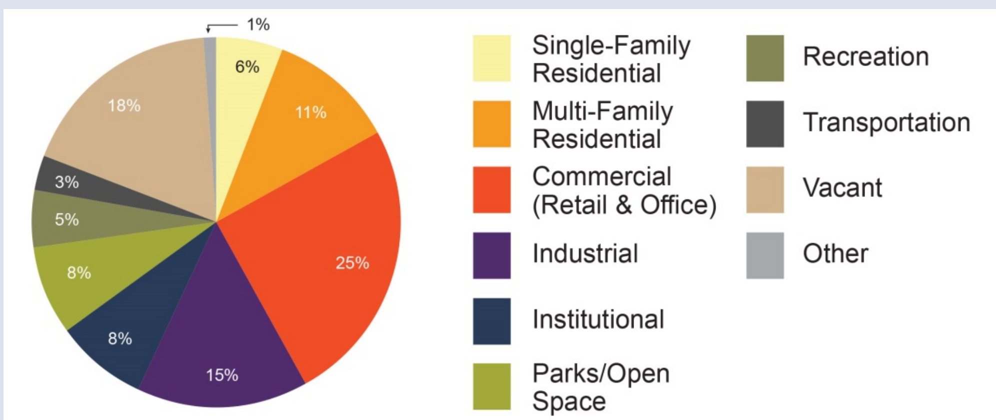
<tr><td>Bellevue Central, Bypass Option 2</td><td>The largest category of existing land use is commercial.

</td></tr>
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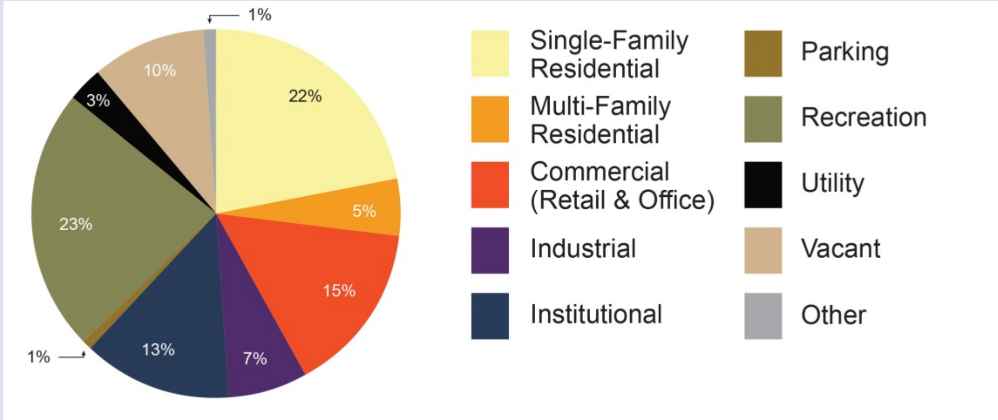
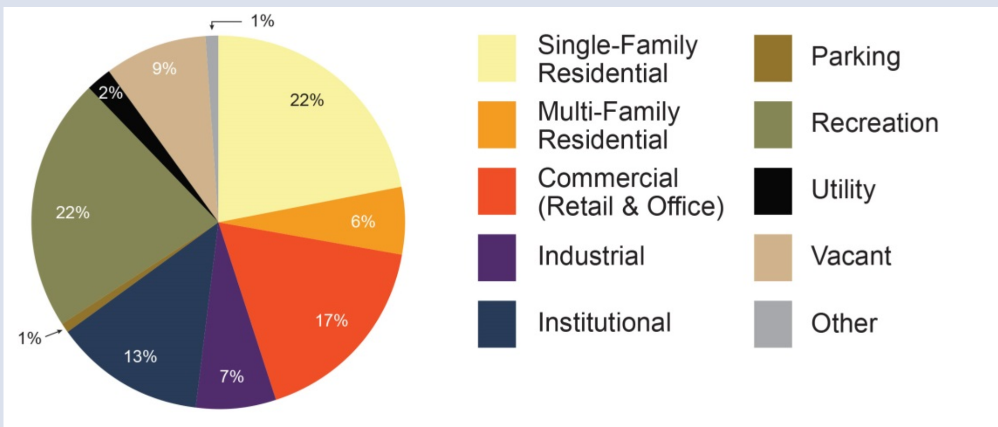
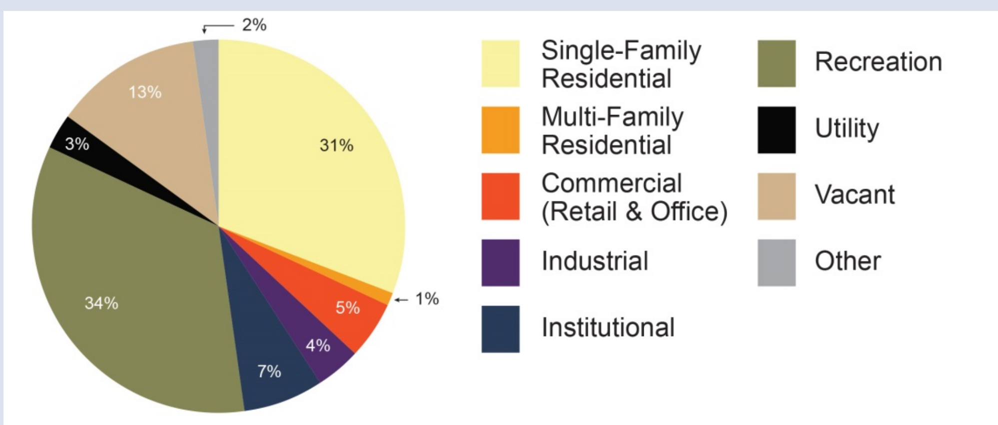
Segment/Option	Existing Land Uses
Bellevue South, Oak 1 Option	The largest category of existing land use is recreation.



Segment/Option	Existing Land Uses
Bellevue South, Oak 2 Option	The largest categories of existing land use are single-family residential and recreation.



Segment/Option	Existing Land Uses
Bellevue South, Willow 1 Option	The largest category of existing land use is recreation.



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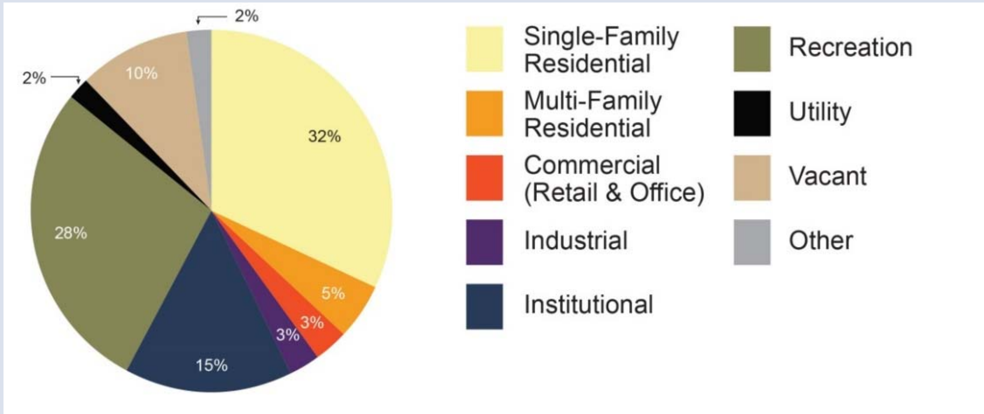
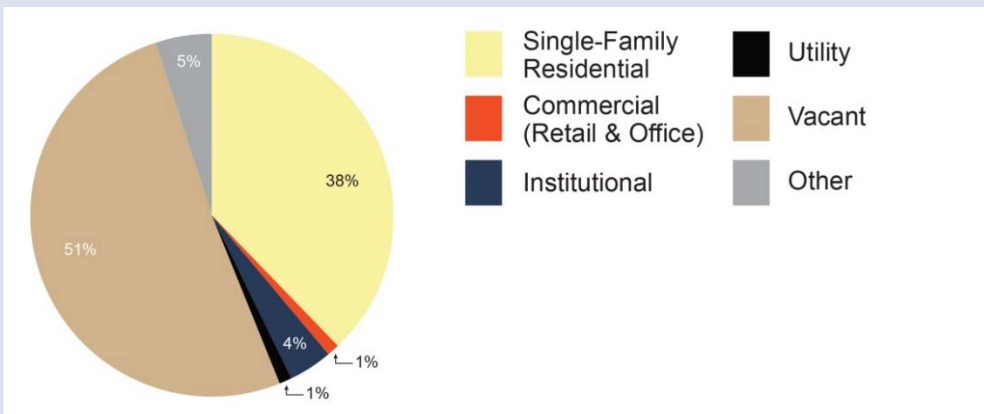
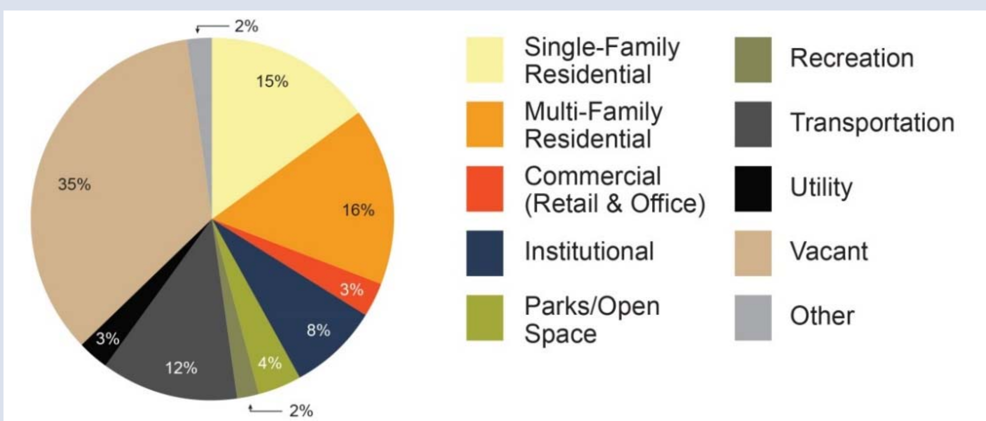
<tr><th>Segment/Option</th><th>Existing Land Uses</th></tr>
<tr><td>Bellevue South, Willow 2 Option</td><td>The largest category of existing land use is single-family residential.

</td></tr>
<tr><td>Newcastle</td><td>The largest category of existing land use is vacant lands (some of which are associated with May Creek Park).

</td></tr>
<tr><td>Renton</td><td>The largest category of existing land use is vacant land, largely because this category includes large parcels associated with the bed and floodway of the Cedar River.

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</table>

During the Phase 2 Draft EIS scoping period, several members of the community expressed concern about EMF exposure at unique sites, such as parks, schools, and daycare facilities. These land uses are unique in that they are non-residential uses, but are places where the general public congregates, sometimes for extended periods of time. Together with residential uses and trails that run along or underneath the transmission line corridor, such unique sites potentially extend the general public's length of exposure to power frequency EMF. In this analysis, unique sites were considered to include the following: schools, parks, trails, a fire station, and a museum. Table 3.8-4 identifies unique sites within the study area (see Section 3.6.2, *Recreation Resources in the Study Area* for a list of parks and trails located in or adjacent to the transmission line corridor). There are five sites within 50–150 feet, one site within 50-250 feet, and four sites within 150–250 feet. See Appendix H for a map of these unique uses. These unique sites represent a relatively small portion of the total land uses within the study area.

Table 3.8-4. Sites with Unique Uses within the Study Area

Segment/Option	Unique Use	Type	Distance from Transmission Line
Redmond	Rose Hill Middle School	School	150–250 ft
Bellevue Central, Bypass Options 1 and 2	Chestnut Hill Academy	School	150–250 ft
Bellevue Central, Bypass Options 1 and 2	Bellevue Fire Station 6	Fire Station	50–150 ft
Bellevue Central, Bypass Options 1 and 2	Eastside Heritage Center	Museum	150–250 ft
Bellevue Central, Bypass Option 2	Asian Pacific Language School	School	50–150 ft
Bellevue South, all Options	Tyee Middle School	School	50–250 ft
Bellevue South, Willow 2 Option	Newport Children's School	School	50–150 ft
Bellevue South, Oak 2 Option	KinderCare	School	50–150 ft
Renton	Renton Technical College	School	50–150 ft
Renton	Sierra Heights Elementary School	School	150–250 ft

Source: Compiled by ESA. from project GIS data.

3.8.3 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 Alternative 1. 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 Alternative 1.
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 Alternative 1 (Power Engineers, 2017).

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, 2017). 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, 2017a; 2017b). Magnetic field levels for Alternative 1 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.

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 Alternative 1 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 Alternative 1 because loads for Alternative 1 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 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 (EPRI, 2005).

3.8.3.1 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.

3.8.4 Long-term Impacts: No Action Alternative

Under the No Action Alternative, PSE would continue to operate their 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).

Table 3.8-5 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 industry guidelines. (Power Engineers, 2017). 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.

Table 3.8-5. 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, Existing Corridor	71	27	47	18
Bellevue South, Existing Corridor	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, 2017.

3.8.5 Long-term Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

3.8.5.1 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.

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.

For each segment and option, the following pages present magnetic field levels as bar graphs for the 35 representative calculation locations. 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 Alternative 1. The magnetic field values would generally drop below 5 mG toward the outermost edge of the study area (see the Power Engineers report for graphs that depict the magnetic field levels as a function of distance). 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 relative to the No Action Alternative for all segments and options that utilize the existing corridor. Magnetic field levels would decrease for the following reasons:

1. 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 2.1-2).
2. The proposed poles 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.

In locations where Alternative 1 would utilize a new corridor, there would be an increase in magnetic field levels. Portions of the road rights-of-way that Bypass Option 1 and Bypass Option 2 would utilize do not currently have any overhead transmission lines. Therefore, a new source of power frequency EMF would be introduced along Bypass Option 1 and Bypass Option 2. A new source of power frequency EMF would also be introduced along 124th Avenue SE and SE 38th Street as part of the Oak 2 Option; and along SE Newport Way as part of the Willow 2 Option because these streets do not currently have any overhead transmission lines. An existing source of power frequency EMF, overhead 115 kV transmission lines, is present along the remaining streets associated with the Oak 1, Oak 2, and Willow 2 Options (SE 30th Street, Richards Road, Factoria Boulevard, Coal Creek Parkway SE). There would be an overall increase in magnetic field levels along these streets because Alternative 1 would result in an overall increase in the number of circuits compared to existing conditions, as well as a larger load current in the line.

Alternative 1 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 in locations where the project would utilize a new corridor. Although no mitigation measures are identified to reduce magnetic field strengths for portions of the project along new corridors, the calculated magnetic field levels would be sufficiently low enough to avoid known health effects, and therefore considered consistent with Bellevue and Redmond policies.

There are no known health effects from power frequency EMF at the levels expected from the No Action Alternative or Alternative 1. For all proposed segments and options in Alternative 1, the calculated magnetic field levels would be at least 1,800 mG below the lowest industry guideline for magnetic field exposure for the general public (Power Engineers, 2017)[3]. This includes all of the unique sites listed in Table 3.8-4. Therefore, for all proposed segments and options under Alternative 1, impacts would be less-than-significant. Please refer to Chapter 8 of the Phase 1 Draft EIS for the complete discussion.

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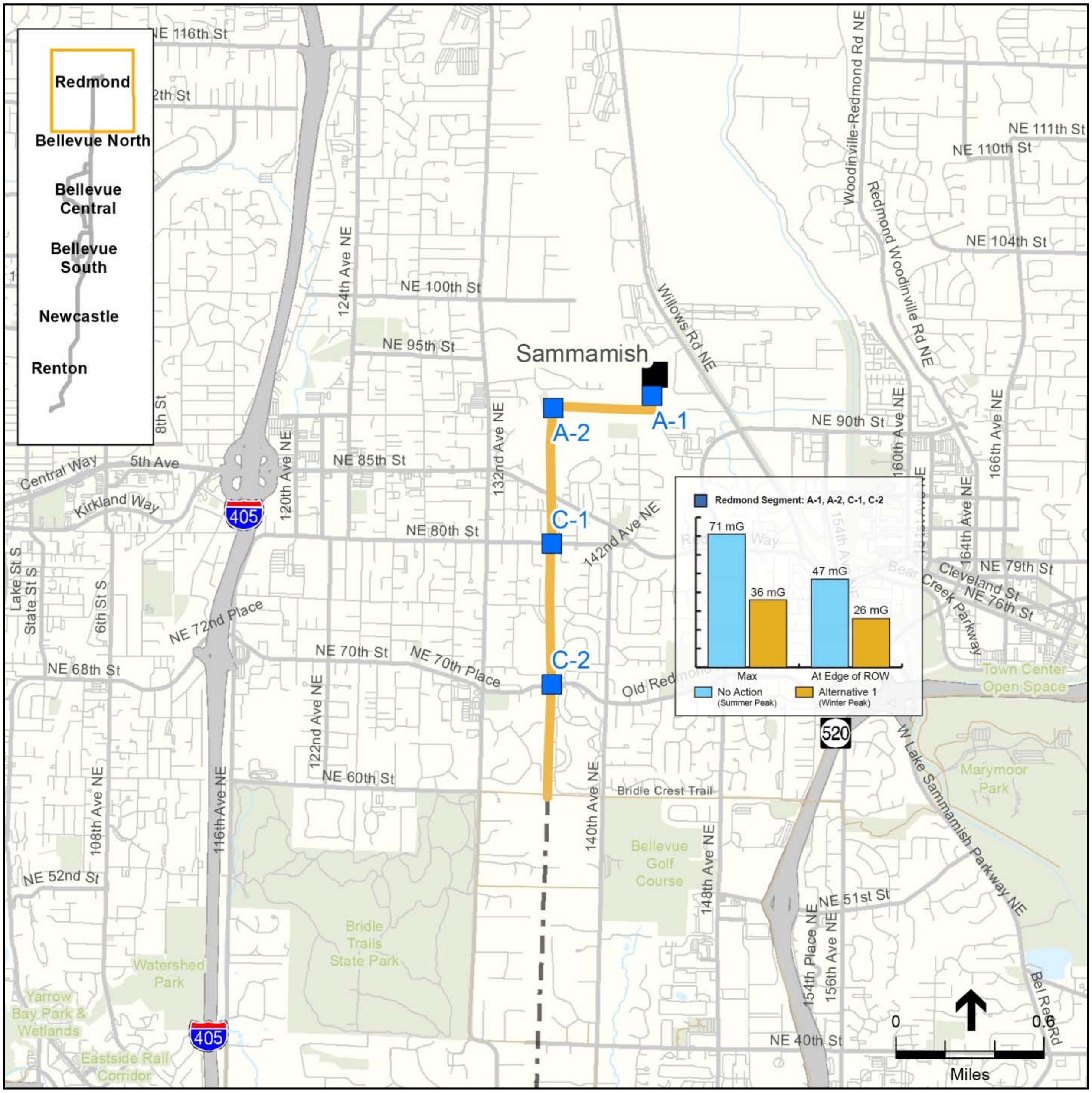
[3] The highest calculated magnetic field level for Alternative 1 would be 174 mG (see Bellevue South Segment). The lowest industry guideline established for general public exposure to magnetic fields is 2,000 mG.

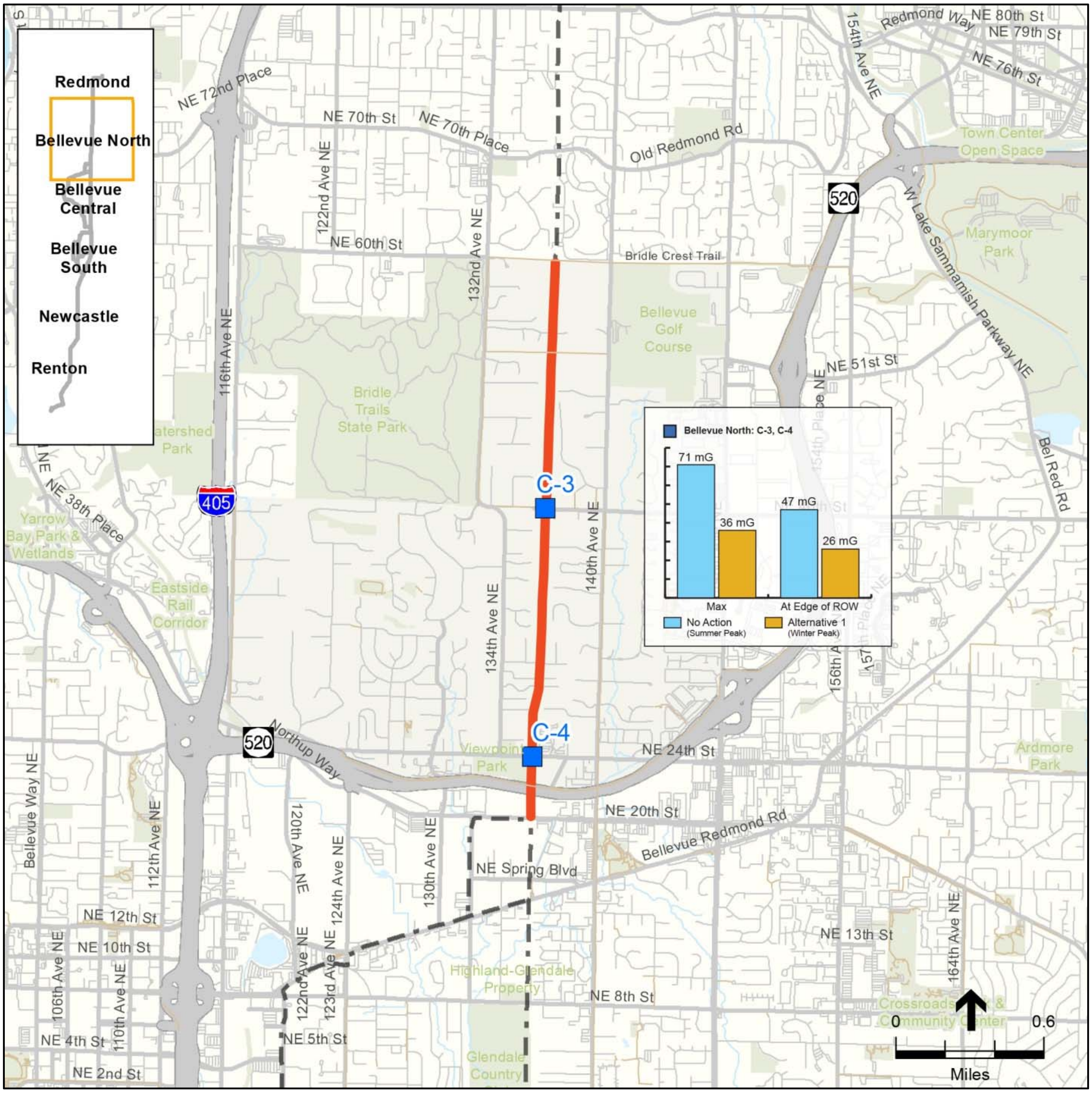
3.8.5.2 Redmond Segment

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Redmond Segment. The calculated magnetic field levels generated by the project along the Redmond Segment would be well below industry guidelines; therefore, impacts would be less-than-significant.



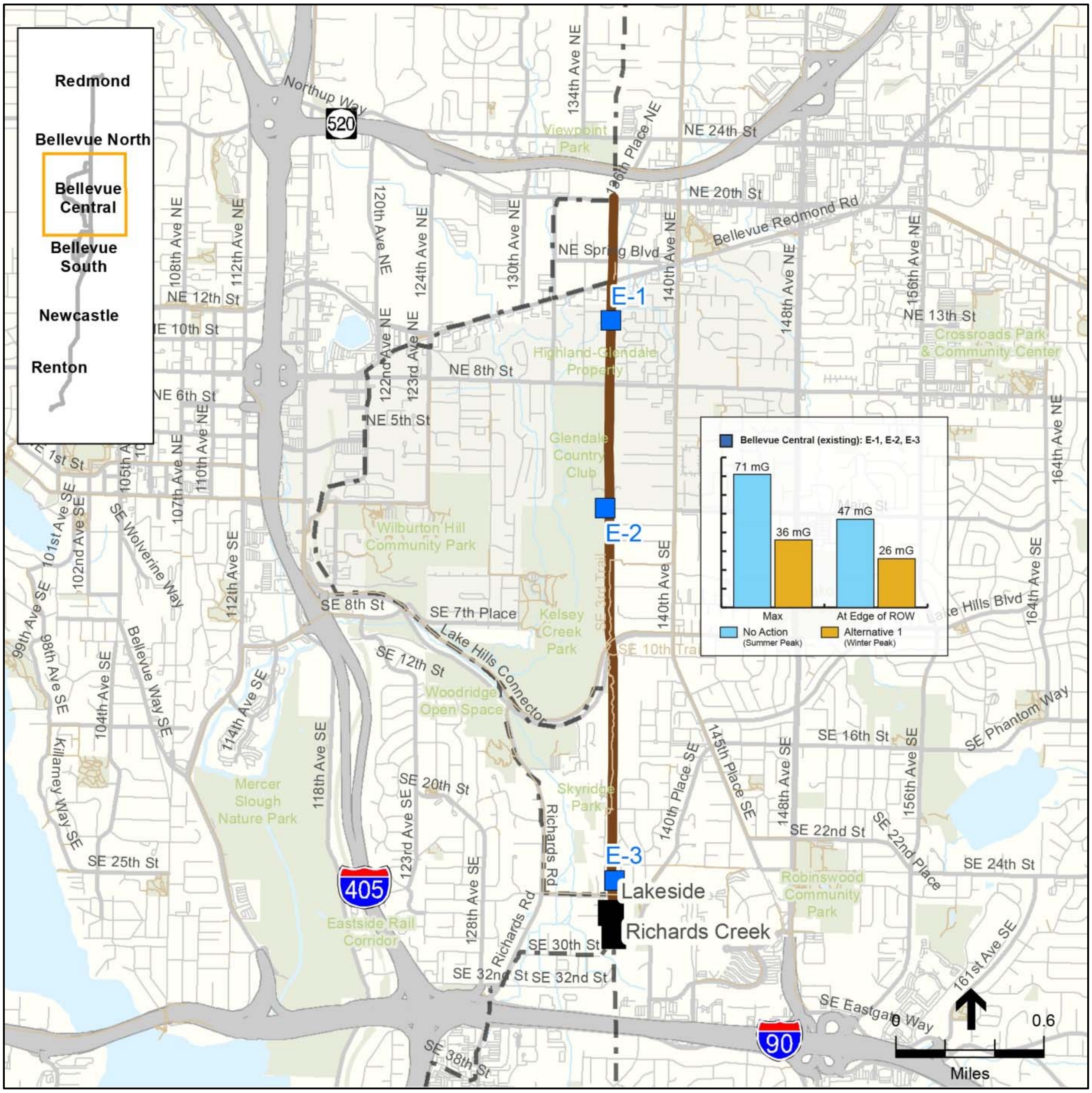
3.8.5.3 Bellevue North Segment

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Bellevue North Segment. The calculated magnetic field levels generated by the project along the Bellevue North Segment would be well below industry guidelines; therefore, impacts would be less-than-significant.



3.8.5.4 Bellevue Central Segment, Existing Corridor Option

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Bellevue Central Segment, Existing Corridor Option. The calculated magnetic field levels generated by the project along the Existing Corridor Option would be well below industry guidelines; therefore, impacts would be less-than-significant.



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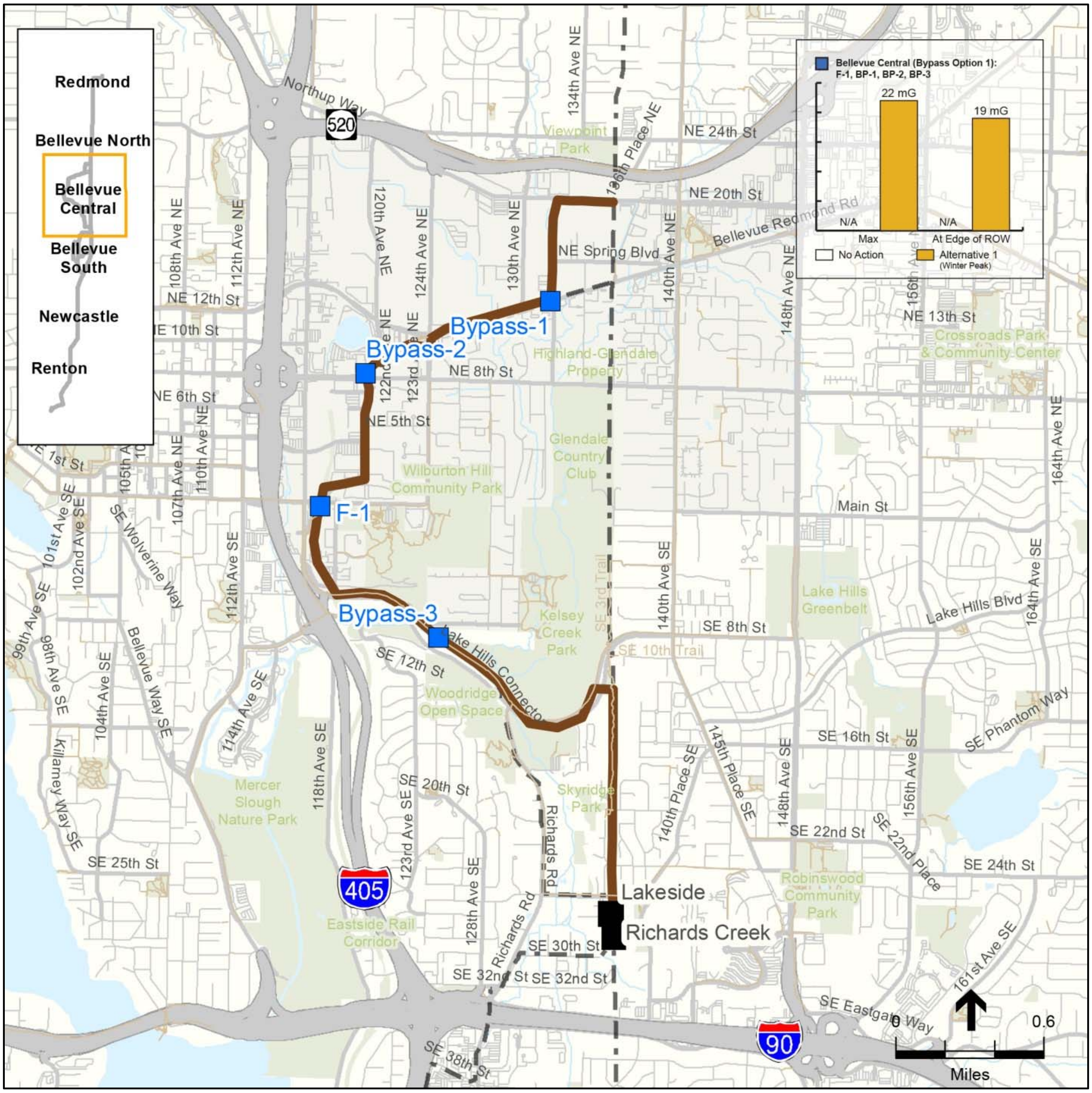
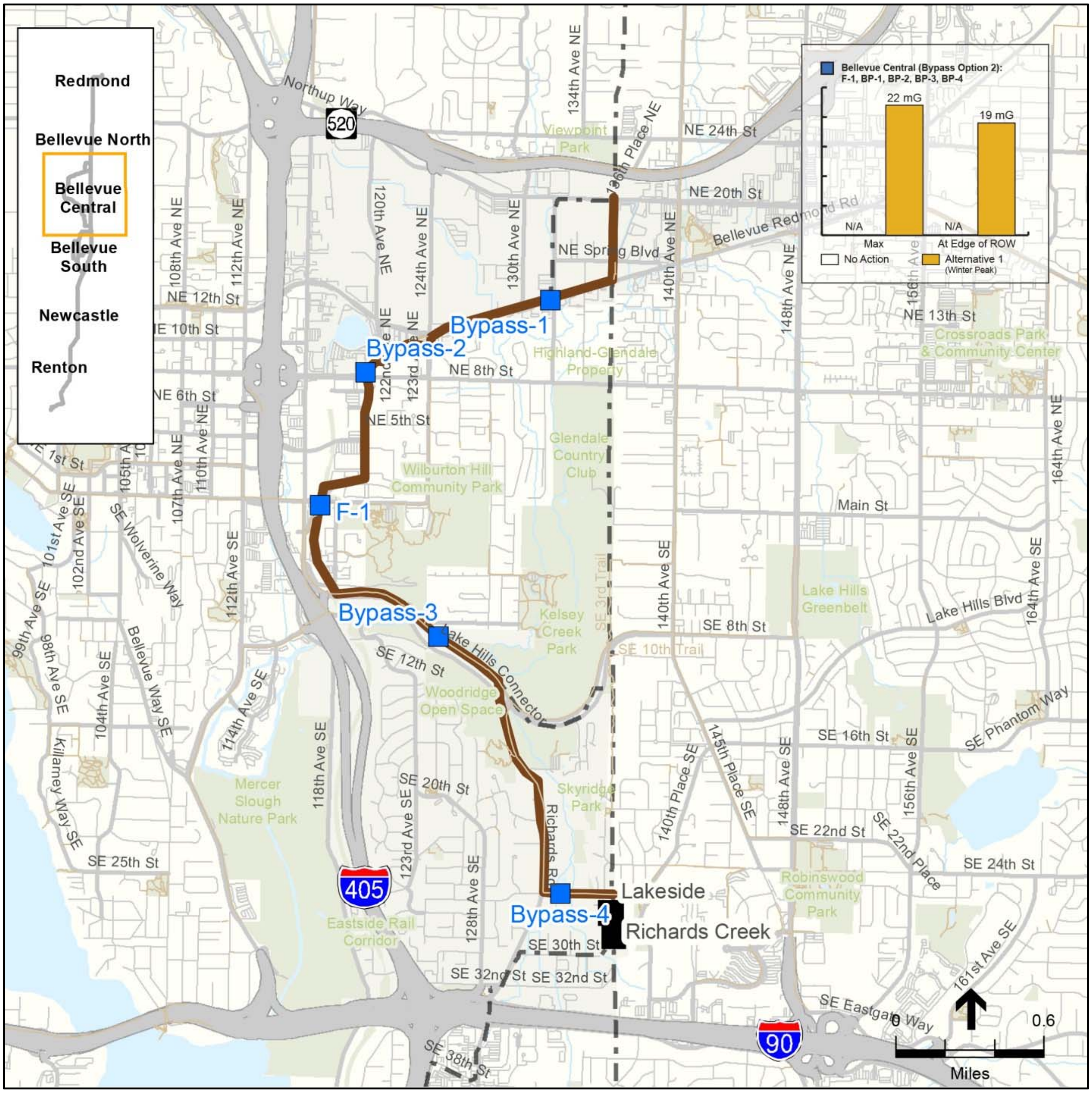
3.8.5.5 Bellevue Central Segment, Bypass Option 1

Because there are no existing transmission lines along the Bypass Option 1 corridor, Alternative 1 would result in a new source of magnetic fields. The calculated magnetic field levels generated by the project along Bypass Option 1 would be well below industry guidelines; therefore, impacts would be less-than-significant.



3.8.5.6 Bellevue Central Segment, Bypass Option 2

Because there are no existing transmission lines along the Bypass Option 2 corridor, Alternative 1 would result in a new source of magnetic fields. The calculated magnetic field levels generated by the project along Bypass Option 2 would be well below industry guidelines; therefore, impacts would be less-than-significant.



3.8.5.7 Summary: Comparison of Segments and Options, Bellevue Central Segment

In the Bellevue Central Segment, the Bypass Options 1 and 2 would result in a net increase of magnetic field levels compared to the No Action Alternative because the transmission line would follow a new corridor. The Existing Corridor Option would reduce the magnetic field levels compared to the No Action Alternative but would have higher magnetic field levels than Bypass Options 1 and 2. The magnetic field levels for Bypass Options 1 and 2 would be identical, and are well below industry guidelines.

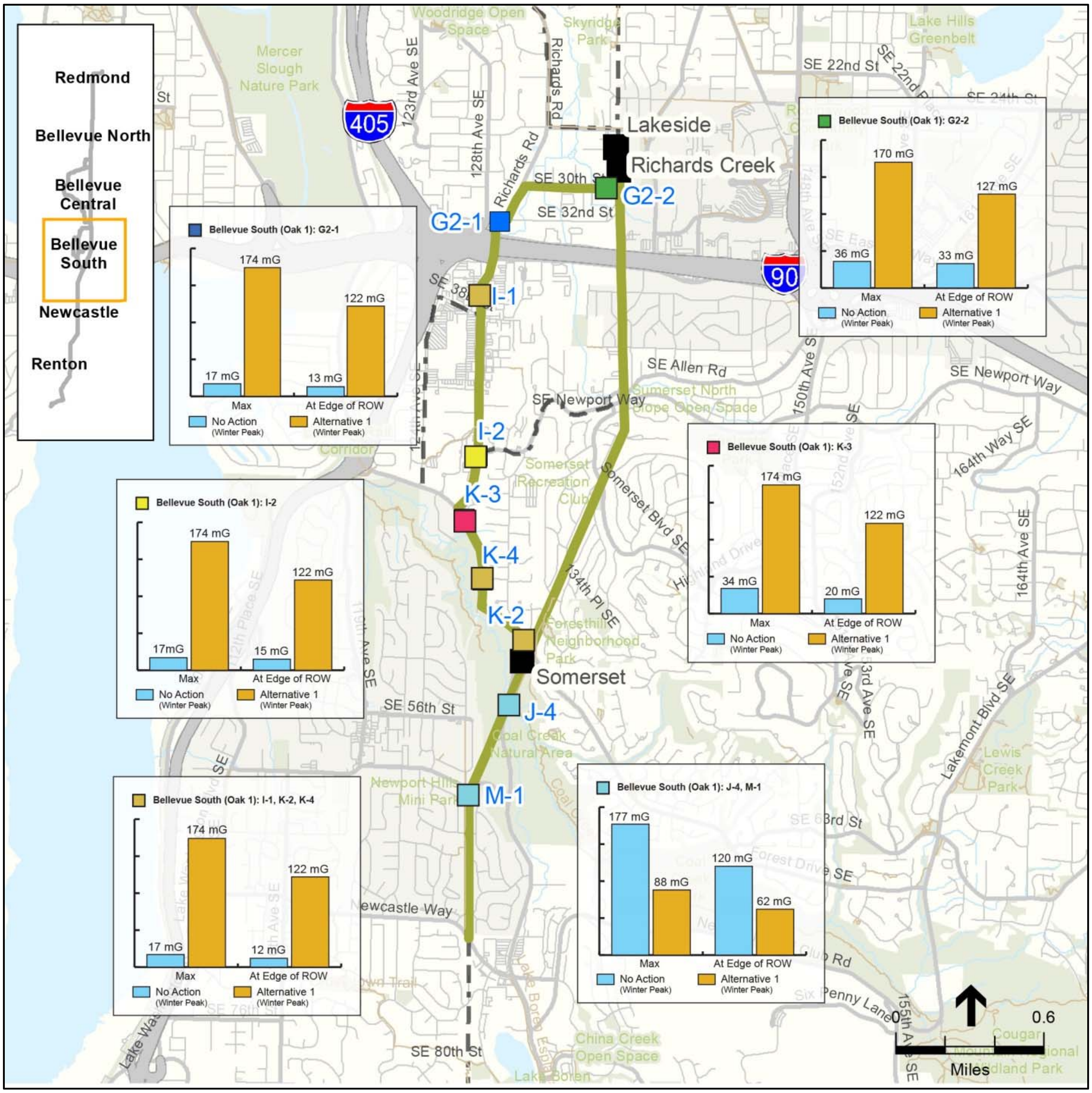
Table 3.8-6. Comparison of Bellevue Central Options, Calculated Magnetic Field Levels

	Alternative 1, 2027/2028 Winter Peak	
Segment / Option	**Maximum**	**At Edge of ROW**
Existing Corridor Option	36 mG	26 mG
Bypass Option 1	22 mG*	19 mG*
Bypass Option 2	22 mG*	19 mG*

*The calculated magnetic field levels shown in the table are associated with the 230 kV lines proposed along a new corridor. The 115 kV line within the existing transmission corridor would remain but would likely have lower magnetic field values than the No Action Alternative.

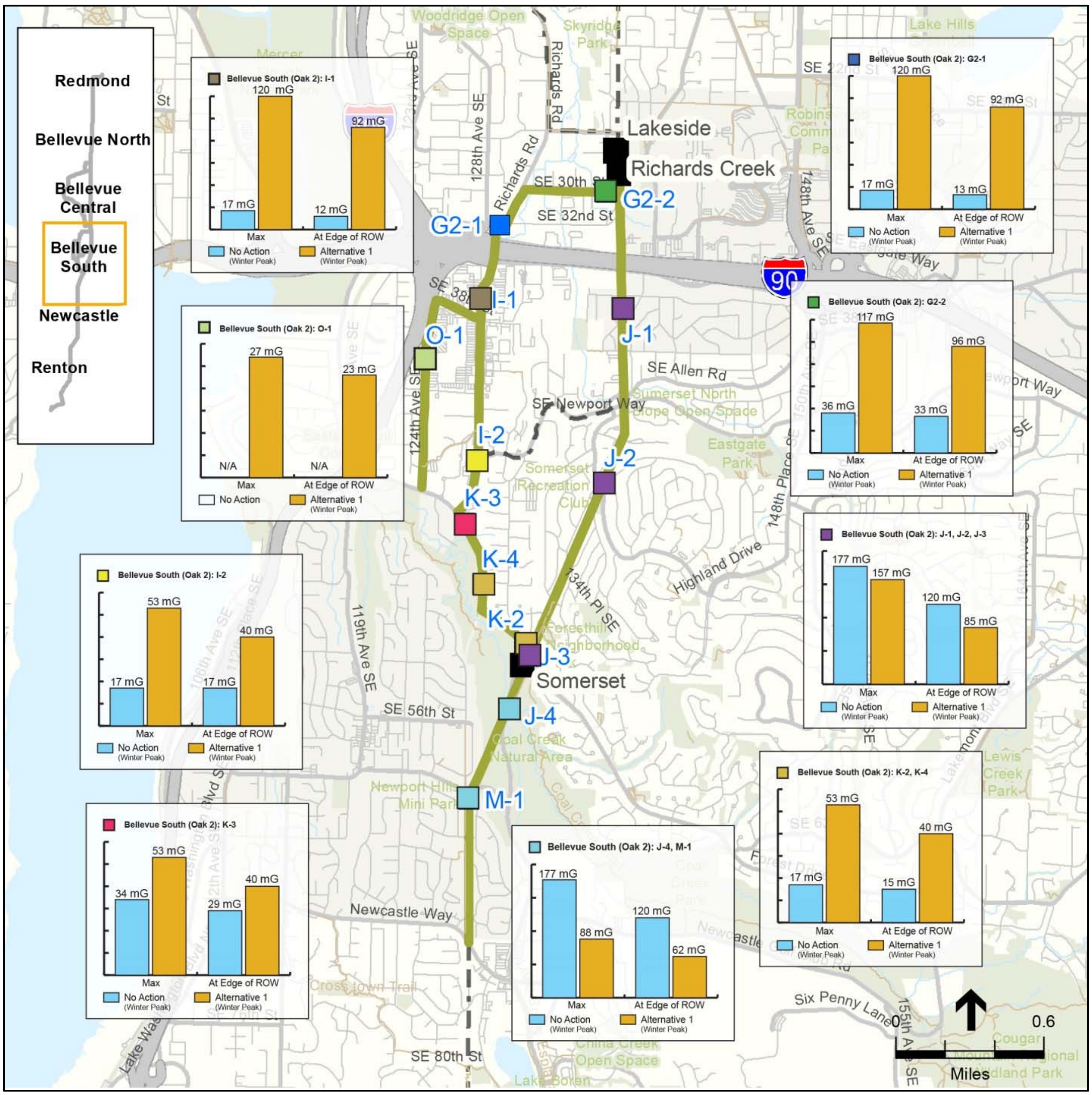
3.8.5.8 Bellevue South Segment, Oak 1 Option

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Oak 1 Option for portions of the alignment along the existing PSE corridor. The magnetic field levels would increase under Alternative 1 for portions of the alignment along SE 30th Street, Richards Road, Factoria Boulevard, and Coal Creek Parkway, which currently have an overhead 115 kV transmission line and Alternative 1 would add a 230 kV line. The calculated magnetic field levels generated by the project along the Oak 1 Option would be well below industry guidelines; therefore, impacts would be less-than-significant.



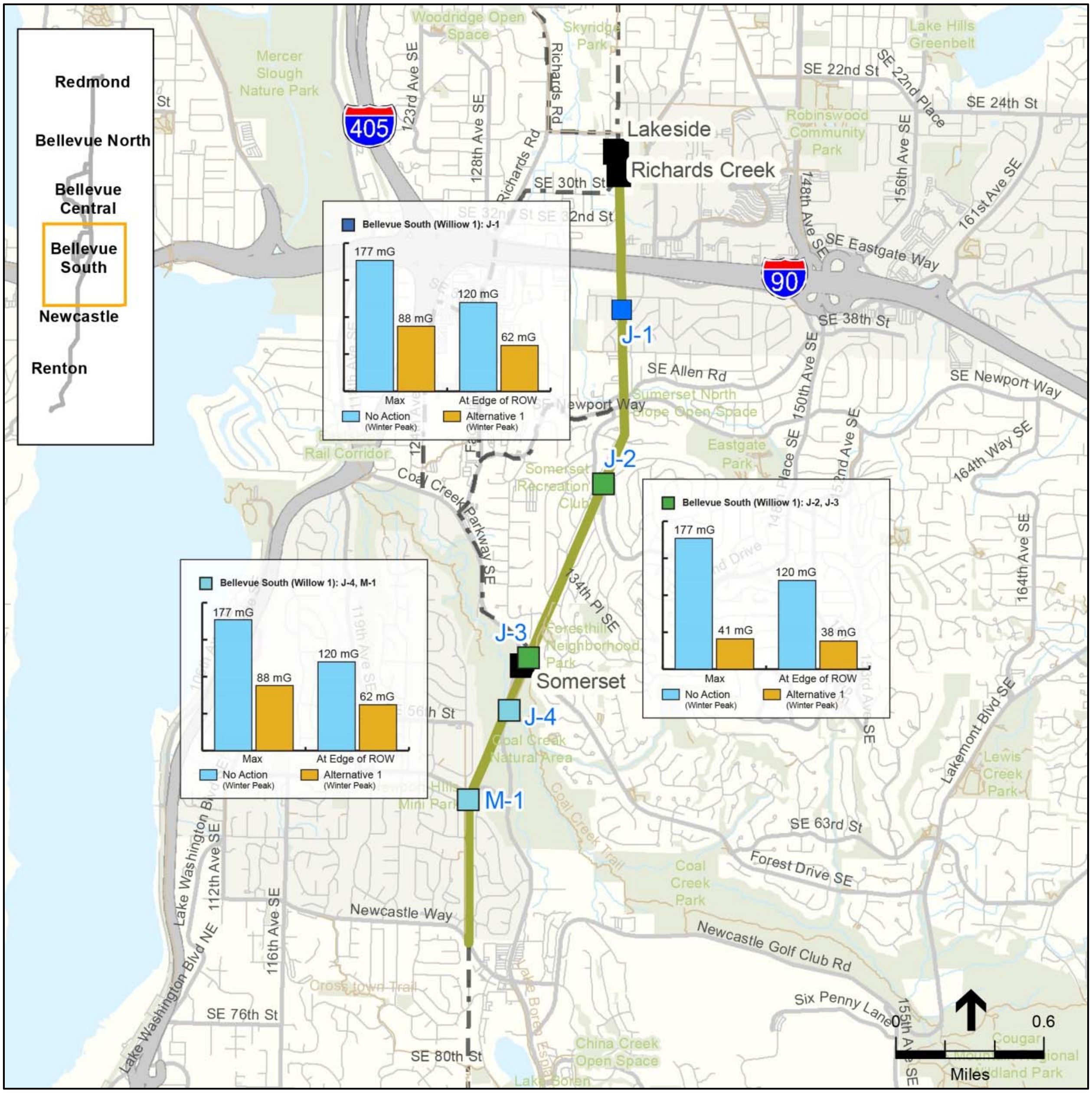
3.8.5.9 *Bellevue South Segment, Oak 2 Option*

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Oak 2 Option for portions of the alignment along the existing PSE corridor. The magnetic field levels would increase under Alternative 1 for portions of the alignment along SE 30th Street, Richards Road, Factoria Boulevard, and Coal Creek Parkway, which currently have an overhead 115 kV transmission line and Alternative 1 would add high-capacity 115 kV lines. Alternative 1 would result in a new source of magnetic fields on 124th Avenue SE and SE 38th Street, which currently do not have an overhead transmission line. The calculated magnetic field levels generated by the project along the Oak 2 Option would be well below industry guidelines; therefore, impacts would be less-than-significant.



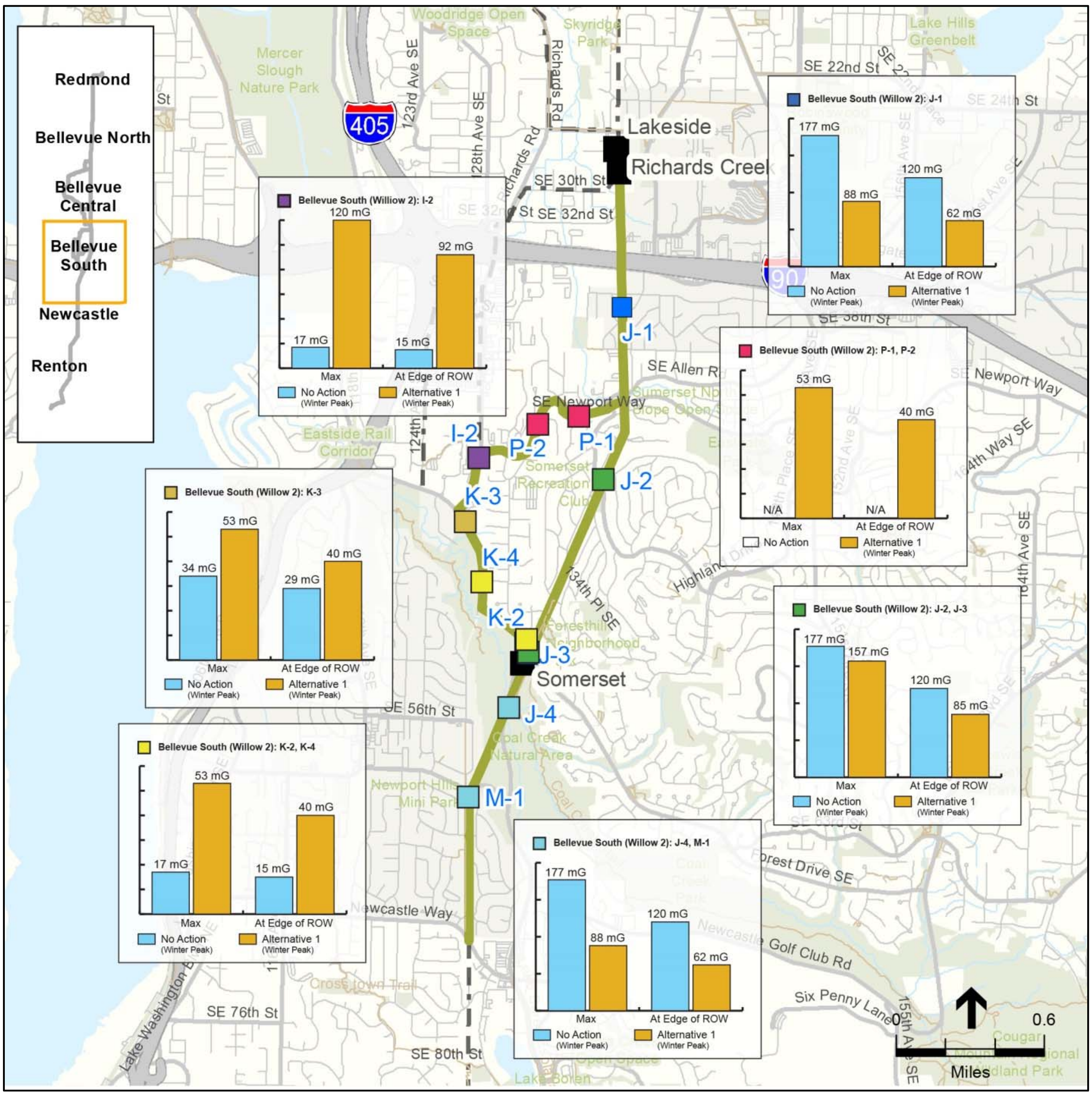
3.8.5.10 Bellevue South Segment, Willow 1 Option

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Willow 1 Option. The calculated magnetic field levels generated by the project along the Willow 1 Option would be well below industry guidelines; therefore, impacts would be less-than-significant.



3.8.5.11 Bellevue South Segment, Willow 2 Option (PSE's Preferred Alignment)

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Willow 2 Option for portions of the alignment along the existing PSE corridor. The magnetic field levels would increase under Alternative 1 for portions of the alignment that utilize a new corridor, including Factoria Boulevard and Coal Creek Parkway, which currently have an overhead 115 kV transmission line and Alternative 1 would add high-capacity 115 kV lines. Alternative 1 would result in a new source of magnetic fields on SE Newport Way, which does not currently have an overhead transmission line. The calculated magnetic field levels generated by the project along the Willow 2 Option would be well below industry guidelines; therefore, impacts would be less-than-significant.



3.8.5.12 Summary: Comparison of Segments and Options, Bellevue South Segment

In the Bellevue South Segment, the Oak 1, Oak 2, and Willow 2 Options would increase magnetic field levels compared to the No Action Alternative where the transmission line follows a new corridor. Willow 1, and the portions of the Oak 1, Oak 2, and Willow 2 Options that follow the existing corridor, would reduce the magnetic field levels compared to the No Action Alternative. The Oak 1 Option would have the highest upper range of magnetic field levels, while the Willow 1 Option would have the lowest upper range of magnetic field levels, and are well below industry guidelines.

Table 3.8-7. Comparison of Bellevue South Options, Calculated Magnetic Field Levels

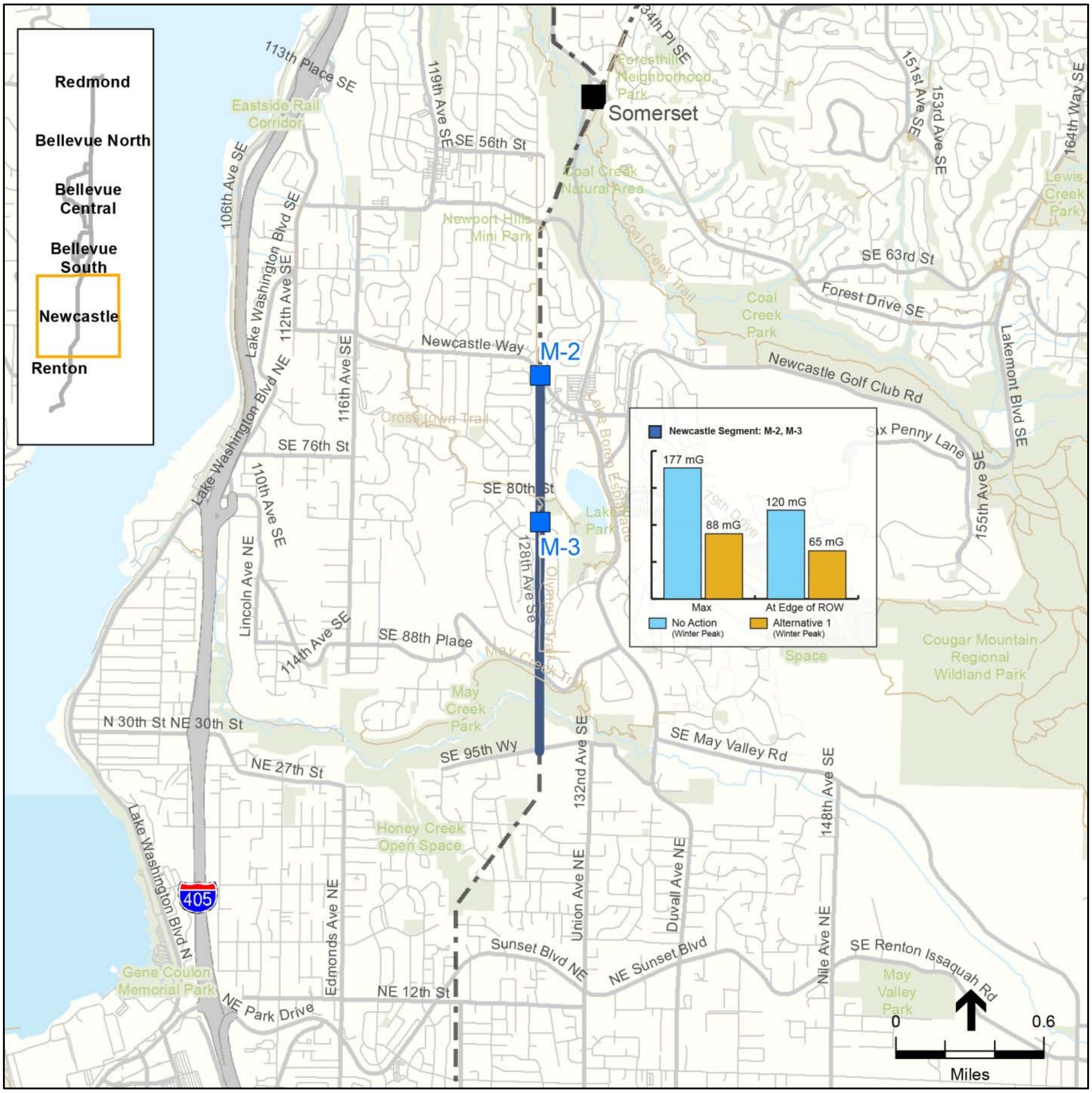
Segment / Option	Alternative 1, 2027/2028 Winter Peak	
	Maximum	At Edge of ROW
Oak 1	88–174*	62–127*
Oak 2	27–157	23–96
Willow 1	41–88	38–62
Willow 2	53–157	40–92

Note: Magnetic field levels range depending on the calculation location.

*The calculated magnetic field levels shown in the table are associated with the 230 kV lines proposed along a new corridor. The 115 kV line within the existing transmission corridor would remain but would likely have lower magnetic field values than the No Action Alternative.

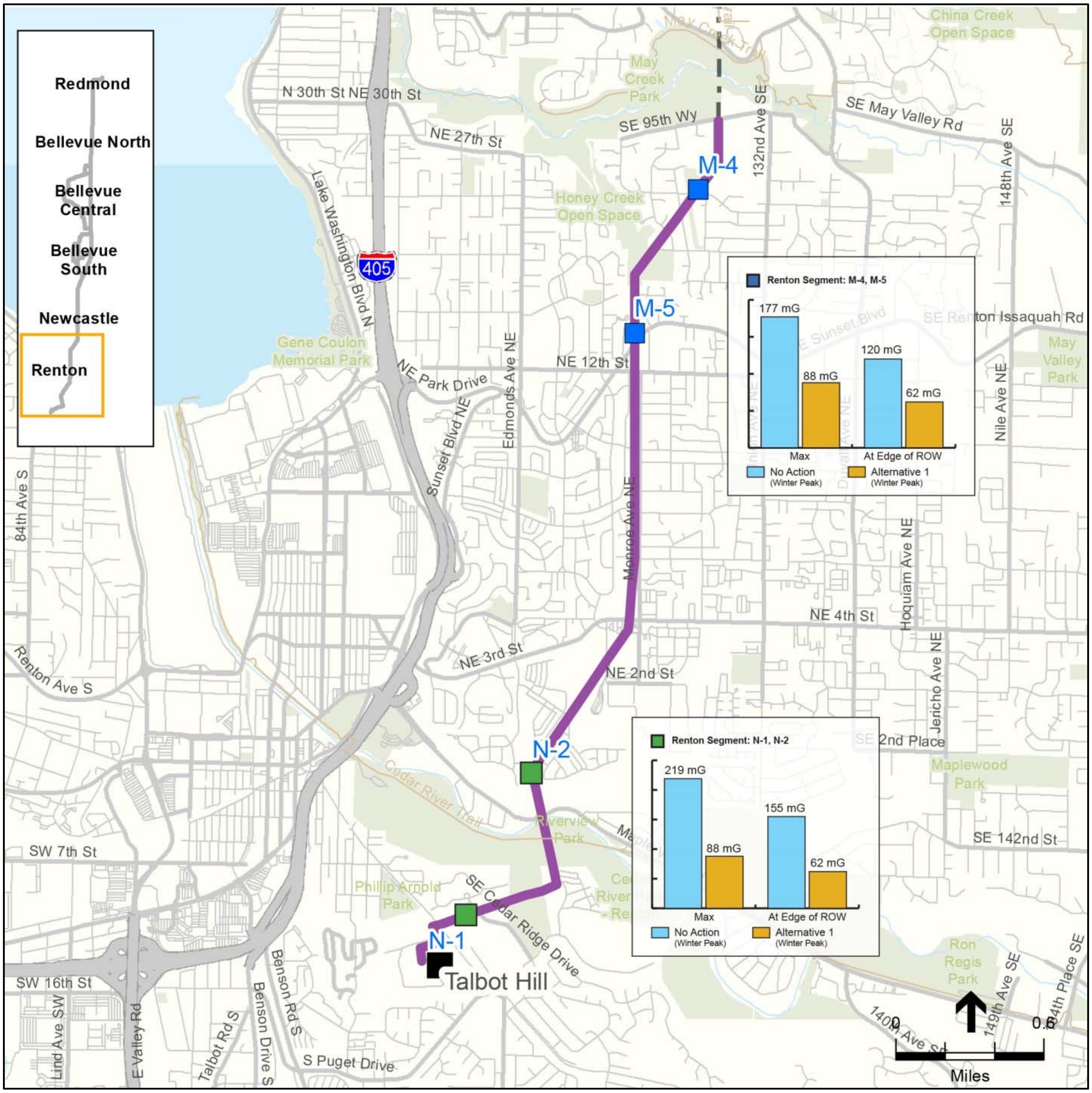
3.8.5.13 Newcastle Segment

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Newcastle segment. The calculated magnetic field levels generated by the project along the Newcastle Segment would be well below industry guidelines; therefore, impacts would be less-than-significant.



3.8.5.14 *Renton Segment*

Relative to the No Action Alternative, magnetic field levels would decrease under Alternative 1 in the Renton segment. The calculated magnetic field levels generated by the project along the Renton Segment would be well below industry guidelines; therefore, impacts would be less-than-significant.



3.8.6 Mitigation Measures

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

As noted in Section 3.9.7, *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 (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.

3.9 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. Two petroleum pipelines are 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. As part of the EIS Consultant Team, EDM Services, a firm specializing in pipeline safety, conducted a *probabilistic pipeline risk assessment* (risk assessment). This section summarizes the results of the risk assessment, and provides an analysis of long-term impacts on resources in the event of a pipeline incident related to the project. As a factor considered in EDM's risk assessment, this section also summarizes 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). The EDM Services *Pipeline Safety Technical Report* (EDM Services, 2017) is included in full in Appendix I.

Methods for Studying the Affected Environment

To evaluate changes in pipeline safety that would occur as a result of the Energize Eastside project, the ESA Consultant Team retained EDM Services to conduct a risk assessment (EDM Services, 2017). This assessment relied on information from relevant plans, policies, regulations, and frameworks that prevent and respond to an incident, and background data provided by the Olympic Pipe Line Company on pipeline condition, inspection techniques, and operating parameters. Several Phase 2 scoping comments addressed other pipeline safety guidance and studies, which were also incorporated to characterize pipeline safety considerations and issues.

The study area for pipeline safety focuses on the area potentially affected by an Olympic Pipeline leak or fire caused by the construction or operation of the Energize Eastside project. The study area for this analysis is the transmission line corridor, including all segments and options, and the surrounding area including human populations, urban environment, and natural resources that could be affected by an incident. 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 potential magnitude of such an event, if it did occur, would be the same regardless if 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 3.9 along with a description of the operational concerns for the Energize Eastside project that affect pipeline safety. Section 4.9 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.

3.9.1 Relevant Plans, Policies, and Regulations

As described in Chapter 8 of the Phase 1 Draft EIS, environmental health and safety issues related to pipeline safety are regulated at federal, state, and local levels. Table 3.9-1 summarizes the applicable laws and regulations addressing pipeline safety, which is followed by a detailed summary of the major pipeline safety regulations. More information about the applicable laws and regulations is provided in Chapter 8 of the Phase 1 Draft EIS and the *Pipeline Safety Technical Report* (Appendix I). Federal and state regulations apply to the operation of existing pipelines, and the regulations identified below apply to the Olympic Pipeline located in the transmission line corridor.

Table 3.9-1. Pipeline Safety Regulations

Regulation	Summary
Federal	
Pipeline Safety Act of 1968 (49 United States Code [USC] Section 60101)	Granted authorization to the U.S. Department of Transportation to develop minimum safety standards for natural gas pipelines.
Hazardous Liquid Pipeline Safety Act of 1979 (Public Law 96-129)	Granted authorization to the U.S. Department of Transportation to develop minimum safety standards for oil and hazardous liquid pipelines.
49 CFR, Parts 190 through 199	Primary U.S. Code sections that cover pipeline safety.
Pipeline Safety, Regulatory Certainty, and Jobs Creation Act of 2011 (Public Law 112-90)	Increased the number of pipeline inspectors and mandated a variety of new safety measures. Required studies of pipeline safety.
Protecting Our Infrastructure of Pipelines and Enhancing Safety Act of 2016	Reauthorized the Pipeline Safety, Regulatory Certainty, and Jobs Creation Act of 2011; reaffirmed mandates of the 2011 act; and established new mandates.
Pipeline Safety Improvement Act of 2002 (CFR 192 Subpart O, Pipeline Integrity Management)	Strengthened federal pipeline safety programs, state oversight of pipeline operators, and public education regarding gas pipeline safety. Required gas pipeline operators to conduct a risk assessment and implement integrity management programs for pipelines in *high consequence areas*.
Oil Pollution Act of 1990 (49 CFR Part 194)	Expanded EPA's oversight of oil storage facilities and vessels. Required some oil storage facilities to prepare Facility Response Plans.
2006 Pipeline Inspection, Protection, Enforcement and Safety Act (Public Law 109-468)	Created state grant system to improve damage prevention programs, and established the national "Call Before You Dig" program. Required a review of the adequacy of federal pipeline safety regulations related to *internal corrosion* control.
State	
WAC, Title 480, Chapter 480-75, Hazardous Liquid Pipelines	Adopted the federal hazardous liquids pipeline regulations.
Underground Utilities – Damage Prevention Law (RCW 19.122)	Established a comprehensive damage prevention program. Required pipeline companies, underground facility owners, and excavators to participate in protecting the public health and safety when excavating.

Regulation	Summary
WAC 173-182 – Oil Spill Contingency Plan	Established covered vessel and facility oil spill contingency plan requirements, drill and equipment verification requirements, primary response contractor standards, and recordkeeping and compliance information.
Local	
Redmond Zoning Code (RZC) 21.26.040 Setback Requirements	Established minimum setback requirements from the hazardous pipeline corridors. Purpose is to minimize risk to public health, safety, and welfare due to hazardous liquid pipelines. No construction or expansion of structures is allowed in the pipeline corridor. No setback is required for utilities for areas along the hazardous liquid corridor, but the Director of Planning and Community Development (or their designee) may require a setback based on site-specific conditions.

3.9.1.1 Federal

The U.S. Department of Transportation oversees the nation's pipeline system. Its responsibilities were established under the Pipeline Safety Act of 1968 (49 USC Section 60101). The *Pipeline and Hazardous Materials Safety Administration*, Office of Pipeline Safety, administers the national regulatory program to ensure the safe transportation of gas and other hazardous materials by pipeline. The Office of Pipeline Safety shares this responsibility with state agency partners and others at federal, state, and local levels.

The Pipeline Safety Act of 1968 and the Hazardous Liquid Pipeline Safety Act of 1979 provide the framework for federal pipeline regulations. Federal pipeline regulations are published in Title 49 CFR, Parts 190 through 199. Many of these pipeline regulations are performance standards. These regulations set the level of safety to be attained and allow the pipeline operator to use various methods and technologies to achieve the desired level of safety.

Due to concerns surrounding pipeline ruptures in 2010 (in Marshall, Michigan, and San Bruno, California), Congress passed the Pipeline Safety, Regulatory Certainty, and Jobs Creation Act of 2011. This law mandated a variety of new safety measures, and directed the Pipeline and Hazardous Materials Safety Administration (PHMSA) to evaluate concerns surrounding the pipeline ruptures and to submit a report to Congress. Based on those findings, PHMSA is developing rule changes to 49 CFR Part 195, Hazardous Liquid Pipeline Safety Regulations.

The Protecting Our Infrastructure of Pipelines and Enhancing Safety Act of 2016 reauthorized the Pipeline Safety, Regulatory Certainty, and Jobs Creation Act of 2011, and directed PHMSA to accomplish the mandates of the 2011 act. It also created new mandates in response to the 2015 gas leak in Aliso Canyon, California.

Proposed Rule Changes to Hazardous Liquid Pipeline Regulations are to:
(1) extend reporting requirements; (2) require inspections of pipelines in areas affected by extreme weather and natural disasters; (3) require periodic inline integrity assessments for lines that are outside of high consequence areas; (4) require the use of leak detection systems in all locations; (5) modify pipeline repair provisions; and (6) expand requirements for accommodating use of inline inspection tools. If enacted as published in the Federal Register, the existing Olympic Pipelines would be subject to these new requirements.

Pipeline Integrity Management

Pipeline integrity management, which "provides for continual evaluation of pipeline condition; assessment of risks to the pipeline; inspection or testing; data analysis; and follow-up repair; as well as preventive or mitigative actions," has been a part of PHMSA requirements for the pipeline industry since 1997 (CRS, 2010). In 2002, Congress passed the Pipeline Safety Improvement Act to strengthen pipeline safety laws following two major pipeline incidents (see Appendix I for descriptions of these incidents, which occurred in Bellingham, Washington and Carlsbad, New Mexico). CFR 192 Subpart O, Pipeline Integrity Management, was established to promulgate rules implementing the act. This subpart requires operators of liquid or natural gas pipeline systems in high consequence areas to develop a written integrity management program and to significantly increase their minimum required maintenance and inspection efforts. For example, all existing pipelines in high consequence areas must be analyzed by conducting a baseline risk assessment. In general, the integrity of the pipelines must also be evaluated using an internal inspection device or a direct assessment. The federal Pipeline Safety Improvement Act of 2002 also enabled shared oversight of hazardous liquid pipelines with authorized state agencies.

High Consequence Areas are defined under the Pipeline Integrity Management Program as either:

- High population areas, defined by the Census Bureau as urbanized areas.
- Other populated areas, defined by the Census Bureau as places that contain a concentrated population.
- Unusually sensitive areas.
- Commercially navigable waterways.

The study area for this project is entirely within a high consequence area and is covered under Pipeline Integrity Management Program requirements.

Pipeline Offsets

Requirements for minimum offsets (or clearance) between any underground structures and hazardous liquid pipelines are 12 inches (49 CFR 195.250). Olympic Pipe Line's practice is to require a minimum of 24 inches of clearance between underground structures and the pipeline, and 10 feet of clearance aboveground, to facilitate access to the pipeline for maintenance purposes. Alternative plans for aboveground clearance can be developed on a case-by-case basis where access is more limited (Olympic, 2016).

Oil Spill Prevention and Response

The Oil Pollution Act of 1990 (49 CFR Part 194) streamlined and strengthened EPA's ability to prevent and respond to catastrophic oil spills. This legislation requires pipeline operators to prepare oil spill response plans for onshore oil pipelines (including pipelines transporting petroleum, fuel oil, etc.). The intent of the regulations is to reduce the environmental impact of oil discharged from onshore pipelines. The operator is required to determine the worst-case discharge in each response zone and meet specified criteria. The completed plan must be submitted to the U.S. Department of Transportation Pipeline Response Plans Officer for review and approval. These spill response plans must be consistent with the National and Area Contingency Plans for oil spill response (see state regulations below establishing the Northwest Area Contingency Plan).

Northwest Area Contingency Plan

The Northwest Area Contingency Plan is a guideline for coordination of spill response actions and ensures consistency in response to spills of oil or other hazardous substances. Federal and state rules require that a responsible party (or spiller) must be able to manage spills with a pre-designated response management organization that accommodates a *Unified Command structure* in recognition of federal, state, tribal, or local jurisdiction. The National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300) requires that facility response plans be compatible with the applicable area plan.

3.9.1.2 State

The State of Washington's Utilities and Transportation Commission (UTC) is responsible for the administration and oversight of hazardous liquid pipeline operations in the state as authorized by the U.S. Department of Transportation. The following section summarizes state regulations addressing hazardous liquid pipelines, damage prevention, and contingency plan requirements in the event of a spill.

Hazardous Liquid Pipeline Regulations

The state has adopted the federal hazardous liquids pipeline regulations as a part of its own enhanced regulations contained in WAC, Title 480.

- **Chapter 480-73: Hazardous Liquid Pipeline Companies** – Defines the applicability of the regulations and the administrative guidelines and rules that hazardous liquid pipeline companies must follow.
- **Chapter 480-75: Hazardous Liquid Pipelines, Safety** – Provides pipeline safety rules specific to Washington State. This regulation contains requirements similar to 49 CFR Part 195 for the design, construction, operation and maintenance, and reporting for hazardous liquid pipelines. The Chapter requires compliance, by reference, with 49 CFR Part 195.

Damage Prevention

The Underground Utilities – Damage Prevention Law (RCW 19.122) addresses one of the assigned responsibilities of the UTC for administering hazardous liquids pipelines. This responsibility includes requiring pipeline companies, underground facility owners, and excavators to participate in protecting the public health and safety when excavating. As a result of several high-profile fatal pipeline failures related to excavator damage (including the incident in Bellingham- see Appendix I), Congress mandated that each state address criteria included in the 2006 Pipeline Inspection, Protection, Enforcement and Safety Act to ensure the adequacy of state damage prevention laws. As a result of this legislation, the State of Washington passed the Underground Utilities Damage Prevention Act in 2011 that revised RCW 19.122 in the following ways:

- Specifies that failure by an underground facility operator to subscribe to a one-number locator service constitutes a willful intent to avoid compliance with underground utilities damage prevention law.
- Requires that damage to underground utilities be reported to the UTC, and for the UTC to evaluate damage data.
- Establishes the Damage Prevention Account, funded by penalties, and specifies that expenditures from the Account by the UTC must be used to educate excavators and operators to improve safety and compliance.
- Establishes a Safety Committee of stakeholder representatives to advise on underground utility safety and to review complaints of alleged underground utility violations.
- Establishes enforcement procedures for the UTC or Attorney General to address violations.

RCW 19.122.033 (4) specifies that when permitting construction or excavation within 100 feet, or greater distance if required by local ordinance, of a right-of-way or utility easement containing a transmission pipeline, local governments must:

(a) Notify the pipeline company of the permitted activity when it issues the permit; or

(b) Require, as a condition of issuing the permit, that the applicant consult with the pipeline company.

Oil Spill Contingency Plans

WAC 173-182 – Oil Spill Contingency Plan establishes oil spill contingency plan requirements, drill and equipment verification requirements, private response contractor standards, and recordkeeping and compliance information. On October 12, 2016, Ecology amended the Oil Spill Contingency Plan rule to update standards to ensure that required oil spill response equipment is appropriate for the pipeline risks and operating environments (both marine and inland). The amendments enhance oil spill contingency plan requirements for hazardous liquids pipelines, and for primary response contractors that support the implementation of pipeline plans. This amendment requires pipeline operators to update their contingency plans (e.g., facility response plans) in accordance with the applicable area plan, and submit them to Ecology for approval. The Northwest Area Contingency Plan is the applicable area plan for Washington State.

3.9.1.3 Local

The Partner Cities generally do not directly regulate pipeline safety, but they have the authority to regulate land uses near pipelines within their jurisdictions to protect public health and safety. The City of Redmond establishes minimum setback requirements from hazardous liquid pipelines with the expressed purpose of minimizing risk to public health and safety (see Table 3.9-1). Other planning policies and regulations of King County and the Partner Cities related to co-location of transmission lines with pipelines, are described in the Phase 1 Draft EIS, Chapter 8 and Appendix F. Setback requirements established by the City of Newcastle are described in Section 3.1 in the Phase 2 Draft EIS.

Franchise Agreements

The Partner Cities have franchise agreements, established by ordinance, with Olympic Pipe Line Company that cover its existing petroleum pipelines. These agreements grant the company the right to construct, operate, maintain, and improve its facilities within the cities' boundaries while adhering to applicable local, state, and federal laws. They state that the company must comply with the duties imposed on pipeline operators by 49 CFR Part 195, including the requirement of regular inspections and testing to determine whether the pipeline was damaged by excavation work in the vicinity. In the event of a leak or other emergency, the company is required to investigate and report on the incident, and is responsible for all costs relating to the spill response effort. Both the City of Bellevue's and City of Redmond's agreements state that, if the company is aware that a third party conducts any excavation or other significant work that may affect the pipelines, the company must conduct inspections and/or testing as necessary to determine that no direct or indirect damage was done and that the work did not abnormally load the pipelines or impair the effectiveness of the *cathodic protection system*.

Partner Cities' Franchise Agreements with Olympic Pipe Line Company:

- Bellevue Ordinance 6275
- Kirkland Ordinance 4298
- Newcastle Ordinance 2008-0388
- Redmond Ordnance 2289
- Renton Ordinance 5788

3.9.1.4 Non-Regulatory Guidance

PSE follows non-regulatory guidance included in the Interstate Natural Gas Association of America (INGAA) report (INGAA Report) *Criteria for Pipelines Co-Existing with Electric Power Lines* (DNV GL, 2015). The report presents the technical background, and provides best practice guidelines and summary criteria for pipelines co-located with *high-voltage alternating current (AC)* power lines. PSE retained DNV GL (the author of the INGAA Report) to develop a detailed analysis of risks and recommendations for the Energize Eastside project. DNV GL produced *A Detailed Approach to Assess AC Interference Levels Between the Energize Eastside Transmission Line Project and the Existing Olympic Pipelines, OLP16 & OPL20,* referred to in this Draft EIS as the *AC Interference Study* (DNV GL, 2016), which was also used in preparing the analysis for the EIS. Recommendations from that analysis are included under Section 3.9.7, *Mitigation Measures.*

High-Voltage AC Power Lines

Most transmission lines in the region are high-voltage alternating current (AC) operating at 115 kV or higher. Both the existing 115 kV transmission lines and the proposed transmission lines are high-voltage AC lines.

3.9.2 Pipelines in the Study Area

3.9.2.1 Study Area Characteristics

The study area contains both natural gas and petroleum pipelines (Figure 3.9-1). Natural gas lines that cross the study area are owned by PSE and Northwest Pipeline. See the Phase 1 Draft EIS Chapter 8, *Environmental Health*, and Chapter 16, *Utilities*, for more details on the natural gas pipelines. Scoping comments expressed particular concern about the potential for the Energize Eastside project to damage the co-located petroleum pipelines (Olympic Pipelines). As

Ownership and Operation of the Olympic Pipeline System

BP Pipelines-North America (BP) is the operator of the Olympic Pipeline system, and partial owner of the Olympic Pipe Line Company, with Enbridge, Inc. In the EIS, the pipeline ownership and operator are collectively referred to simply as Olympic.

a result, this section focuses on safety issues related to petroleum pipelines.

During the Phase 2 Draft EIS scoping period, several members of the community expressed concern about pipeline safety at unique sites, such as schools, parks, and other facilities where the public congregates. Together with residential uses, such unique sites potentially increase the exposure of the general public to pipeline safety risks. Figure 3.9-1 identifies unique sites within the study area (see Section 3.6.2, *Recreation Resources in the Study Area* for a list of parks and trails located in or adjacent to the transmission line corridor).

3.9.2.2 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. It connects four refineries in northwestern 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 Pipe Line Company, 2017). 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.

Electrical System Upgrades within the Shared Corridor

Electrical system upgrades and pole replacements in the shared utility corridor are not uncommon. PSE previously upgraded its 115 kV line to a 230 kV line for 15 miles north of the Sammamish substation in Redmond. In 2007 and 2008, PSE replaced and reframed hundreds of poles in the shared corridor. In 2016, PSE replaced poles to address a specific safety concern created by nearby construction in Newcastle. For all of these upgrades and replacements, PSE coordinated closely with Olympic in the design and construction of these activities (Strauch, pers. comm., 2017).

Buried hazardous liquids pipeline, similar to the Olympic Pipelines

Pipeline warning sign in the project corridor

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 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 (Figure 3.9-1). 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, one of the pipelines is along PSE's existing corridor while the other follows Factoria Blvd SE and Coal Creek Parkway SE before rejoining the corridor (Stone, pers. comm., 2016). Construction of the pipeline began in 1964 after PSE's transmission line corridor was built in the late 1920s and early 1930s (Newton, 1965).

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).

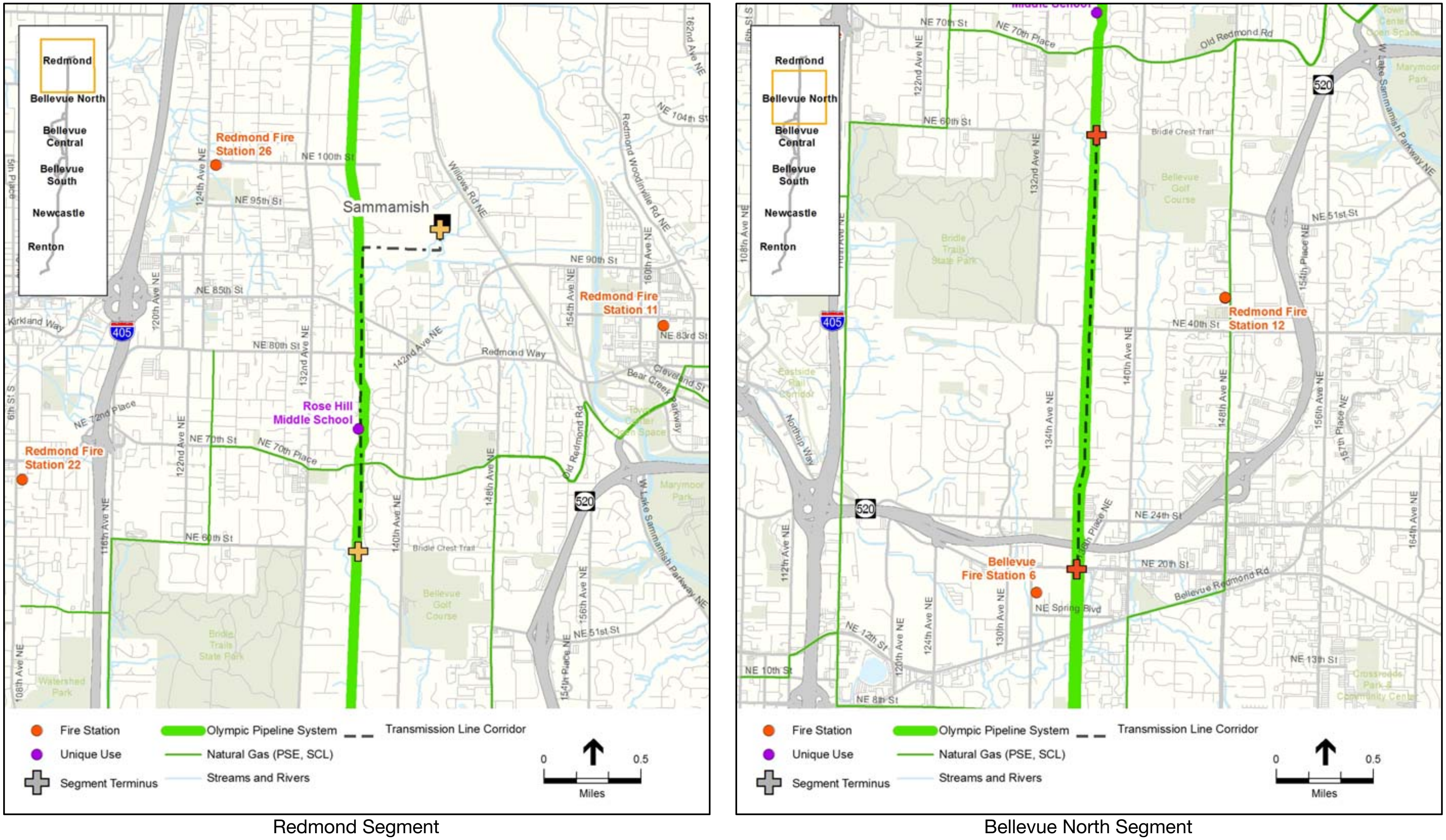
Preventing Unintentional Releases

As the pipeline operator, Olympic is responsible for operating and maintaining their pipelines in accordance with or to exceed PHMSA's 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, external, and atmospheric 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.*"

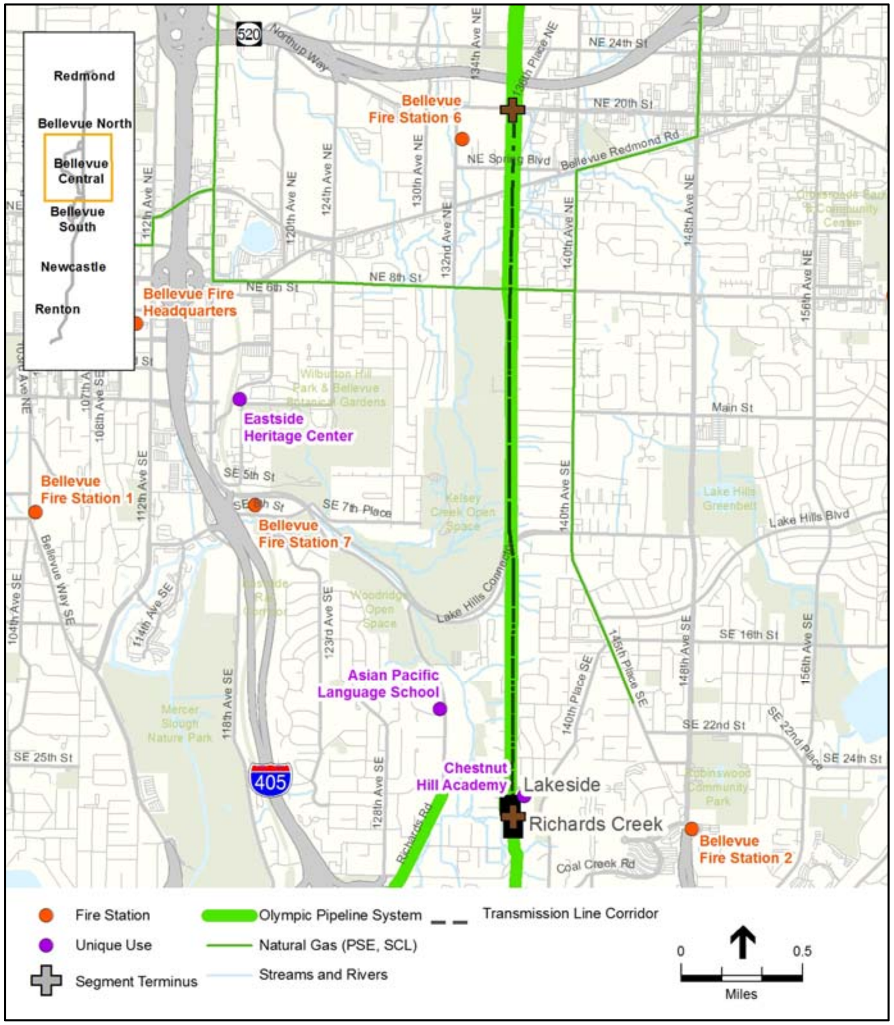
In response to these federal requirements, Olympic has a number of programs and systems in place to prevent unintentional releases, as summarized below.

Integrity Management Program. Pipelines and high voltage AC transmission lines often share the same corridor. As a result, the 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).

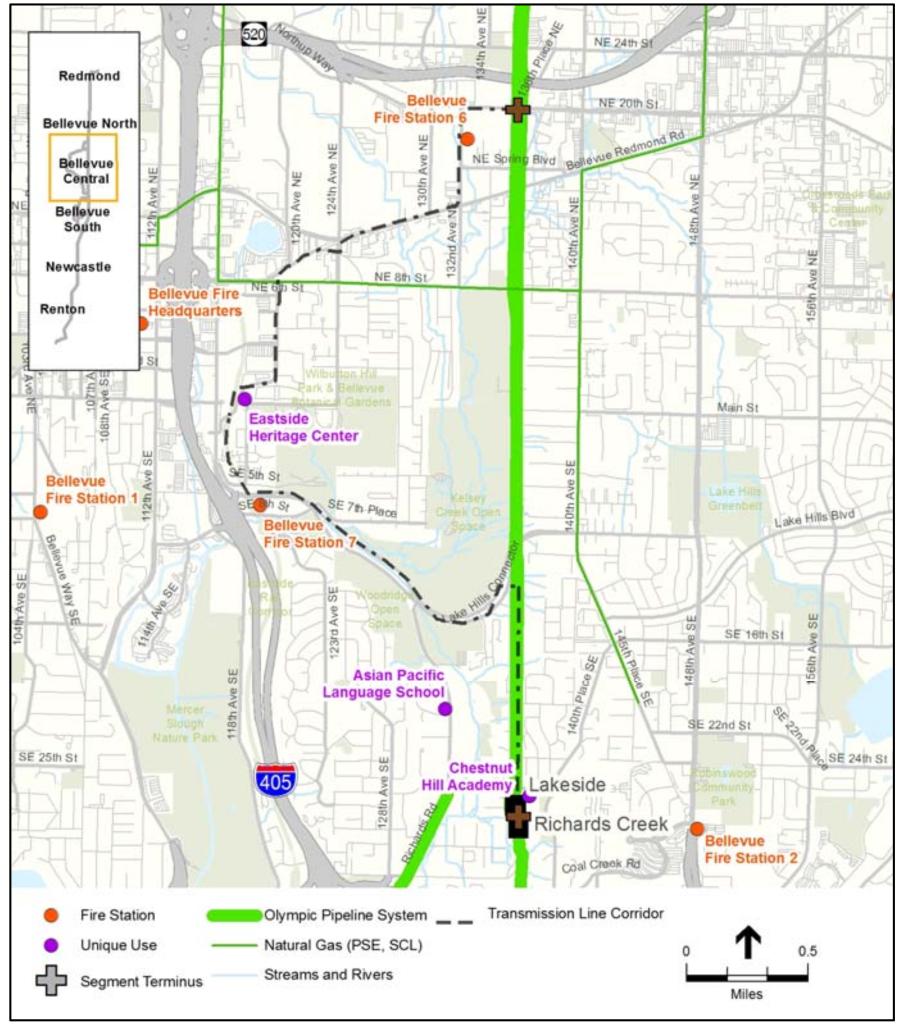


Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; WA UTC, 2015.

Figure 3.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area



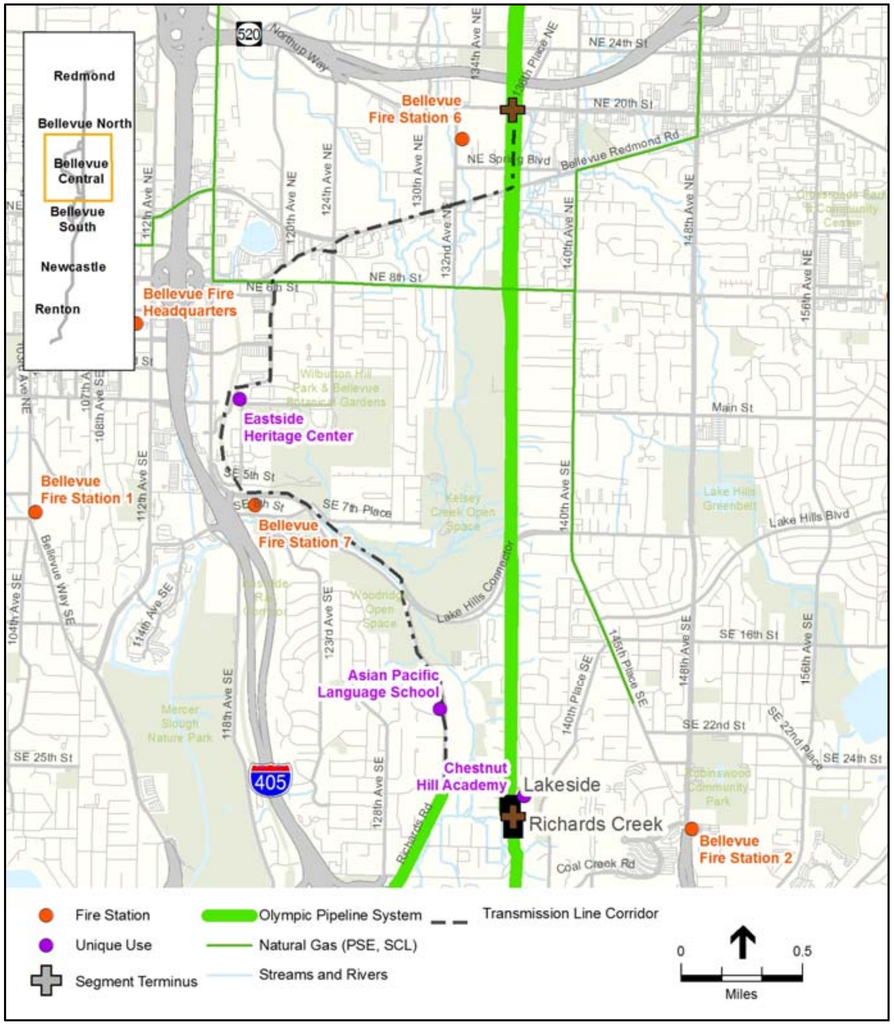
Bellevue Central Segment, Existing Corridor Option



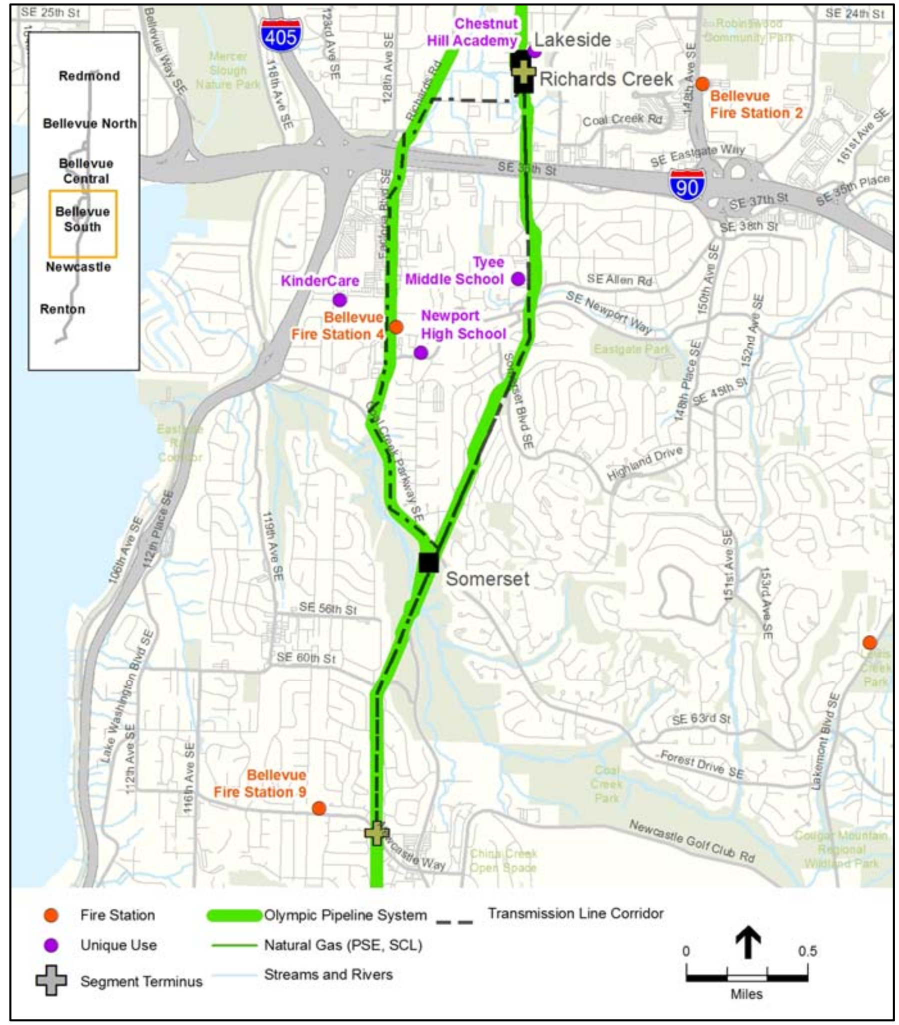
Bellevue Central Segment, Bypass Option 1

Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; WA UTC, 2015.

Figure 3.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area (continued)



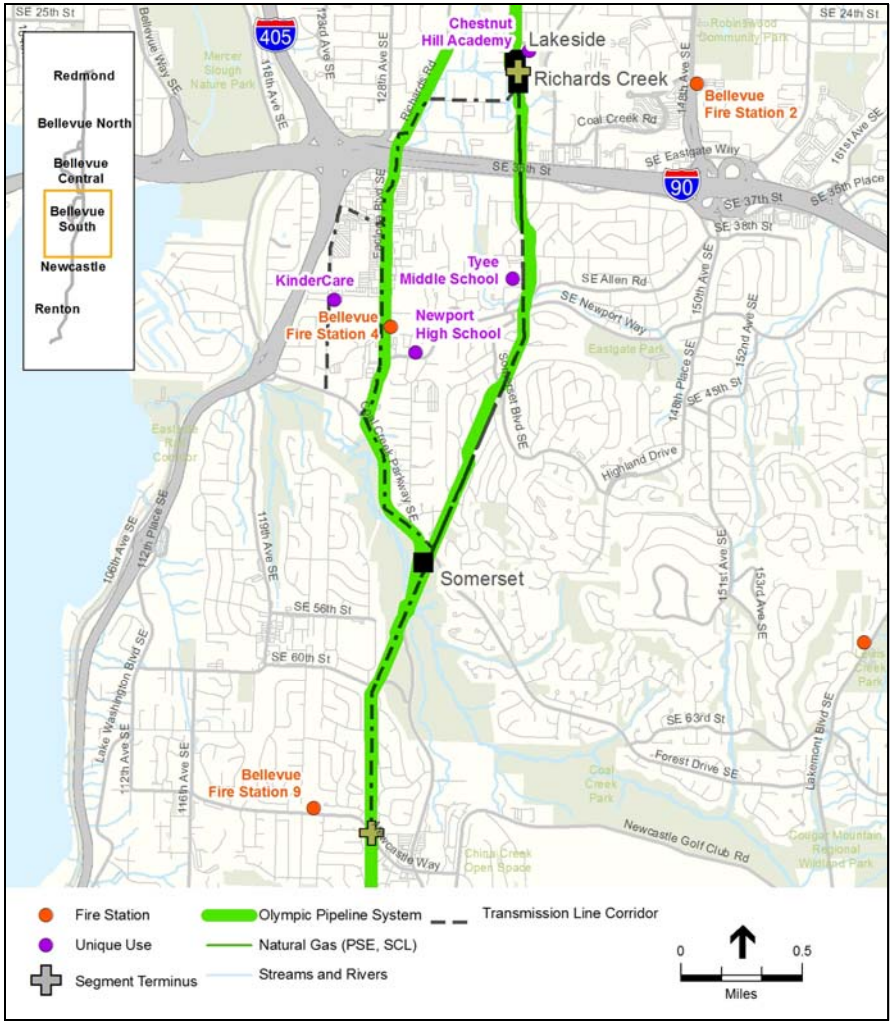
Bellevue Central Segment, Bypass Option 2



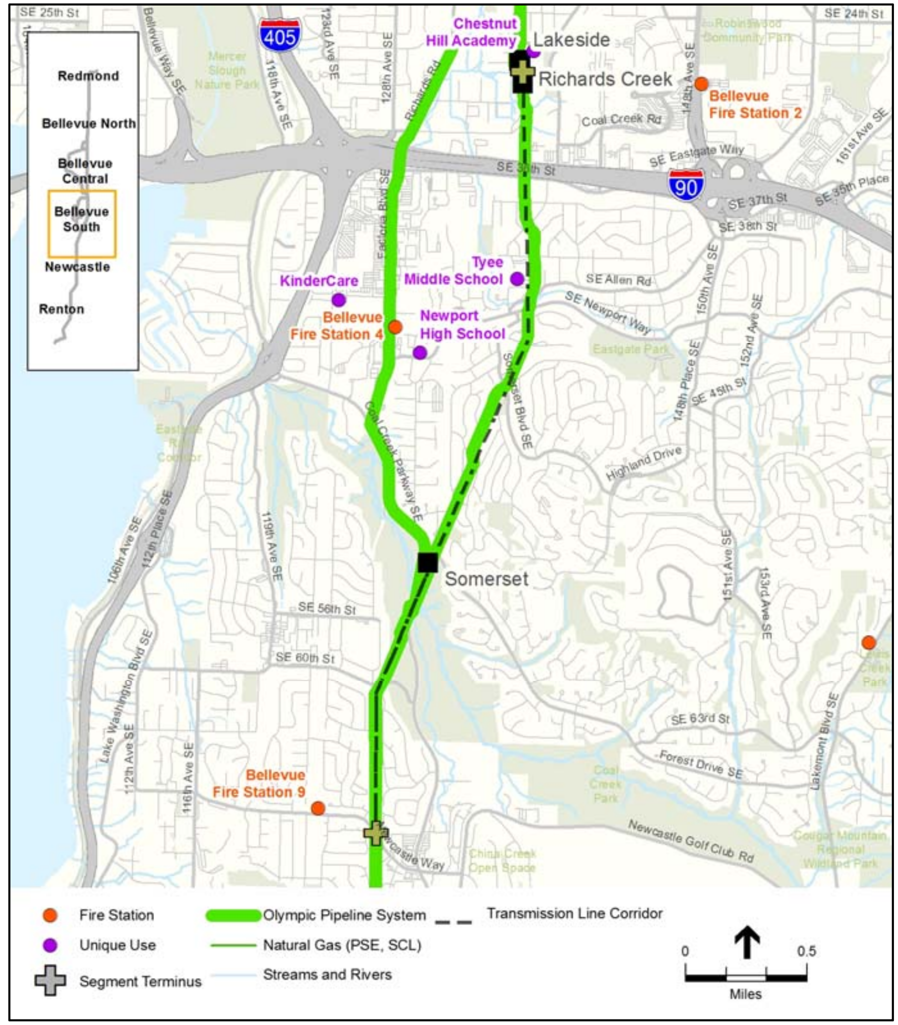
Bellevue South Segment, Oak 1 Option

Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; WA UTC, 2015.

Figure 3.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area (continued)



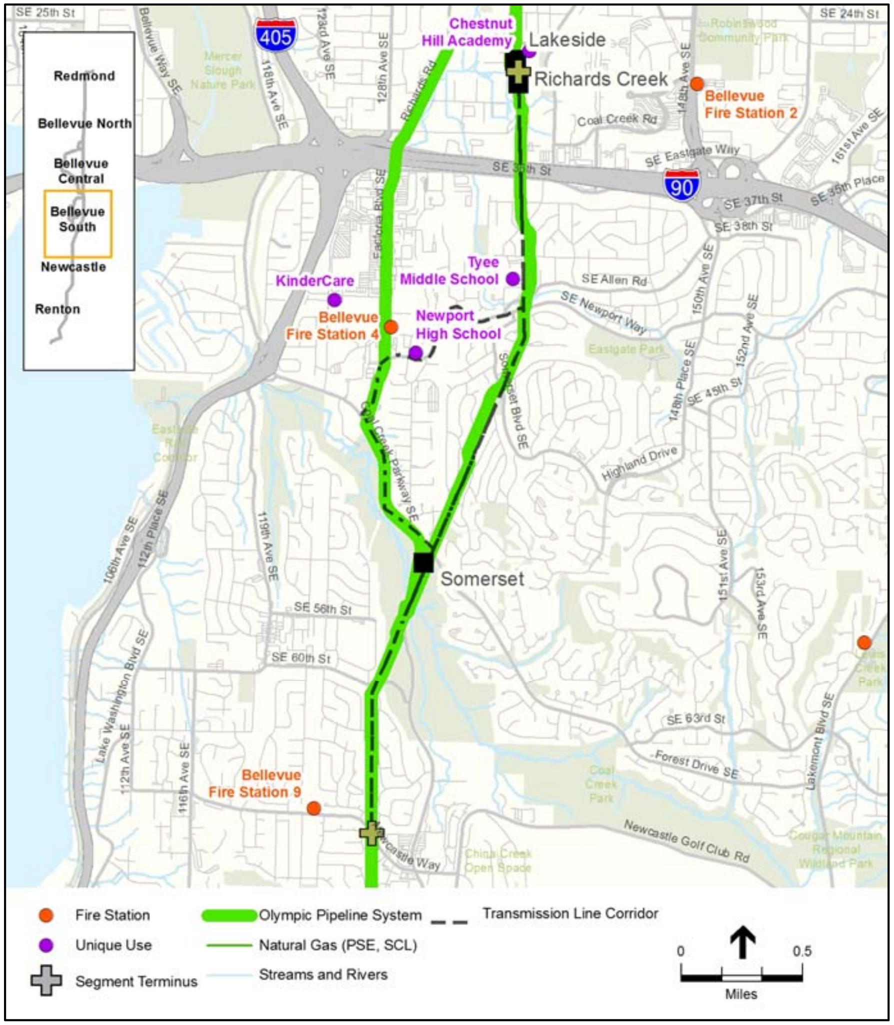
Bellevue South Segment, Oak 2 Option



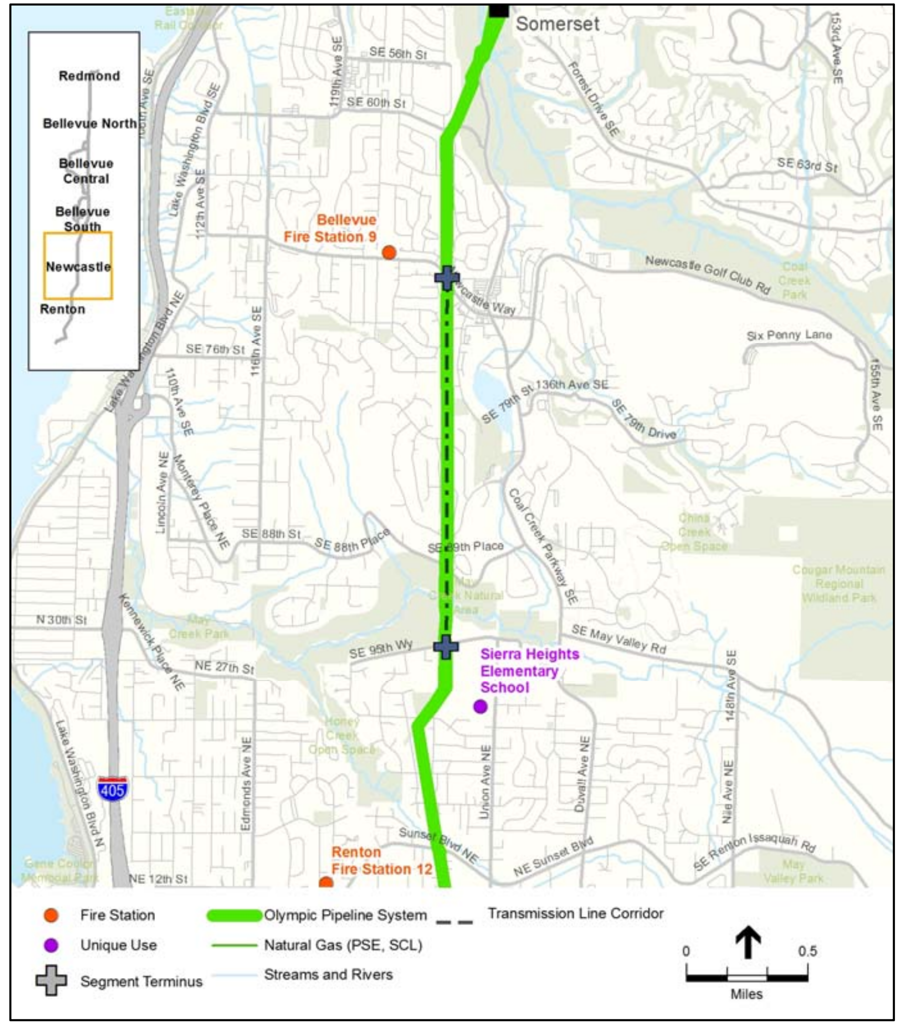
Bellevue South Segment, Willow 1 Option

Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; WA UTC, 2015.

Figure 3.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area (continued)



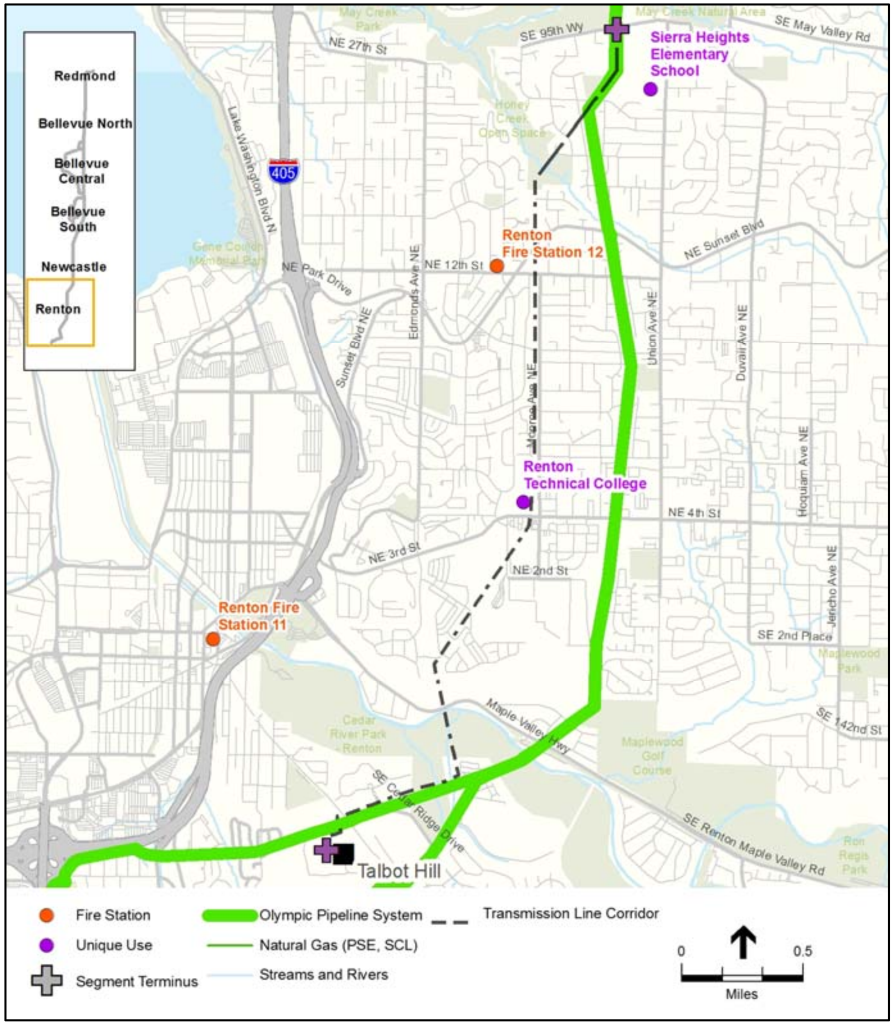
Bellevue South Segment, Willow 2 Option



Newcastle Segment

Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; WA UTC, 2015.

Figure 3.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area (continued)



Renton Segment

Source: King County, 2015; Ecology, 2014; PSE, 2015; SCL, 2015; WA UTC, 2015.

Figure 3.9-1. Existing Electric Transmission Lines and Natural Gas/Petroleum Pipelines in the Study Area (continued)

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 3.9.3.3 and in Section 16.3.37 of the Phase 1 Draft EIS. Additional information is provided in the *AC Interference Study* (DNV GL, 2016).

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 by comparing a modeled flow rate to the measured flow balance in a defined pipeline section. When the difference exceeds a defined loss threshold, the software declares a warning, followed by an alarm if the condition persists. Alarms are communicated through the supervisory control and data acquisition (SCADA) alarm and event system. The Pipeline Leak Detection System meets and in some cases exceeds state and federal requirements for pipeline leak detection, including WAC 480-75-300: "Leak detection systems must be capable of detecting an eight percent of maximum flow leak within fifteen minutes or less" (West, pers. comm., 2016). Information on shut-off valves and response systems was not available from Olympic. Olympic treats these data as confidential information that is not available for public disclosure due to potential security risks.

General Construction Requirements. Olympic has a general list of requirements as part of *BP Pipelines (North America) General Construction Requirements* for all work proposed near the pipelines (see Appendix I). 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 utility lines underground within the pipeline easement. It also includes specific notification and monitoring requirements, consistent with federal, state, and local requirements. Individuals, businesses, and government entities planning to excavate within the corridor in proximity to the pipelines are required to notify Olympic at least 48 hours prior to the start of any work to comply with the state's "one-call" locator service law (Chapter 19.122 RCW). Local governments must also notify Olympic when they issue a permit that allows construction or excavation within 100 feet, or condition the permit to require the permit applicant to consult with Olympic (RCW 19.122.033[4]; see Section 3.9.1.2, *Damage Prevention*, for more detail). As company practice, if a project is within 100 feet of the pipeline, 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 pipeline, the Damage Prevention Team would be on-site to monitor excavation.

Protections in Place to Prepare for and Respond to an Incident

Several Phase 2 Draft EIS scoping comments requested additional information on emergency response procedures, which are summarized below.

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). The Comprehensive Emergency Management Plans are reviewed and updated periodically. All applicable personnel receive annual training on the Emergency Management Plans, and the area offices conduct emergency response exercises on an annual basis. Chapter 15 of the Phase 1 Draft EIS provided additional information on emergency response procedures of local jurisdictions within the corridor.

Olympic's *Facility Response Plan* provides guidelines to prepare for and respond to a spill from the Olympic Pipeline system. The 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. The Facility Response Plan is based on the Northwest Area Contingency Plan (Regional Response Team 10 and Northwest Area Committee, 2016), as approved by Ecology and the federal PHMSA (see Section 3.9.1). The Facility Response Plan is not made available to the public, but is shared with federal, state, and local officials, including emergency planning agencies and first responders, to strengthen and coordinate planning and prevention activities, with certain key information redacted due to potential security risks.

Unified Command Structure

The Unified Command structure allows for a coordinated response that takes into account the federal, state, tribal, local, and responsible party concerns and interests when implementing a response strategy. It is part of the Incident Command System, which is a standardized approach to command, control, and coordinate emergency response for incidents involving multiple jurisdictions or agencies. During responses to oil and hazardous substance spills, local agencies may be involved as part of the Unified Command and may provide agency representatives who interface with the command structure through the Liaison Officer or the State On-Scene Coordinator.

As described in Chapter 15 of the Phase 1 Draft EIS, 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 and King County recently acquired an emergency notification software system called "Code Red" (referred to respectively as Bellevue Inform/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).

3.9.3 Hazardous Liquid Pipeline Incident Data

Scoping comments expressed concern about the potential for the Energize Eastside project to damage the co-located Olympic Pipelines, resulting in releases. In response, EDM Services conducted a risk assessment to evaluate what could go wrong (causes of pipeline incidents), how likely those are to occur (probability of incidents), and what the consequences would be if there were an unintentional release.

The baseline data used for the risk assessment are summarized below, and include information on the frequency, major causes, and major risks associated with pipeline releases. The *Pipeline Safety Technical Report* (Appendix I) presents additional information on the baseline data used.

3.9.3.1 Reported Incidents in the United States

PHMSA categorizes pipelines as hazardous liquid, liquefied gas, and natural gas distribution and transmission. The Olympic Pipelines are categorized as hazardous liquid pipelines. In general, a small percentage of pipelines in Washington (2%) and nationally (by mileage) are hazardous liquid pipelines (PHMSA, 2016a). Natural gas distribution lines make up the majority of all pipelines, are in most residential streets, and do not have large rights-of-way and pipeline markers common to regulated transmission pipelines (Rathbun, pers. comm., 2016). In contrast, hazardous liquid pipelines are present in a limited number of rights-of-way and routinely patrolled by the operator to inspect surface conditions on or adjacent to the pipeline right-of-way. For these reasons, incidents are much less common with hazardous liquid pipelines than with natural gas distribution lines.

Pipeline and Hazardous Materials Safety Administration, (PHMSA)

The PHMSA Office of Pipeline Safety administers the national regulatory program to ensure the safe transportation of gas and other hazardous materials by pipeline. PHMSA uses incident data to assess safety trends and guide the development of new initiatives to enhance safety.

Pipeline companies are required to report hazardous liquid pipeline failures to PHMSA (49 CFR 195.50). Table 3.9-2 lists the unintentional release incidents (in the PHMSA database) for hazardous liquid pipelines from 2010 to 2015, which is the most recent data range under current rules. During this reporting period, there were 2,362 reported hazardous liquid pipeline incidents and seven fatalities nationwide associated with hazardous liquid pipelines (EDM Services, 2017; PHMSA, 2016b).

In accordance with 49 CFR 195.248:

- All pipes must have a minimum cover of 3 feet.

In accordance with 49 CFR 195.250

- All pipes must have a minimum clearance of 12 inches from any other underground structure.

When there is a change in pipeline operator requirements, PHMSA often begins a new database to ensure that all data within a given database are consistent. This most recent database began in January 2010 following new requirements established as a result of several pipeline incidents (see Appendix I). Using this current database (2010 to 2015) is appropriate for conducting a risk assessment because it allows for estimating risks based on rules currently in place. To use a broad analogy, if one were to estimate the rate of wetlands loss in the U.S., using data prior to the 1990s would overestimate the rate of wetland loss, compared to using data for the most recent period of time when more stringent regulations are in place. Although the current database only provides a 6-year timeframe (2010–2015), the reported incidents and fatalities are associated with hundreds of thousands of miles of pipeline (see total pipeline mileage in Table 3.9-2), providing a large and appropriate sample size for conducting a risk assessment.

Table 3.9-2. Reported U.S. Hazardous Liquid Pipeline Unintentional Release Leaks and Fatalities, 2010–2015[1]

Reported Incidents	General Public Fatalities	Total Fatalities[2]	Total Pipeline Mileage
Hazardous Liquid Pipelines (total)			
2,362	4	7	1,143,831[3]
Refined Petroleum Products (only)			
805	0	0	379,086[4]

[1] Because pipeline safety is expected to improve with each successive change in federal safety rules, PHMSA reports data based on the period reflecting the most recent rule changes to ensure consistent data (see further explanation above).
[2] Includes pipeline operator employees, contractor employees, and the general public.
[3] This is a sum of the individual pipeline mileages for each year, from 2010 through 2015.
[4] This is a sum of the individual pipeline mileages for each year, from 2010 through 2015.
Source: PHMSA, 2016b.

Of the incidents for hazardous liquid pipelines, 805 were on pipelines or facilities that carry refined petroleum products; of these, 648 occurred at facilities (e.g., tank farm, station equipment, pump station, appurtenance piping, and valve station) and 157 occurred along pipeline rights-of-way. The number of incidents over the total mileage of refined petroleum product pipelines indicates that the likelihood is low for an incident at any given location.

The frequency of incidents along refined petroleum product pipeline systems was 2.12 incidents per 1,000 *mile years*. For those incidents occurring on pipeline rights-of-way only (and not at facilities), this rate was 0.51 incidents per 1,000 mile years; none resulted in fatalities. The average spill size of these incidents[1] was 306 barrels (12,900 gallons). The largest reported unintentional release was 9,000 barrels (378,000 gallons).

Mile Years

A means of predicting the number of incidents for a given length of line, over a given period of time. For example, if one considered an incident rate of 1.0 incident per 1,000 mile years, one would expect one incident per year on a 1,000-mile pipeline.

[1] This is the average spill size inclusive of incidents that occurred within pipeline rights-of-way and incidents that occurred at pipeline facilities (e.g., valve stations) where the release migrated beyond the parcel boundary.

3.9.3.2 Reported Olympic Pipeline Incidents

Table 3.9-3 shows data on releases from the Olympic Pipeline system (the entire 400-mile system) provided by the PHMSA incident database for hazardous liquid pipeline releases. The data show that the Olympic Pipeline system has had incidents at about the same frequency as the national average during the reporting period, but with far smaller average volume of spilled product per incident. All of the releases occurred at valve stations. There were no reported releases along the pipeline right-of-way.

Table 3.9-3. Olympic Pipeline Reported Releases, January 2010 through December 2015

Date[1]	Release Volume (barrels)	Location	Cause
9/19/2011	0.29	MP 7 Block Valve	Instrumentation Connection Failure
3/31/2012	1.96	Allen Station	Threaded Connection/Coupling Failure
4/1/2012	0.97	Allen Station	Instrumentation (Pressure Gauge) on Pig Trap Door
7/20/2014	0.19	Renton Station	O-Ring Connection Failure on Pig Trap Door
11/10/2014	7.49	Allen Station	Threaded Connection Failure

[1] Reported releases between January 1, 2010 and December 31, 2015. No reported releases were identified for 2010 and 2015.
Source: EDM Services, 2017.

The resulting frequency of unintentional release along the Olympic Pipeline system was estimated at 2.08 incidents per 1,000 mile years over this reporting period; this is a slightly lower frequency of unintentional release compared to the frequency of incidents that occurred along U.S. refined petroleum product pipeline systems over this same period (2.12 incidents per 1,000 mile years). The average spill size was 2.2 barrels (92 gallons), less than the national average of 306 barrels (12,900 gallons).

Olympic Pipe Line Company Violations (2012 – 2016)

The Washington UTC inspects pipelines to assess compliance with federal and state pipeline safety rules in accordance with WAC, Title 480. Several Phase 2 scoping comments referred to or requested information on Olympic's past violations of these safety rules. The inspection reports on UTC's website for Olympic's facilities in Washington State are only available for the years 2012 through 2016. In these inspection reports, several violations and areas of concern were noted (as summarized in Table 3.9-4). These inspections included a review by UTC of Olympic's records, operation and maintenance, emergency response, and field inspection of the pipeline facilities. Violations included late reporting and defects at test sites.

Table 3.9-4. UTC Reports on Olympic Pipeline Violations and Areas of Concern, 2012–2016[1]

Violation or Area of Concern	Code Section	Explanation of Violation or Area of Concern
2012		
Area of Concern	49 CFR 195.432 (operators must inspect in-service atmospheric and low-pressure steel aboveground breakout tanks, and conditions must be documented for follow-up action by authorized inspector).	The seal for a breakout tank in Anacortes was faulty. After the inspection, a new sealant was applied.
Area of Concern	49 CFR 195.430 (adequate firefighting equipment must be maintained at each pump station and in proper operating condition).	Some fire extinguishers had missing inspection tags. After the inspection, the missing tags were reattached to the fire extinguishers.
2013		
Area of Concern	N/A	Incident at Allen Station resulted in a release of 84 gallons of diesel, which the Programmable Logic Controller did not register the pressure data correctly. UTC recommended that personnel trained in Programmable Logic Controllers be available to assist investigations of future incidents that involve the SCADA system.
Area of Concern	49 CFR 195.446 (operators must submit Control Room Management procedures to PHMSA or state agency).	BP would not provide a copy of their Control Room Management procedures prior to inspection.
2014		
Violation	49 CFR 195.583 (mandates that pipeline company must inspect onshore pipelines that are exposed to the atmosphere for evidence of atmospheric corrosion once every 3 years, not to exceed an interval of 39 months).	For the Seatac Delivery Facility, Tacoma Junction, and Tacoma delivery facility, the required atmospheric corrosion reads for 2014 were late (should have been read by March, but were read in November instead).

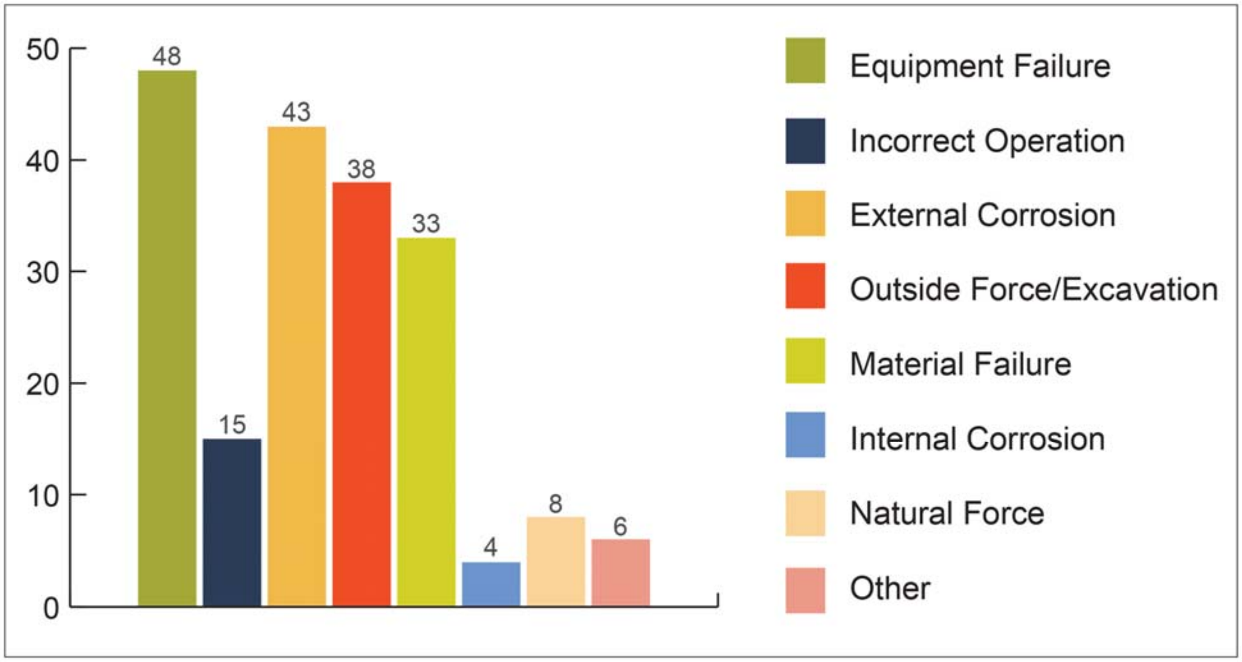
Violation or Area of Concern	Code Section	Explanation of Violation or Area of Concern
Violation	WAC 480-75-510 (mandates that pipeline companies must initiate remedial action to correct deficiencies within 90 days of detection).	Defective test sites were noted. It could not be determined whether the pipeline was adequately protected in these areas. Olympic needs to ensure their pipelines are adequately cathodically protected and to repair, as necessary, the defective test sites.
Area of Concern	49 CFR 195.573 (pipeline company must test protected pipelines at least once a year and not to exceed an interval of 15 months to determine whether cathodic protection complies with Section 195.571).	BP self-reported instances where they were late in conducting pipe-to-soil readings. BP presented a list of changes made to ensure compliance with this section in the future.
2015		
None		
2016		
Violation	49 CFR 195.583 (mandates that pipeline company must inspect onshore pipelines that are exposed to the atmosphere for evidence of atmospheric corrosion once every 3 years, not to exceed an interval of 39 months)	For the Seattle Delivery Facility, corrosion was noted coming from under a non-adjustable pipe support. Olympic is required to inspect each portion of the pipeline that is exposed to atmospheric corrosion. Olympic is also required to evaluate the condition of the coating under pipe support and determine if the pipeline integrity is compromised. Olympic is also required to inspect its other non-adjustable pipe supports in their other intrastate facilities to ensure pipeline integrity is not compromised.

[1] Inspection reports on UTC's website for Olympic's facilities in Washington State are only available for the years 2012 through 2016.

Source: UTC, 2017.

3.9.3.3 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), *external corrosion* (22 percent), outside force/excavation (20 percent), and *material failure* (17 percent). Figure 3.9-2 shows the distribution of these incidents by cause. Figure 3.9-3 shows the volume (barrels) of reported incidents by cause.



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.

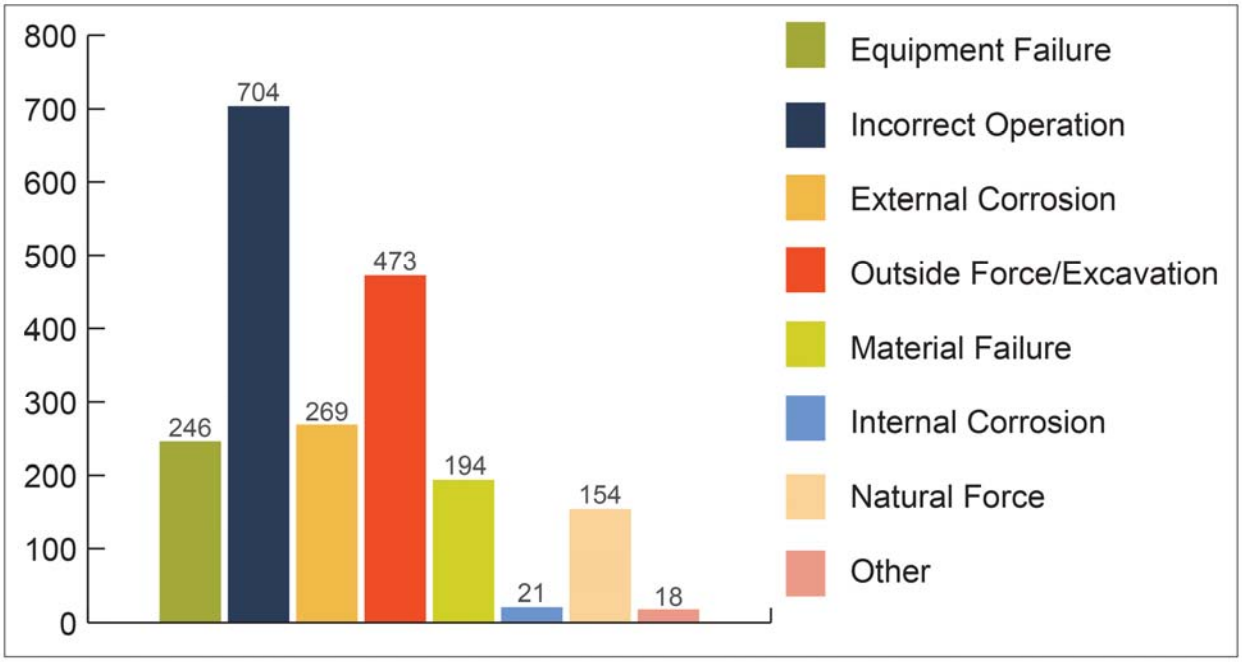
“Incorrect operation” includes items such as incorrectly installed equipment, over-pressure, overfill tank or vessel, valve left in wrong position, wrong equipment installed, etc.

“Natural force” includes earthquakes, floods, lightning, extreme temperature, etc.

Source: EDM Services, 2017.

Figure 3.9-2. Number of Reported Incidents by Cause, 2010–2015

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.



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 3.9-3. Average Volume (Barrels) Per Release 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 the line will 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 4.9.

Electrical Interference

Electrical interference can occur during normal high voltage AC transmission line 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.

External Corrosion. *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.

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.

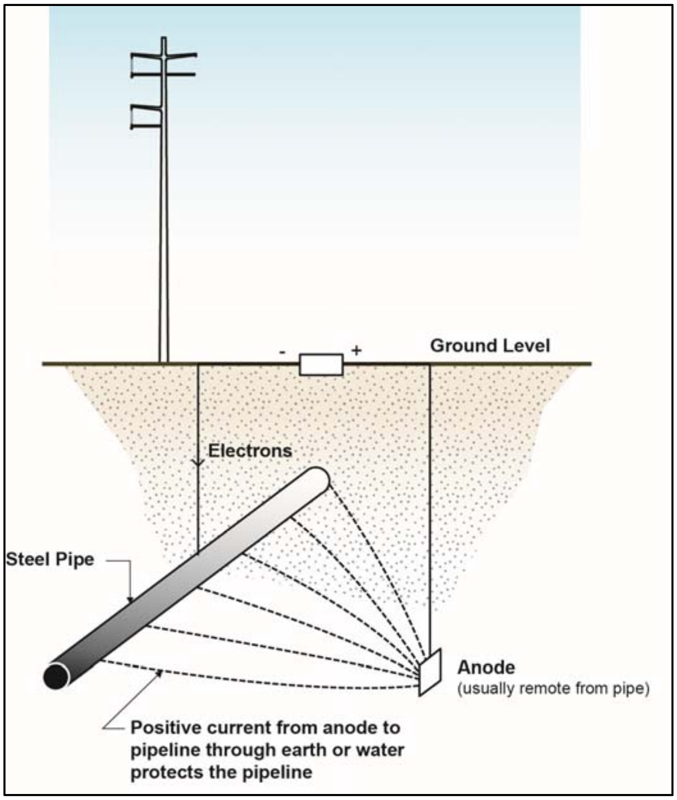
Electrical Interference. High voltage AC power lines near pipelines can be a source of electrical interference. In the study area, the existing transmission lines and substations can cause electrical interference. This includes areas immediately under and adjacent to PSE’s existing 115 kV transmission lines, as well as areas near the Sammamish, Lakeside, Somerset, and Talbot Hill substations.

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).

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.

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 3.9-4). Throughout the study area, the Olympic Pipelines are 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 pipeline with a connection to a source of electric direct current (DC) to drive the protective electrochemical reaction.



Representative photograph from PHMSA report showing hole in a pipe wall caused by electrical fault (not Olympic Pipeline)

Figure 3.9-4. 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 Pipelines have 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 the pipeline is subject to (*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 3.9-5). 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 Pipelines, such as exterior coating, the existing transmission lines do not have a shield wire.

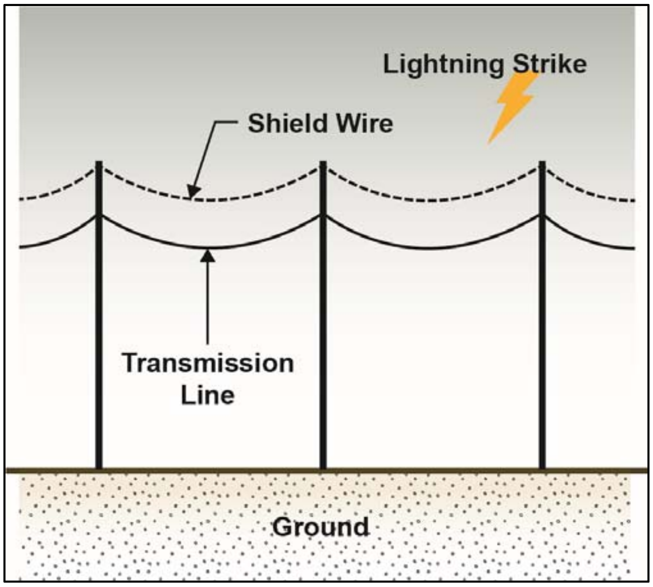


Figure 3.9-5. Shield Wire

Arc Damage. High currents from a fault condition can cause arcing damage to the 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 transmission line poles are within the arc distance, arc shielding protection is typically installed, often consisting of a zinc ribbon extending past the transmission line pole grounding cables.

External corrosion is described in Section 16.3.37 of the Phase 1 Draft EIS, and additional information is provided in *the AC Interference Study* (DNV GL, 2016).

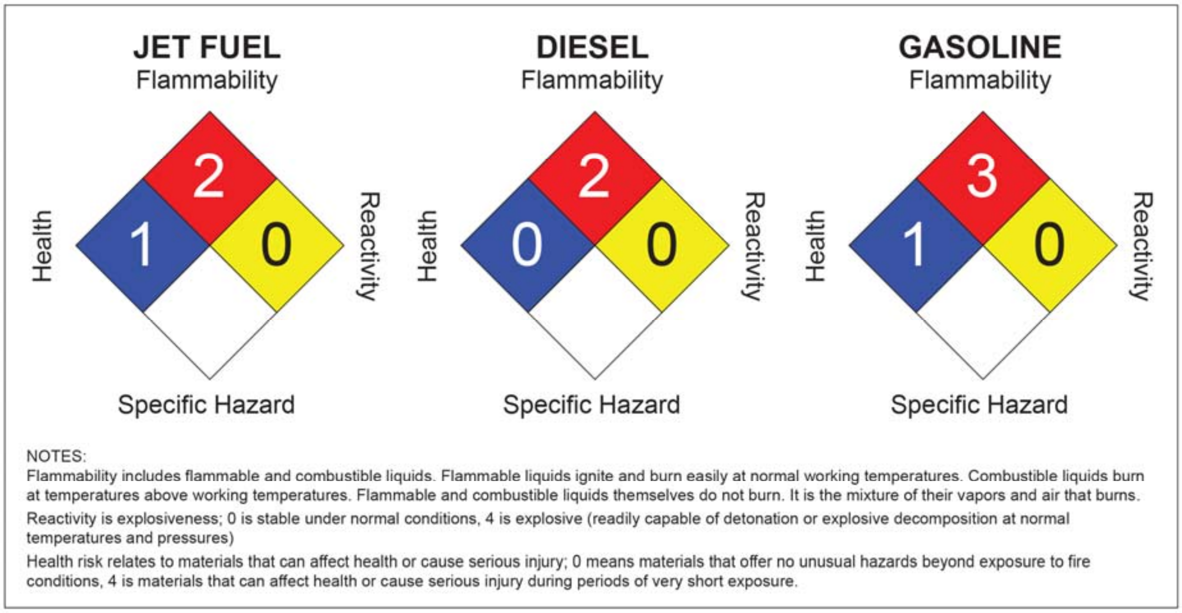
3.9.4 Major Risks to Public from Unintentional Pipeline Release

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. Depending on these characteristics and conditions, pipeline releases can result in a *pool fire, flash fire*, or explosion, as described below.

Pool Fire

A pool fire occurs when flammable liquid pools on the ground and comes in contact with an outside ignition source.

The Olympic Pipelines transport refined petroleum products, including diesel, jet fuel, and gasoline. The product or the mix of products transported varies. The National Fire Protection Association assigns hazard ratings for each of these fuels, as depicted in Figure 3.9-6. For each hazard, the severity ranges from 0 (no hazard) to 4 (severe risk).



Source: EDM Services, 2017

Figure 3.9-6. National Fire Protection Association Ratings for Jet Fuel, Diesel, and Gasoline

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).

EDM Services (2017) used a number of reasonable assumptions and data inputs, including the estimated release rate and pipe contents of the Olympic Pipelines, to model a release and subsequent pool fire as described in Sections 7.1 and 8.3 of their report (see Appendix I). Based on these inputs, EDM Services estimated the following maximum release volume:

- **372,162 gallons**

Figure 3.9-7 is a graphical depiction of the estimated pool fire size based on the maximum release volume (yellow circle) and the resulting *heat flux* zones. 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 but typically would not result in fatalities.

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

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 waterbody, pool fire characteristics were different than the depiction in Figure 3.9-7.

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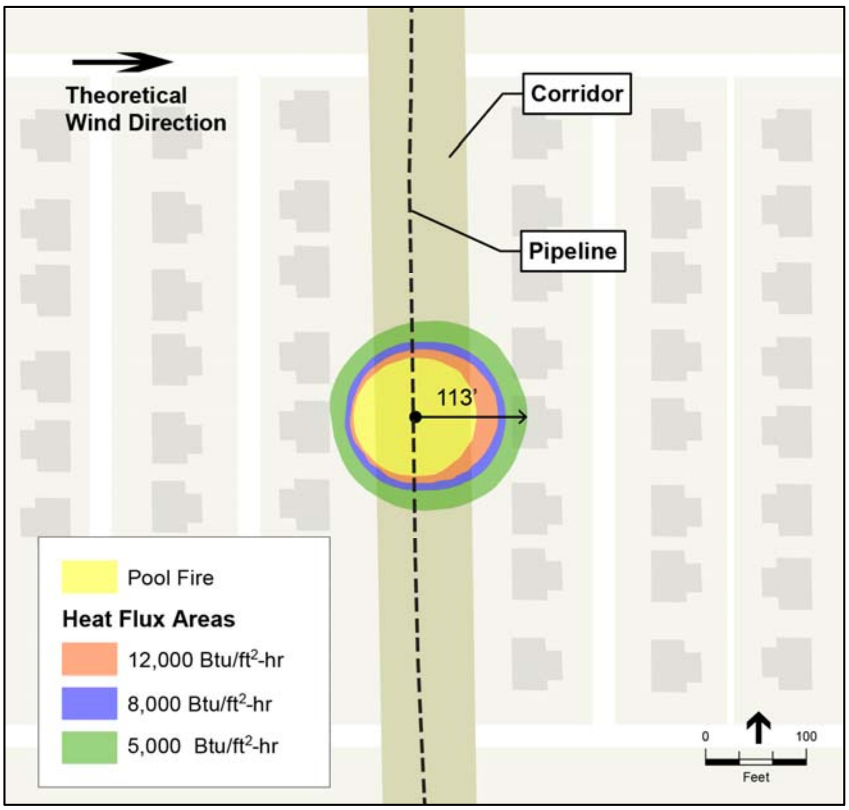
schematic figure is a simplistic representation and does not show site-specific conditions. For example, this figure illustrates a release where no hills, waterbodies, or catch basins are present. If hilly conditions, waterbodies, or catch basins were present, the pipe contents could flow away from the site of the release, resulting in an elongated pool fire and heat flux areas. 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. Although the pool fire and heat flux areas could be larger, this diagram provides the basis for calculating the number of potential fatalities assuming a worst-case scenario, and informed the risk assessment results that are presented in Section 3.9.5.3.

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.



Note: This diagram is meant to be a simplistic representation of where released pipe contents would spread (or pool) and result in a fire (if an ignition source is present), and does not show site-specific conditions. See Sections 7.1 and 8.3 of the EDM Services report in Appendix I for more information on assumptions and data inputs used to develop this diagram.
Source: EDM Services, 2017.

Figure 3.9-7. 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 Pipelines 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). This overpressure level is not high enough to pose potential explosion risks. As a result, explosions are not described any further in this EIS chapter. For additional information on explosions, see the *Pipeline Safety Technical Report* (Appendix I).

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.

3.9.5 Risks During Operation

This section addresses the potential pipeline safety risks associated with the operation of the project within the study area. The section begins with a description of the methodology used to conduct a risk assessment, identification of the key risk assessment steps that were followed by EDM Services, limitations of the data used to inform the risk assessment, and a description of key terms used to present the risk assessment results. The existing pipeline safety risks that would remain under the No Action Alternative are presented in this section as baseline information. The section then describes the incremental change in risks from baseline conditions under Alternative 1. This section addresses the potential risk of human fatalities occurring as a result of a pipeline leak or pool fire; the impacts of a leak or pool fire on environmental resources are addressed in Section 3.9.6.

3.9.5.1 Methodology

As described in the Phase 1 Draft EIS, and as addressed in numerous scoping comment letters for the Phase 2 Draft EIS, the Energize Eastside project could pose additional risks to the public. For example, if the Energize Eastside project were to damage one or both of the Olympic Pipelines, 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.

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) 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 probability of a potential leak or fire. Estimated existing pipeline safety risk was then compared to estimated pipeline safety risk under Alternative 1.

To quantify this risk, EDM Services conducted a probabilistic pipeline risk assessment for the following conditions:

- Olympic Pipelines Co-located with Existing Transmission Lines (No Action).
- Olympic Pipelines Co-located with Proposed Transmission Lines (Alternative 1).

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.

To identify the change in risk associated with Alternative 1, the risk assessment estimated the change in frequency of pipeline incidents for the following three main causes of pipeline damage resulting from electrical interference:

(1) External Corrosion

(2) Fault Damage

(3) Arc Damage

The estimated change in frequency for each of these main causes was considered in combination with all other causes of pipeline damage identified in Section 3.9.3.3 in order to present the overall pipeline safety risk associated with Alternative 1. For results of the risk assessment related to outside force/excavation, see Chapter 4.

Risk Assessment Steps

EDM Services completed the risk assessment using the five steps described below (and illustrated in Figure 3.9-8).

1. **Baseline Data Compilation** – To estimate the probability of pipeline failures, historical data on similar systems are most commonly used in conjunction with information on the characteristics of the pipeline system being evaluated. However, it should be acknowledged that using this information has limitations, as described in more detail in the next section.

Limitations relate to the national database, which does not independently collect and evaluate co-location of pipeline and transmission line systems information, and certain data not provided by Olympic. As an initial step, baseline data were compiled from sources summarized in Section 3.9.3, including historic release data. EDM Services also reviewed information provided by Olympic on the operating conditions of the Olympic Pipelines in the study area (West, pers. comm., 2016; Stone, pers. comm. 2016). This information was used to estimate:

- Frequency of release
- Frequency of public injuries and fatalities
- Spill size distribution
- Causes of release
- Likelihood of fires or explosions following a release.

How is Risk Expressed?

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

Risk is presented as the probability (or likelihood) that a specific consequence will occur within a specified time period. The severity of the consequence (or impact) depends on the nature and quantity of the substance released, as well as proximity to people.

For this risk assessment, the severity of consequences (or impact) is the same with or without the project because the project does not alter the operation of the Olympic Pipelines (e.g., type and amount of hazardous liquids in the pipelines), nor would the project result in a change to the population potentially exposed to a leak or pool fire near the corridor. Only the event probability of an incident occurring could potentially change as a result of this project.

2. **Probability Analysis –** Using the above baseline data, estimates of the likelihood of various size releases, fires, and public fatalities resulting from unintentional releases from the Olympic Pipelines were developed. This included a review of a number of publications and reports, including DNV GL's *AC Interference Study* (2016), to identify the potential change in risk associated with the proposed high-voltage AC transmission lines.
3. **Consequence Analysis** –Using Olympic Pipeline operating parameters, EDM performed release modeling to evaluate the potential impacts from unintentional releases (leaks) alone, as well as leaks that result in a pool fire. For a buried refined petroleum product pipeline, the greatest risk to the public is posed by pool fires.
4. **Conditional Probabilities –** Using the above data, the probabilities for a number of conditions were estimated, including:
   - Probability of various size unintentional releases from the Olympic Pipelines.
   - Probability of fires following an unintentional release.
   - Probability of fatal injuries following a fire.
5. **Risk Determination –** The risks were then calculated to present a numerical combination of both the probability of an event and its consequences. The presentation of risk results and the terminology used in this assessment are described below.

These risk assessment steps are described in more detail in Sections 6.0 through 11.0 of the *Pipeline Safety Technical Report* (EDM Services, 2017).

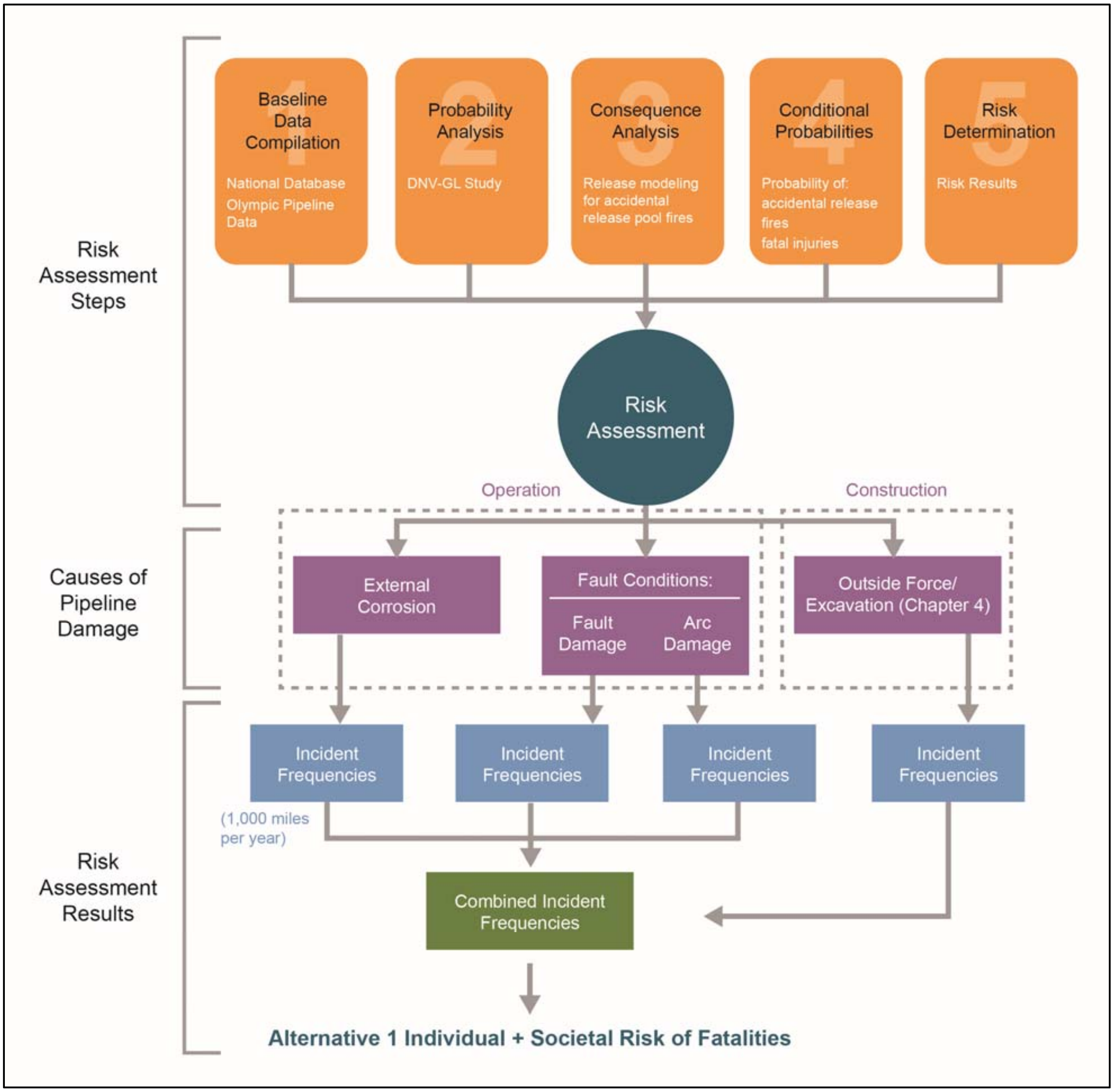


Figure 3.9-8. Conceptual Illustration of the Risk Assessment Methodology

Limitations of the Baseline Data

The baseline data used for the EDM Services risk assessment have a number of limitations. These are described below and relate to the following: (1) limitations of the national database for addressing co-located pipeline and transmission line systems, and (2) limited data provided by Olympic.

Limitations of PHMSA Incident Database

Despite it being relatively common for transmission lines and underground pipelines to be co-located, the available data sources on release incidents do not distinguish between co-located and non-co-located pipelines. The PHMSA incident database does not include an inventory of pipelines that are co-located with high-voltage transmission lines, nor do the incident data reports identify incidents that occurred where the pipeline was co-located with high-voltage transmission lines. As a result, it is not possible to directly develop and quantify the difference in risk that may exist between a co-located pipeline system and those that are not co-located with transmission lines.

In the absence of national collocation data, EDM Services used national data on releases associated with all pipelines and attempted to identify releases that may have been caused by a pipeline's proximity to electrical utility facilities. Unfortunately, the reports on external corrosion-caused releases do not include data to identify whether releases were caused by electrical interference with cathodic protection systems. The reports also do not identify whether releases caused by excavation damage were related to overhead power line construction.

Limited Olympic Pipeline Data

To provide a more project-specific risk assessment, information was requested from Olympic on the Olympic Pipelines in the study area to supplement the national data (information requested and received is identified in Appendix I). Some of the requested information was provided; however, for some information requests, only partial responses or no response were provided due, in part, to information being identified as confidential for security reasons. In the risk assessment field, it is not uncommon for certain pipeline information to be unavailable from the pipeline operator due to proprietary or security reasons (CDE, 2007). In the absence of specific information, the risk assessment largely relied on actual reported pipeline release volumes from national data.

To address the lack of available data related to coating stress and arc distance information for the existing 115 kV corridor (presented below as the No Action condition), several assumptions were used in the risk assessment. To estimate the maximum, or worst-case, incremental change in risk from the No Action Alternative to Alternative 1, 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 overstating the actual difference in risk between the No Action Alternative and Alternative 1.

Risk Terminology

Results of the risk assessment are presented in two main forms: individual risk and societal risk.

Individual risk is most commonly defined as 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 of a specific outcome (e.g., fatalities per year).

Societal risk builds on the individual risk results by considering the number of people in proximity to a potential pipeline safety hazard and groups of people in the surrounding study area. Societal risk is expressed as the cumulative risk to a group of people who might be affected by an unintentional release.

Risk is calculated by first estimating the frequency of pipeline incidents (see below incident frequency) and is presented as an annual probability of fatality (see below risk results).

Incident Frequency

The risk assessment developed anticipated frequencies of pipeline incidents for various causes (called "incident frequency" in this EIS). Causes of pipeline damage include external corrosion, fault damage, and arc damage that have the potential to cause an unintentional release of pipeline contents. Incident frequencies are described (and presented below for the No Action alternative and Alternative 1) in terms of mile years. Mile years are a standard measure for pipeline risk assessments and describe the number of predicted incidents for a given length of pipeline (one mile), over a given period of time expressed in years. For example, for an incident frequency of 1.0 incident per 1,000 mile years, one would expect one incident per year on 1,000 miles of pipeline, or 0.001 incidents on 1 mile of pipeline per year. Pipeline incidents are in reference to any unintentional release of pipeline contents, which could be a minor or major spill. Not all incidents result in fires that could cause injury or fatality.

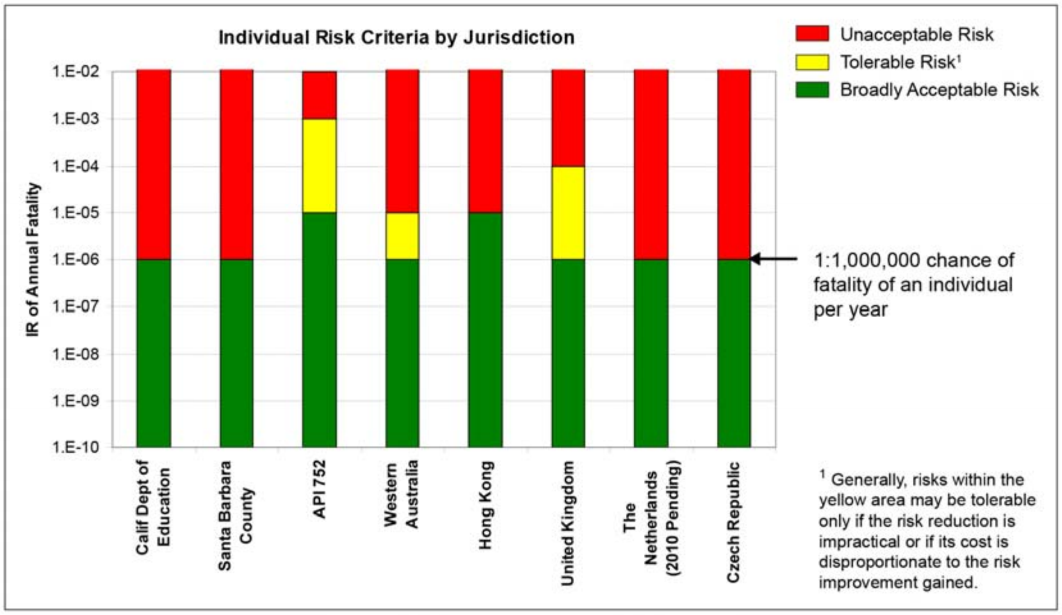
Risk Results

Individual risk results are presented as the annual probability of fatality (e.g., 1 in 1.0 million). The results are developed and presented using a standard risk assessment method, which allows for comparison with other risk results or with risk criteria in use by other jurisdictions for other settings. There are no adopted federal or Washington State criteria for acceptable levels of individual risk. Several jurisdictions have adopted criteria (or thresholds) for use in siting new facilities or sensitive land uses (e.g., schools) near pipelines. There are no known criteria in use by other jurisdictions that address modifications to existing transmission lines co-located with pipelines.

Individual Risk

Annual probability of fatality resulting from a pipeline failure and release for an individual, at a specific location.

Figure 3.9-9 presents the individual risk thresholds for several jurisdictions where such thresholds have been adopted. Risk values for the jurisdictions are depicted by green (broadly acceptable risk), red (unacceptable risk), or yellow (tolerable risk[2]). For example, the California Department of Education and Santa Barbara County have established as their threshold between acceptable and unacceptable risk a 1 in 1.0 million likelihood that an individual at a specific location would be fatally injured over a 1-year period. This risk criterion has the highest factor of safety in use by other jurisdictions. This criterion was originally in use by the United Kingdom and the Netherlands for siting certain industrial facilities. It was later adopted by the California Department of Education for siting new schools within 1,500 feet of pipelines.



Source: EDM Services, 2017.

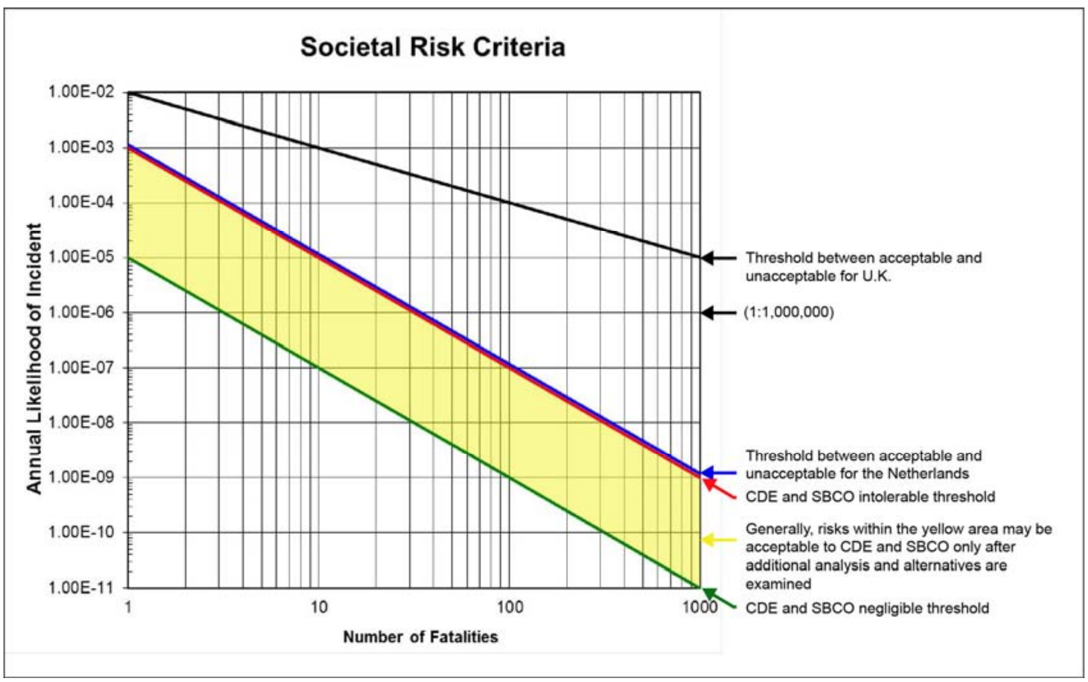
Figure 3.9-9. Individual Risk Criteria by Jurisdiction

[2] Generally, risks within the yellow area may be tolerable only if risk reduction is impractical or if its cost is grossly disproportionate to the risk improvement gained.

Societal risk is expressed as the cumulative risk to a group of people who might be affected by an unintentional release. As with individual risk, there are no adopted federal or Washington State criteria for acceptable levels of societal risk. As shown in Figure 3.9-10, the acceptable values for societal risk vary greatly by different agencies and jurisdictions where risk criteria have been adopted. The California Department of Education (shown on the figure as CDE) and the County of Santa Barbara (shown on the figure as SBCO), California have upper and lower bounds for unacceptable (intolerable) as shown in red and acceptable (negligible) as shown in green societal risk levels. Between these two bounds is a "yellow area" similar to the tolerable risk category described above for individual risks. For example, for 100 fatalities, as shown the "x" axis, the threshold for California Department of Education (green line) is 1.00E-09 (or 1:1.0 billion), as shown on the "y" axis. In other words, if the likelihood of 100 fatalities is less than one in one billion, the risk is deemed negligible. If greater than 1 in 10 million, the risk is considered intolerable. Between these levels, the risk may be considered acceptable only after additional analysis and alternatives are examined. For the United Kingdom (shown on the figure as UK) and the Netherlands, risks above the lines are considered unacceptable, and risks below the line are considered acceptable.

Societal Risk

The annual probability that a specified number of people will be affected by a given pipeline release event.



Source: EDM Services, 2017.

Figure 3.9-10. Societal Risk Criteria by Jurisdiction Significance Thresholds

A review of policies and regulations applicable to the study area revealed that the existing regulatory framework was insufficient for determining significance thresholds because there are no clear written standards addressing pipeline safety in adopted plans, programs, or ordinances for the Partner Cities. To develop a threshold for significance that reflects the policies of the Partner Cities, the EIS Consultant Team held two workshops with staff from the Partner Cities, one in November 2016 and one in February 2017. The threshold for significance established below is based on the Partner Cities workshop discussions.

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 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.

3.9.5.2 *Risk Assessment Results*

The results of the risk assessment (as described in Section 3.9.5.1, *Methodology*) are presented in this section beginning with the incident frequencies for each of the three electrical-interference-related causes of pipeline damage (external corrosion, fault damage, arc damage). These frequencies were used to develop the final risks results, which follow.

The incident frequencies (or estimated number of incidents per 1,000 mile years) were developed for individuals (individual risk) and groups of people (societal risk) for each of the electrical-interference-related pipeline damage (external corrosion, fault damage, arc damage) and are presented in Figure 3.9-11. The incident frequencies are presented for the No Action Alternative and Alternative 1, and the change in frequency is presented in the far right column. For two of the causes (fault damage and arc damage), data were not made available from Olympic to quantify the No Action Alternative.

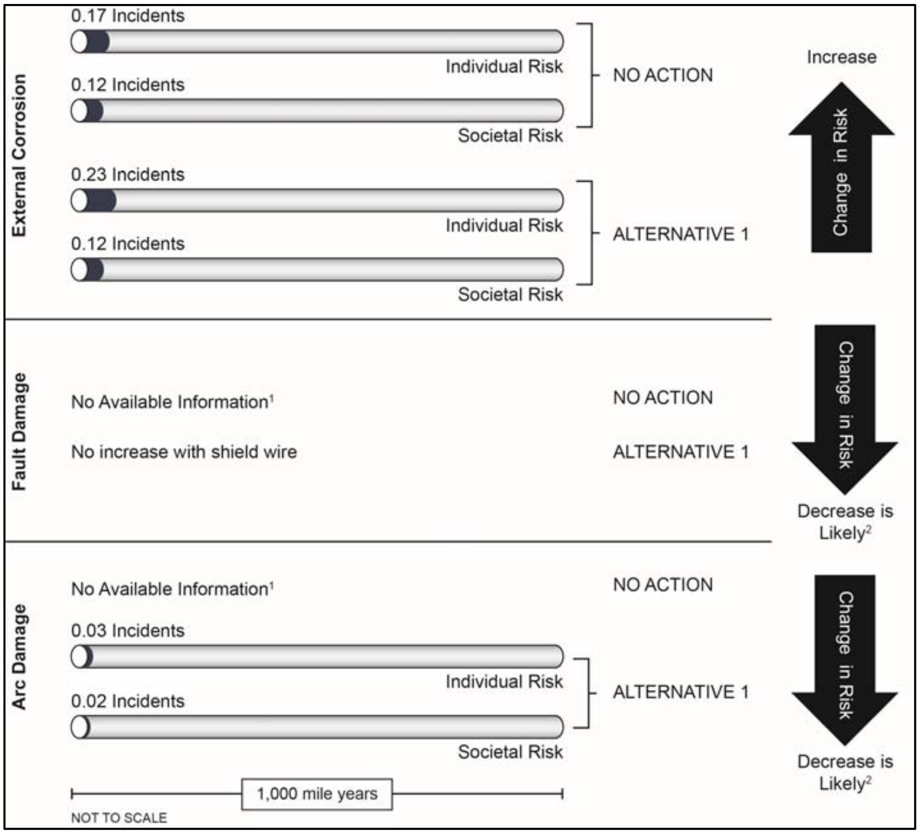
Key Assumptions

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. To estimate the maximum, or worst-case incremental change in risk from the No Action Alternative to Alternative 1, the risk assessment included an assumption that the coating stress voltages and resulting coating stress caused pipeline releases for the existing 115 kV corridor 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 overstating the actual difference in risk between the No Action Alternative and Alternative 1.**

Mile Years

A means of predicting the number of incidents for a given length of line, over a given period of time. For example, if one considered an incident rate of 1.0 incident per 1,000 mile years, one would expect one incident per year on a 1,000-mile pipeline.

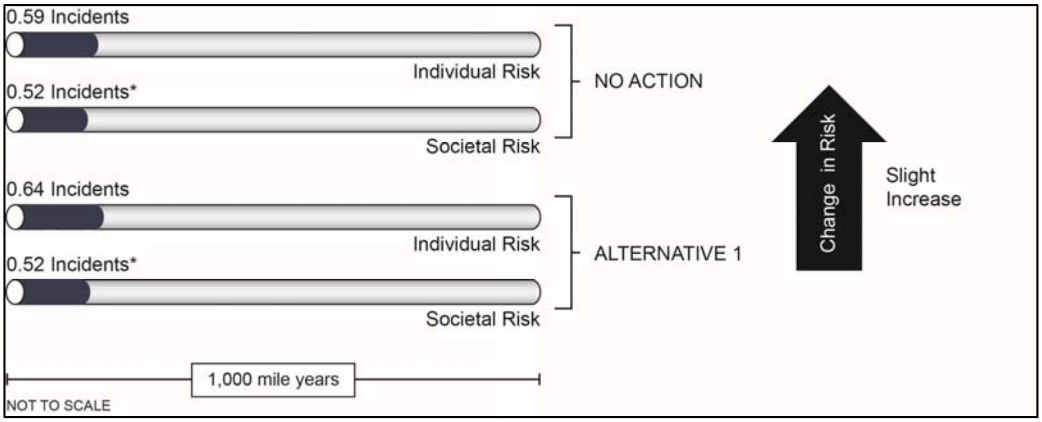
For the purposes of Figure 3.9-11, the predicted changes in frequency are based on qualitative considerations.



[1.] As described in Section 3.9.5.1, Olympic did not provide information to estimate the coating stress voltage for the existing 115 kV transmission lines, and the arcing distance of the existing 115 kV transmission lines.
[2.] While decrease is likely, the results for individual risk and societal risk presented in Figure 3.9-12 below assumed there would be no change in incident frequency related to fault damage or arc damage. This ensures that the change in risk for Alternative 1 is likely overstated while the existing risk is understated.
Source: EDM Services, 2017.

Figure 3.9-11. Change in Incident Frequency

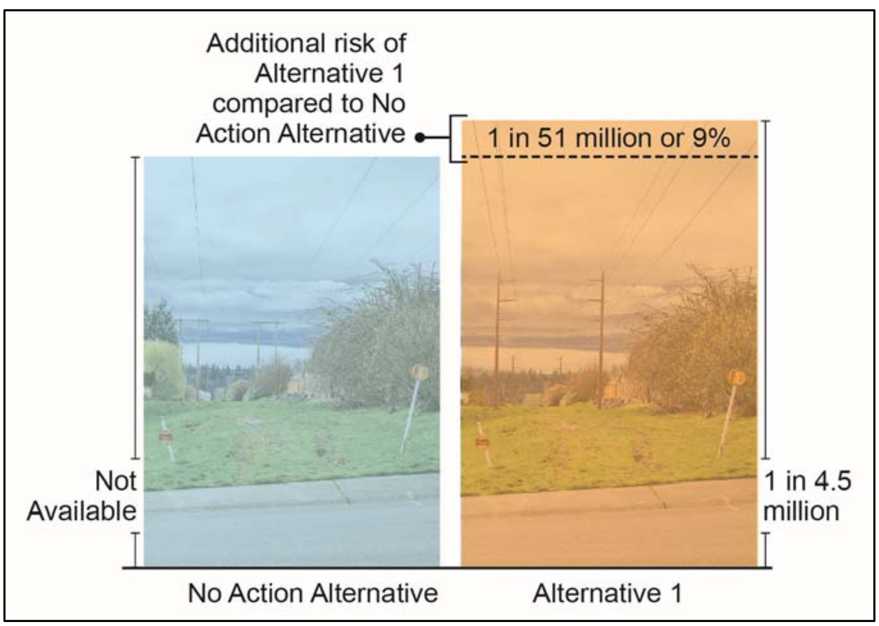
In consideration of the separate incident frequencies for individual risk and societal risk developed for the three conditions noted above, Figure 3.9-12 presents the combined incident frequency for the No Action Alternative and Alternative 1, and the change in incident frequency that could be anticipated.



*Under the No Action Alternative, the incident frequencies for societal risk is in fact 0.5193 per 1,000 mile years and for Alternative 1, the incident frequency for societal risk is 0.5235 per 1,000 miles years. The figure shows rounded values.
Source: EDM Services, 2017.

Figure 3.9-12. Change in Incident Frequency (Combined)

Using the incident frequency results in Figure 3.9-12, the individual risk results for Alternative 1 are presented in Figure 3.9-13.



Source: EDM Services, 2017.

What is meant by the "increase in risk"?

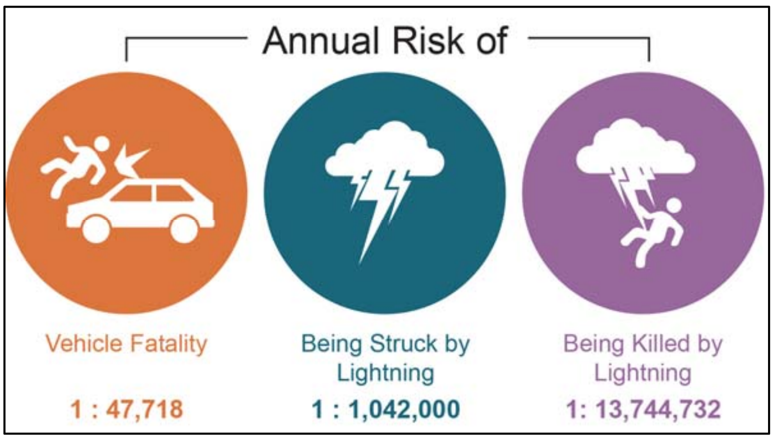
Risk is characterized as a 1 in x chance of a specified event occurring. The "increase in risk" is the chance that the specified event (e.g., an individual fatality from an unintentional release from the pipeline) would occur that would not have occurred if the project had not been built. In this case, there is an estimated 1 in 51 million chance that an individual fatality would occur that would not have occurred if the project was not built.

Figure 3.9-13. Alternative 1 Individual Risk (of Fatality) Results

The annual individual risk of fatality for operation of the 230 kV lines within the corridor is 1 in 4.5 million (Figure 3.9-13). In other words, it is estimated that there could be a 1 in 4.5 million likelihood that an individual at a specific location would be fatally injured over a 1-year period.

These results are below the common threshold of 1 in 1.0 million used by Santa Barbara County, the California Department of Education, and other jurisdictions in determining unacceptable and acceptable risk. Based on the results of the risk assessment, the individual risk for the proposed 230 kV lines would incrementally increase over that posed by the existing 115 kV lines (No Action). This maximum estimated increase in risk is slight, approximately 1 in 51 million. In other words, the assessment estimates that there would be an approximately 9 percent[3] increase in individual risk during operation of Alternative 1 before any mitigation is applied. Because the risk level is already very low, this 9 percent increase is not considered substantial.

To put individual annual risk results in context, the following are annual risks for a relatively common type of incident (vehicle fatality) and a relatively uncommon type of incident (being struck or being killed by lightning), as illustrated in Figure 3.9-14.

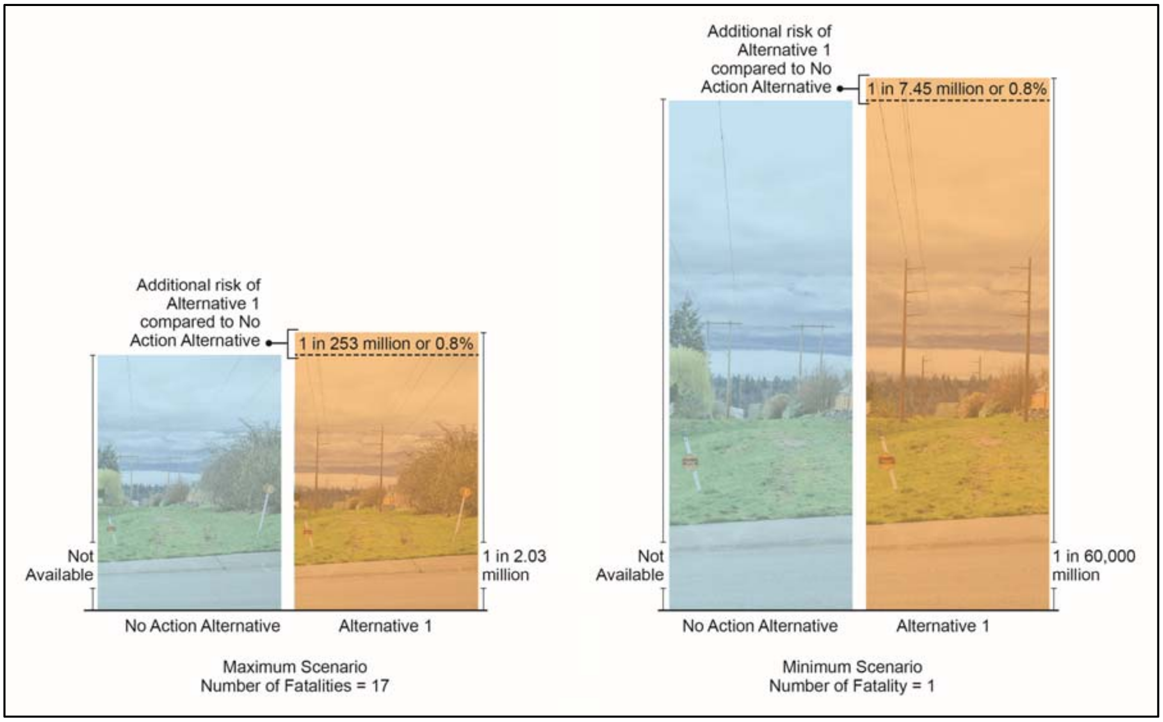


Source: Insurance Information Institute, 2013; National Weather Service, 2017.

Figure 3.9-14. Annual Risk of Other Incidents, for Comparison

The assessment also considered the broader societal risk, or risk to groups of people, which takes into account the number of individuals who may be present near the project corridor at any given time and the duration of their presence. Societal risk takes into account multiple release scenarios. The societal risk results for any 1-mile segment are presented below in Figure 3.9-15 for the maximum and minimum fatalities under the possible release scenarios, which are further described in *Pipeline Safety Technical Report* (EDM Services, 2017). While it is possible that a more severe event could occur, the maximum number of fatalities, 17, is the most severe event estimated by the model based on the data assumptions and event scenarios, and represents a worst-case scenario for purposes of this EIS.

[3] Calculated as: 1 in 51 million / 1 in 4.5 million = 9 percent.



Source: EDM Services, 2017.

Figure 3.9-15. Alternative 1 Societal Risk Results

In other words, there is a one in 2 million probability of an event resulting in 17 fatalities occurring in any 1-year time period, and a one in 60,000 probability of an even resulting in a single fatality occurring in any 1-year period. These results are above the thresholds for negligible impacts, and below the thresholds for intolerable impacts as used by Santa Barbara County and the California Department of Education for school siting purposes.

Based on the results of the assessment, the increased societal risk of the proposed 230 kV lines over that posed by the existing 115 kV lines (No Action) is 1 in 253 million (for a scenario resulting in 17 fatalities) and 1 in 7.45 million (for a scenario resulting in one fatality). In other words, the assessment estimates that there would be a 0.8 percent increase in societal risk during operation of Alternative 1. Because the risk level is already very low, this 0.8 percent increase is not considered substantial.

3.9.5.3 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 corridor are associated with refined petroleum products that are currently transported in the Olympic Pipelines where they are within PSE's existing transmission line corridor. 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 or flash fire. These existing risks are described at a general level in the Phase 1 Draft EIS, Chapter 8. Safety risks related to outside force/excavation are addressed in Chapter 4 of this Phase 2 Draft EIS.

As described above, 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 in Section 3.9.3.3. The estimated incident frequencies (or estimated incidents per 1,000 mile years) for individuals (individual risk) and groups of people (societal risk) are presented above in Section 3.9.5.3.

External Corrosion. 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. (As described above, AC current density levels less than 20 amps per square meter do not cause AC-induced corrosion.) The current densities in these areas are estimated to range from 22 to 35 amps per square meter. The incident frequencies presented above were developed using worst-case assumptions about length of pipeline affected and the duration of peak winter voltages.

Fault Damage. Because no data were available from Olympic to estimate the coating stress voltages on the existing Olympic Pipelines within the existing 115 kV corridor, the existing pipelines were assumed to have the same coating stress voltages and potential for coating stress-caused pipeline releases as for Alternative 1. See Section 3.9.5.2 (Alternative 1) below for information on fault damage. Using this assumption in the risk assessment calculation likely overstates the overall change in risk associated with Alternative 1 because the proposed design for Alternative 1 would include a shield wire, while the existing system does not.

Arcing Damage. Because no data were available from Olympic to estimate the arc distances for the existing Olympic Pipelines 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 Alternative 1. See Section 3.9.5.2 (Alternative 1) below for information on arcing damage. Using this assumption in the risk assessment calculation likely overstates the overall change in risk associated with Alternative 1 because the proposed design for Alternative 1 incudes a shield wire, the potential arcing distance is known, and most poles would be placed at sufficient distance to avoid arcing damage to the pipeline. 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 pipeline.

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 pipeline related to coating stress and arc distances, as described in Section 3.9.5. 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 the *Pipeline Safety Technical Report* (EDM Services, 2017).

No Action Alternative Impacts Conclusion

Based on the limited pipeline data available to the EIS team, it is not possible to calculate exact risks along the existing corridor. Using low estimates of existing risk (to present a worst-case change in risk associated with Alternative 1), 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 Pipelines within the existing 115 kV corridor, the existing pipelines were assumed to have the same risk as for Alternative 1. Even with these low estimates of existing risk, the likelihood of a pipeline rupture and fire would remain low. Under the No Action Alternative, PSE would continue to operate their existing 115 kV transmission lines as described in Chapter 2. 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.

3.9.5.4 Alternative 1: New Substation and 230 kV Transmission Lines

This section describes the potential pipeline safety risks under Alternative 1, focusing on how these risks would change compared to the No Action Alternative.

As described above, the 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 Alternative 1 are expected to be the same as the No Action Alternative, no change in risk related to ongoing maintenance activities is anticipated.

In the case of 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 the other two cases examined, the risk assessment estimated that, without consideration of potential mitigation measures, there could be an increase in potential risk of damage to the pipeline. These include external corrosion (related to AC current density) and arcing damage (related to arc distances). As described in Section 3.9.6.4, the risk assessment was limited by the lack of available data on the existing (No Action) condition related to coating stress and arc distances. 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 Alternative 1. Using these assumptions likely understates the existing risk (No Action), thereby overstating the actual difference in risk between the No Action Alternative and Alternative 1.

***External Corrosion*.** There are two areas along the corridor where the estimated AC current density would exceed 20 amps per square meter under peak winter loads. The estimated AC current densities at these locations range from 25 to 70 amps per square meter. This current density is higher than that presented in Section 3.9.5.3 for the existing 115 kV corridor (No Action Alternative).

The incident frequencies presented above were developed using worst-case assumptions about length of pipeline affected and the duration of peak winter voltages. These estimates do not reflect the implementation of testing and monitoring once the lines are energized, or measures that may be taken to mitigate potential AC current density levels based on the results of the monitoring (see Section 3.9.7, *Mitigation Measures*).

As described in Chapter 2, the plan for the Energize Eastside project is to first operate one circuit at 230 kV and the other would remain at 115 kV, then eventually operate both circuits at 230 kV. The imbalance of having two different voltages can have an impact on the overall AC interference on the adjacent pipelines and was a factor in the external corrosion results for Alternative 1. While the total magnitude of current for the 115 kV/230 kV transmission lines is less than both circuits operating at 230 kV, the electrical current imbalance between the two circuits can result in overall higher levels of interference on nearby pipelines.

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.

***Fault Damage*.** PSE plans to use a shield wire on the new transmission lines (see also Section 3.9.7, *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, Alternative 1 would likely improve conditions related to fault conditions because the shield wire would reduce the risk of fault damage to the pipeline (Fieltsch and Winget, 2014).

Arcing Damage. With a shield wire, the distance an arc can travel from a line fault (arc distance) is estimated to range from 4 to 13 feet under Alternative 1. This would pose a potential risk for pipeline damage at transmission pole locations where the electrical grounding rod might be less than 13 feet from the pipeline. This risk is not posed along the entire length of the corridor; the only affected segments of the pipeline would be those portions of the pipeline located within the arc distance of the grounding rod (4 to 13 feet). Based on worst-case estimates of average pole spacing and pipeline configuration at the grounding rods, 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]).

The results presented above in Section 3.9.5.3 do not reflect the implementation of measures to mitigate potential arc damage to the pipeline. These measures include the installation of arc shielding protection, such as buried zinc ribbons (see Section 3.9.7, *Mitigation Measures*).

***Extreme Weather Events and Seismic Hazards*.** If the overhead transmission lines were damaged during an extreme weather event or natural disaster, there could be risks to public safety if the poles fall and damage the buried pipelines. Safety measures would be incorporated into the project design to address the extreme weather and seismic conditions that occur in western Washington. The final structural design would comply with NESC 2012 as adopted by the UTC, which also includes seismic standards. PSE would incorporate NESC design cases, Rules 250B for combined ice with wind, 250C for extreme wind, and 250D for extreme ice with wind into their design of the overhead transmission lines. Construction of the overhead transmission lines would satisfy all NESC design cases related to extreme wind and temperature conditions. Rule 250C considers wind velocities of 85 mph. For the transmission lines, NESC 2012 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 (ASCE, 2013), "*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*." Nonetheless, load comparisons would be performed between a seismic event and extreme weather conditions to ensure that the appropriate structural design would be able to withstand either of these conditions.

Alternative 1 Impacts Conclusion

Based on the results of the risk assessment, the probability of a pipeline release and fire occurring and resulting in fatalities remains low under Alternative 1. However, the potential public safety impacts could be significant if this unlikely event were to occur.

Under Alternative 1, the probability of a pipeline incident 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. In areas where AC current density could be a concern, testing and monitoring would be conducted and mitigation measures (e.g., grounding mats) installed to reduce AC currents to acceptable levels. In areas where the pipelines would be within 13 feet of transmission line pole grounds, additional engineering analysis would be conducted and mitigation measures implemented to reduce fault risks (e.g., arc shielding protection). See Section 3.9.7, *Mitigation Measures* for measures that would lower the risks.

The individual and societal risks described above would be similar across all Alternative 1 segments and options. However, the risk would be reduced in segments and options with fewer miles of the transmission line co-located with the Olympic Pipelines. Bypass Option 2 has the lowest number of co-located miles in the Bellevue Central Segment, and the Willow 1 Option has the lowest number of co-located miles in the Bellevue South Segment. Table 3.9-5 lists the length of the Olympic Pipelines (both the 20-inch and 16-inch diameter pipelines) co-located with the transmission lines in the segment options.

Table 3.9-5. Miles of Transmission Line and Olympic Pipeline Co-location in Study Area with Alternative 1, by Segment Option

Location/Segment	Miles of Co-location		Highest and Lowest Number of Co-Located Miles
	20-inch diameter	16-inch diameter	
Bellevue Central Segment			
Existing Corridor Option	2.9	2.9	Highest number of co-located miles in segment
Bypass Option 1	0.91	0.91	
Bypass Option 2	0.60	0.60	Lowest number of co-located miles in segment
Bellevue South Segment			
Oak 1 Option	3.2	3.3	
Oak 2 Option	5.3	3.3	Highest number of co-located miles in segment
Willow 1 Option	1.2	3.3	Lowest number of co-located miles in segment
Willow 2 Option	2.1	3.3	

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 Alternative 1. Using these assumptions likely understates the existing risk (No Action), thereby overstating the actual difference in risk between the No Action Alternative and Alternative 1. Even with these assumptions, the likelihood of a pipeline rupture and fire would remain low, and no substantial change in risk has been identified. As a result, the potential risk is not considered significant. With implementation of the mitigation described in Section 3.9.7, conditions related to potential for fault damage due to coating stress and arc distances would likely improve under Alternative 1 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).

3.9.6 Long-term Impacts on Resources

Implementation of the regulatory requirements identified in Section 3.9.1, *Relevant Plans, Policies, and Regulations*, and the mitigation measures described for pipeline safety in Sections 3.9.7 and 4.9.4, will reduce the chances of a pipeline incident occurring. However, some level of risk would remain, and it is possible that petroleum products transported through the Olympic Pipelines could still enter the environment, or a fire could occur, as a result of proximity to the transmission line under the No Action Alternative or Alternative 1.

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 and option 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 does not affect pipeline pressure and flow rates, or other operating parameters of the pipeline, the potential characteristics of a spill or fire would be the same regardless if it occurred under the No Action Alternative or Alternative 1.

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 and can be difficult to contain and remove. The Olympic Pipelines carry diesel, jet fuel, and gasoline, which are very light or light oils. These types of oils evaporate within a few days, with the light oils leaving a residue. Very light and light oils can have localized and significant impacts; however, they tend not to persist long-term in the environment, lasting up to a few weeks (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 3.9.5, *Risks from Operation*, and Section 4.9.1, *Risks from 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 3.9-7 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.

Land Use and Housing

A release of material from the Olympic Pipelines 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. 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.

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.

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 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. 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.

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 were to enter 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 3.4, *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 were to occur 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 were to enter a watercourse.

If a fire were to occur 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 were to leave the area 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 to 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.

Economics (Ecosystem Services)

If a spill or a fire were to damage 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 discussed in Section 3.9.6 could be significant if a pipeline incident were to occur. However, the likelihood of a pipeline rupture and release remains low under Alternative 1, and implementation of regulatory requirements (Section 3.9.1) and mitigation measures (Sections 3.9.7 and 4.9.4) would further reduce the probability of a pipeline incident occurring.

3.9.7 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 Chapter 4, Section 4.9.4 for mitigation measures that would be used 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 inference from the Energize Eastside project. The design features and BMPs that PSE proposes to use to avoid or minimize impacts during operation and those required by agency standards are assumed to be part of the project and have been considered in assessing the environmental impacts to environmental health and safety.

All 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, some mitigation measures (such as integrating where applicable the results and recommendations of DNV GL's *AC Interference Study* [2016] to the design of pole locations, layout, and configuration) would be incorporated into the project design. Other mitigation measures necessarily would need to be identified and implemented after the project is energized or during peak winter load conditions in order to ensure that mitigation measures are appropriate based on measured field conditions.

Mitigation 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. Olympic, as pipeline operator, is responsible for operating and maintaining their 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 their 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.

3.9.7.1 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 Pipelines. 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) 2012, 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 Pipelines, 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 plans to integrate, where applicable, the results and recommendations 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 (Strauch, pers. comm., 2017).

Olympic Responsiblities and Requirements

As the pipeline operator, Olympic is responsible for operating and maintaining their 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 their pipeline in compliance with federal safety requirements, measures to be used will be determined by Olympic in coordination with PSE and based on their 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 they will identify specific measures, or a suite of measures, following their detailed engineering analysis of the final

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design and based on site-specific conditions and field measurements conducted at project start-up and during peak loading scenarios.

3.9.7.2 Potential Mitigation Measures

Potential mitigation measures are summarized below based on results and recommendations of DNV GL's AC Interference Study (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

- 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.
- Apply the results and recommendations of the *AC Interference Study* (DNV GL, 2016) to the design of pole locations, layout, and configuration.
- Optimize conductor geometry, where a true delta configuration provides the greatest level of field cancellation.
- During project design, field verify the distances between the pipelines and transmission line poles grounding rods.
- Perform an AC interference study incorporating the final powerline route, configuration, and operating parameters.
- 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 collocation, including both inductive and resistive coupling.
- Fully assess the safety and AC corrosion risks under steady state operating conditions on the powerline.
- Design AC mitigation (as required) to ensure that all safety and integrity risks have been fully mitigated along the collocated pipelines.
- Design monitoring systems to monitor the AC corrosion risks along the pipelines.
- Reassess the safe separation distance to minimize arcing risk based on NACE SP0177 and considering the findings in CEA 239T817.
- Ensure that the separation distance between the pipelines and the powerline structures exceeds the safe distance required to avoid electrical arcing.
- In areas where the pipeline is within 13 feet of transmission line pole grounding rods, incorporate mitigation measures into the project design to prevent ground fault arcing to the pipelines (see Section 3.9.5.5 for information on arcing distances). Recommended measures

to incorporate into the project design include installing arc shielding protection, consisting of a single zinc ribbon extending a minimum of 25 feet past the transmission line pole grounding rods in both directions. The zinc ribbon should be designed so that it is connected to the pipeline through a single direct-current decoupler.

- File a mitigation and monitoring report with the Partner Cities documenting all consultations with Olympic and mitigation measures to address safety-related issues. The report should include a plan that identifies the process for identifying mitigation measures following project start-up, and proposed monitoring to ensure that mitigation related to operational issues is followed.

At Project Start-up

- Install and commission the AC mitigation and monitoring systems prior to energization of the 230 kV powerline.
- Install Optical Ground Wire (OPGW) shield wire on the transmission line poles.
- After energization, perform a site survey to ensure that all AC interference risks have been fully mitigated under stead-state operation of the powerline.
- Work with Olympic to evaluate and implement appropriate mitigation measures to reduce electrical interference on the Olympic Pipelines to safe levels. After the system is energized, Olympic has informed PSE that they will conduct an engineering/mitigation analysis based on the field data collected to assess the necessity for the installation of AC grounding, or similar systems along the pipelines. AC grounding systems are commonly installed in connection with power transmission poles to dissipate any energy to ground.
- Install additional grounding based on the results of the detailed engineering/mitigation analysis conducted by Olympic. Final mitigation measures and design would be based on field data collected after the system is energized. Mitigation 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.

During Operation

- Operate both circuits at 230 kV to address the AC current load imbalance between the two circuits (see Section 3.9.5.5 for information on AC current load imbalance). Although the other proposed measures listed in this section are anticipated to fully address potential external corrosion issues related to the current imbalance, this measure is recommended, where feasible, to reduce or eliminate the potential for electrical interference with the pipeline.

- Inform Olympic when the electrical system is operating at, or near, winter peak loading so that Olympic can conduct testing to ensure that AC current densities do not exceed 20 amps per square meter in areas where AC current density has been predicted by the *AC Interference Study* (DNV GL, 2016) to exceed 20 amps per square meter. PSE would inform the Partner Cities upon completion of Olympic monitoring and/or mitigation.
- Inform Olympic when loading scenarios are expected to be at their greatest to ensure that Olympic conducts field monitoring and/or mitigation for AC potential greater than 15 volts and AC current density greater than 20 amps per square meter throughout the project

corridor. PSE would inform the Partner Cities upon completion of Olympic monitoring and/or mitigation.

- 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.
- Notify Olympic when there are planned outages 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.

3.10 ECONOMICS

This section provides a project-level analysis of potential impacts to economics.

The analysis addresses 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.

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 analyses 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. The analysis of the costs of under-grounding was developed because it was recognized in Phase 1 that the cost of undergrounding the entire line might be prohibitively high, but that undergrounding might be viable as mitigation in some areas. The analysis is intended to assist decision makers considering whether to require undergrounding as a mitigation measure to offset environmental impacts.

Study areas vary for these three topics. The Newcastle analysis focuses on the city limits of Newcastle. The analysis of costs of undergrounding does not focus on a specific geography because it is not known where specifically this might be applied as mitigation, or what area would be involved in paying for mitigation. The City of Newcastle was selected for the worst-case scenario because it has the smallest population (and therefore fewest property taxpayers and/or rate payers) of the Partner Cities. The assessment of ecosystem services includes the study area used by The Watershed Company (2016a) to survey existing trees in the existing and new transmission line corridors.

Methods for Studying the Affected Environment

The major revenue sources for the Partner Cities were identified based on budget information provided by the City Clerk's offices. Assessed value of property was compiled from Comprehensive Annual Financial Reports, City Budgets, State Audit Reports.

The cost of undergrounding a transmission line was based on generic construction and operation estimates provided by PSE. Cost of financing was estimated assuming that public bonds would be issued to pay the costs.

For the ecosystem services analysis, trees within each segment or option of the study area were inventoried by The Watershed Company between March 2015 and July 2016 (The Watershed Company, 2016b). Data collected during the inventory 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/option using United States Forest Service (USFS) i-Tree Eco software (USFS, 2016), a peer-reviewed software program that provides urban and rural forestry analysis and benefits assessment tools.

Ecosystem services are the benefits that the ecosystem provides to humankind. In some cases, these services can be assigned an economic value.

3.10.1 Major Revenue Sources for the City of Newcastle

The EIS Consultant Team performed an analysis of the revenue sources including property tax revenues for the City of Bellevue, the largest of the Partner Cities, as a part of the Phase 1 Draft EIS analysis. This analysis was included because studies have shown that the presence of a transmission line can adversely affect the value of properties adjacent to the transmission line. The land use and housing analysis in the Phase 1 Draft EIS addresses this issue in greater detail.

> Property taxes are **ad valorem taxes,** that is, taxes levied based on the determined value of the item being taxed.
>
> The **assessed value** of the property is used to compute a tax annually levied on the property owner by a municipality or other government entity.
>
> The **total assessed value** of a municipality is the sum of all property values in that jurisdiction.

In general, studies have found that the effects on property values are highest for properties nearest the lines, and tend to diminish over time after the project is constructed. A study published in 2016 found similar results except that it found the effects to vary over time (rather than steadily diminishing) and to be more pronounced for some facilities. The results over the entire 2001–2014 sample period indicate both practically and statistically significant effects from 138 kV and 69 kV lines but no negative effects from 345 kV lines. In fact, a slight positive effect was noted for properties within 50 meters of 345 kV lines (Tatos et al., 2016). For the Energize Eastside project, which would replace 115 kV lines with higher voltage 230 kV lines over the majority of the segments and options, including the Newcastle Segment, the findings of this recent study generally reinforce the conclusion of the Phase 1 Draft EIS that a small, negative effect is expected from the presence of transmission lines, but does not suggest that the replacement of lower voltage with higher voltage lines would result in a greater negative effect than the existing lines have at present.

The analysis conducted for Phase 2 includes an analysis of revenue sources including property taxes for the City of Newcastle, the smallest of the Partner Cities jurisdictions in both population and property tax base (FCS Group, 2016). Table 3.10-1 shows the total assessed value (AV) of real estate in each of the Partner Cities, along with the rate of taxation for City Government in each city (mil rate). Among the Partner Cities, the City of Newcastle exhibits the greatest sensitivity to a shift in assessed value and, therefore, is considered a representation of worst-case in terms of susceptibility to economic impacts from changes in AV.

The City of Newcastle relies on various taxes to cover the cost of governing, including public safety, community development, transportation projects and parks. The City of Newcastle's taxes generated $5.7 million in revenues in 2015, which equates to 75 percent of general fund revenues. These tax revenues consist primarily of real and personal property taxes, sales and excise taxes, real estate transfer fees, and state pass-through taxes.

Of the taxes mentioned above, property taxes make up the majority of Newcastle's revenues. Property taxes are a function of ad valorem real and personal property assessments in the City, and current mil rates. A preliminary estimate of 2015 tax rates based on $1.93 billion in assessed real estate values and a 1.98883 tax rate, results in $3.8 million in 2015 annual property tax revenues for the City of Newcastle (see Table 3.10-2). This amount of tax revenue equates to 50.2 percent of the City's general fund revenues.

Table 3.10-1. Existing Assessed Valuation (AV) Conditions

Jurisdiction	2015 AV	City Government Mil Rate $ Per $1,000 AV (2015)
Bellevue	$40,703,000,000[1]	0.98085
Kirkland	$20,253,626,993	1.50229
Newcastle	$1,933,663,273	1.98883
Redmond	$15,887,420,578	1.48849
Renton	$12,936,757,619	2.83283

[1] Estimated value at the time of report. Certified Assessed Value for Bellevue in 2016 was $41,314,916,618, approximately 1.5% higher than estimated.
Source: City 2015 Comprehensive Annual Financial Reports, City Budgets, State Audit Reports; Compiled by FCS Group (2016).

Table 3.10-2. Newcastle Property Tax Rates (2015)

Tax Recipient	Mil Rate	Annual Revenue (est.)
City of Newcastle	1.98883	$3,845,728
King County	1.34522	$2,601,203
School District	4.59301	$8,881,335
Library	0.50276	$972,169
EMS	0.30217	$584,295
Flood	0.13860	$268,006
State School Fund	2.28514	$4,418,691
Port of Seattle	0.18885	$365,172
Total Property Tax Rate	**11.34458**	**$21,936,598**

Source: King County Assessor; Compiled by FCS Group (2016).

3.10.2 Cost of Undergrounding a Transmission Line

PSE estimates that the cost differential between overhead transmission lines and undergrounding transmission lines is between $16 and $25 million/mile (PSE, 2016). While the cost of the new transmission line would be paid for by all of PSE's customers, PSE has stated that its position is that any cities and/or property owners requesting underground alignments would be required to pay for undergrounding the lines. PSE's position is based on their utility rate tariff rule, which they have interpreted to require the parties requesting the undergrounding, or the "requesting party," to pay for the marginal or additional cost above what it would have cost for overhead lines (PSE, 2016).

3.10.3 Tree Cover Along Transmission Line Corridor

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).

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 9,400 trees were inventoried in the study area in 2015 and 2016 and used in the i-Tree model (The Watershed Company, 2016b). 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 nearly $19 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 $18.6 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, 2016; i-Tree, 2016):

- 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 $37,850. 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 highest number of tree loss would occur in the Bellevue Central Segment, which includes three route options. The fixed values and services value/year is also the highest for the Bellevue Central Segment. The Bellevue Central Segment has 38 percent of all of the trees surveyed, but due to the make-up of tree species, the route has nearly 50 percent of the carbon storage value and 44 percent of the structural value. A summary of the current ecological value of the trees within each segment and option is provided in Table 3.10-3.

3.10.4 Long-term Impacts from Operation of the Project

The methods for analyzing property tax impacts, the cost of undergrounding, and ecosystem services are as follows:

- **Property Tax:** The EIS Consultant Team evaluated the potential impact on the City of Newcastle's total revenue based on a hypothetical $10 million decrease in assessed values on property tax rates and property tax revenues. This hypothetical change in assessed value is not an estimate of the actual reduction in value that Newcastle is expected to experience, but is provided as a generic degree of impact, as described in the Phase 1 Draft EIS (see Section 15.6, *How Could Operation of the Project Affect Public Services?)*.
- **Cost of Undergrounding:** The EIS Consultant Team determined that the cost to a community for undergrounding the 230 kV transmission lines could be paid with a bond by the requesting party, and that the bond could then be paid off by a group of payees over either a 20- or 40-year period. Two scenarios were assumed for the bond's interest rate: current rates typical of bonds issued by the Partner Cities, and one that assumes a 2 percent increase over current rates. The 2 percent increase was included to account for possible market fluctuations or other factors that could affect the actual rates paid. The group of payees was assumed to include the following sizes: 100 payees, 10,000 payees, and 100,000 payees. The impact on the City of Newcastle's total revenue and the cost to a community for undergrounding the transmission line were based on a report prepared by FCS Group, an economic firm that is part of the EIS Consultant Team.
- **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.

Methods for Analyzing Long-term Impacts

The EIS Consultant Team evaluated impacts to property tax, cost of undergrounding, and ecosystem services. The City of Newcastle was determined to be the most sensitive to potential changes to property tax revenues.

Table 3.10-3. Current Ecological Value of Trees 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	7.8	429	148	19,596	1,088,805	**$1,108,401**	4.0	522	10,607	709	0.08	531	**$1,762**
Redmond	45.3	776	142	18,780	1,587,880	**$1,606,660**	4.7	623	21,791	1,457	0.14	1,372	**$3,452**
Bellevue North	59.6	733	63	8,363	824,729	**$833,092**	2.7	355	10,386	695	0.07	654	**$1,704**
Bellevue Central (including all options)	94.3	3,759	1,010	134,336	8,440,413	**$8,574,749**	30.8	4,090	96,933	6,480	0.63	6,100	**$16,670**
Bellevue South (including all options)	159.1	3,287	582	77,308	5,722,189	**$5,799,497**	19.0	2,523	72,811	4,868	0.47	4,582	**$11,973**
Newcastle	48.7	370	28	3,727	308,160	**$311,887**	1.5	188	4,399	295	0.03	277	**$760**
Renton	110.8	499	68	8,949	709,364	**$718,313**	2.8	364	9,030	604	0.06	569	**$1,537**
Total	**525.6**	**9,852**	**2,041**	**271,059**	**18,681,540**	**$18,952,599**	**65.5**	**8,665**	**225,957**	**15,108**	**1.48**	**14,085**	**$37,858**

The magnitude of the operation-related economic impacts evaluated was classified as being either less-than-significant or significant as follows:

Less-than-Significant – The hypothetical property tax revenue impacts would be considered less-than-significant if the City of Newcastle could maintain their current level of service for police, fire, and government services without additional revenue, or a minor change in the mil rate.

Significant – The hypothetical property tax revenue impacts would be considered significant if the City of Newcastle would not be able to maintain their current level of service for police, fire, and government services without a major change in the mil rate for all taxpayers or other additional revenue.

No threshold of significance was set for the costs of undergrounding a portion of the transmission line, or for the cost of ecosystem services. Undergrounding the transmission line is a proposed mitigation measure that could be applied by decision makers anywhere along the corridor, and the exact group of payees that might be selected is unknown. Decision makers would need to consider the economic status of any payees selected to pay for this type of mitigation, recognizing that for lower income households, even a relatively small monthly cost could be significant, while for higher income households, the same cost would not be significant. With regard to ecosystem services, 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.

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). To present the information as one system of trees throughout the entire corridor (existing and new), a total of 12 project scenario combinations were identified. All of the project scenario combinations include Richards Creek substation and the same alignment for the Redmond, Bellevue North, Newcastle, and Renton Segments. The Bellevue Central Segment has three option alignments, and the Bellevue South Segment has four option alignments, yielding a total of 12 project scenario combinations:

1. Existing Corridor Option + Willow 1 Option
2. Existing Corridor Option + Willow 2 Option
3. Existing Corridor Option + Oak 1 Option
4. Existing Corridor Option + Oak 2 Option
5. Bypass Option 1 + Willow 1 Option
6. Bypass Option 1 + Willow 2 Option
7. Bypass Option 1 + Oak 1 Option
8. Bypass Option 1 + Oak 2 Option
9. Bypass Option 2 + Willow 1 Option
10. Bypass Option 2 + Willow 2 Option
11. Bypass Option 2 + Oak 1 Option
12. Bypass Option 2 + Oak 2 Option

3.10.4.1 Potential Loss of Property Tax Revenue for the City of Newcastle

If Energize Eastside project construction results in a decrease in the amount of AV in the city, the City would either collect less local property tax revenue or would need to make a corresponding change to the city mil rate to maintain existing revenue levels. For this analysis, it was assumed that, if the project did result in a decrease in AV, existing revenue levels would be maintained and the mil rate would be increased.

As described in the Phase 1 Draft EIS (Chapter 10), transmission lines have been shown to adversely affect property values. The degree of effect varies widely, and in some cases the effects diminish with time (Mullins et al., 2003). As a result, the amount of any shift in value due to the project is difficult to predict. To understand the possible effect this could have on property taxes, the EIS Consultant Team evaluated the effect of a $10 million shift in assessed value. The choice of this level of change was selected for sensitivity analysis only, and does not represent an estimate of the effects that are expected to occur in Newcastle or any other affected city. It is an arbitrary round number that allows an understanding of how a shift of this magnitude might affect taxes in a jurisdiction. As an example, in Newcastle, there are 86 adjacent single-family residences along the existing corridor. For a cumulative decline of $10 million in AV affecting these homes, property values would have to decline an average of approximately $116,000 per residence.

To determine the potential impact a $10 million shift in AV would have on each city, the EIS Consultant Team examined property tax incomes gained or lost in comparison with each of the Partner Cities' general fund. Of the five cities analyzed, Newcastle is the most sensitive to a potential shift in assessed valuation, with a $10 million shift in AV representing 0.26 percent of the general fund. The other four cities are fairly equal in their relative sensitivity to shifting AV with the same shift representing between 0.01 percent and 0.03 percent of the general fund budget.

The implications of shifting assessed valuation are complex and would not necessarily result in a direct change in property tax incomes for a jurisdiction. Building the Energize Eastside overhead transmission line could lead to at least three outcomes: (1) a decrease in AV due to reduced property value, such as from the lines obstructing views, which could consequently result in an increase in local mil rates; (2) an increase in AV if views are improved in some locations due to higher lines, which could consequently result in an increase in local property tax revenues (or a decrease in the mil rate); and (3) an increase in utility asset AV due to investment in transmission and capacity, which may or may not result in an increase in local property tax revenues. This analysis focuses on decreases in AV, while recognizing that other increases would also occur.

Property taxes are levied by action of a city council, up to a statutory maximum rate and subject to a 101 percent lid on property tax increases (not counting new construction, improvements to property, state assessed utility value increases, and wind turbines, solar, biomass, and geothermal facilities). By November 30 of each year, the amount of taxes to be levied by taxing districts are certified by the county assessor who computes the levy rate necessary to raise that amount of revenue required and calculates the levy mil rate necessary by dividing the total levy amount by the assessed value of taxable property in the district[1]. The implications of a $10 million decrease

[1] See "Property Tax Within Washington State" http://mrsc.org/Home/Explore-Topics/Finance/Revenues/The-Property-Tax-in-Washington-State.aspx). Referendum 747, approved by voters limits property tax increases to 1% in taxing districts of less than 10,000 people, and the lesser of 1% or the rate of inflation, in other taxing districts. The voters of any taxing district, excluding the state, may approve an increase of greater than 1% using a levy lid lift.

in AV in each of the Partner Cities are displayed in Table 3.10-4. This table uses the 2014 median home value because it was the latest available from the U.S. Census.

Table 3.10-4. City Property Tax Implications if Assessed Value Decreases by $10 Million

Jurisdiction	2014 Median Home Value	2015 City Mil Rate	Annual Property Tax Paid by Home of Median Value (city levy)	Resulting Mil Rate if AV Decreased by $10 Million	Resulting Increase in Tax Bill for Median Home
Bellevue	$538,300	0.98085	$528	0.98109	$0.13
Kirkland	$424,700	1.50229	$638	1.50303	$0.32
Newcastle	$509,300	1.98883	$1,013	1.99917	$5.27
Redmond	$462,200	1.48849	$688	1.48943	$0.43
Renton	$282,400	2.83283	$800	2.83502	$0.62

Source: City 2015 Comprehensive Annual Financial Reports, City Budgets, Sate Audit Reports, 2010-2014 U.S. Census American Community Survey; Compiled by FCS Group (2016).

A $10 million decrease in AV in Newcastle could result in a mil rate increase and corresponding tax expenditure increase for the average (median) Newcastle homeowner of approximately $5.27 annually. For context, Newcastle has a median household income of approximately $110,000 (U.S. Census, 2016), so this represents a very small fraction of median household income. If the City Council did not want the mil rate to increase, the City would need to reduce its budget (for items covered by property tax) by approximately $20,000. Based on this analysis, a project with a $10 million AV decrease is likely to have a less-than-significant impact on property tax revenues for the City of Newcastle, and would not affect the ability of the City to provide services.

Other potential fiscal impacts of the Energize Eastside project on Newcastle that have not been quantified could include changes in AV of the PSE utility line, real estate transfer tax revenues, and other miscellaneous fees and development charges that would add to City tax collections.

3.10.4.2 Potential Cost to the Community for Undergrounding Transmission Line

The sensitivity analysis of the distribution of increased marginal costs illustrates the potential financial costs for those customers that make up the "requesting party" for undergrounding 1 mile of transmission line. The concept behind using the 1-mile increment is that it could be used to calculate the approximate cost that would be applied for any given portion of the transmission line by multiplying the costs shown in this analysis by the length of the proposed underground segment.

Because costs must be paid up front by a requesting party, it is assumed that a bond would be used to pay the costs, and that the bond would then be paid off by a group of payees over a period of time. PSE typically amortizes its costs for this type of capital improvements over a 40-year period, but a requesting party might choose a shorter timeframe.

The analysis looks at the lower end of the cost range and the higher end in order to show the potential range of costs. The lower end of the cost range is for construction in an existing corridor, while the higher range is more typical of costs for construction in a street right-of-way. Due to the presence of the Olympic Pipeline, there could be construction constraints that would not allow for the transmission line to be built in the existing corridor.

Table 3.10-5 summarizes the monthly customer costs associated with the per mile costs of undergrounding; it includes the $16 million/mile scenario and a 20-year and 40-year amortization schedule (bond term), along with a range in the number of payees, while Table 3.10-6 includes the $25 million/mile scenario.

Table 3.10-5. Sensitivity Analysis: $16 million in "Undergrounding Costs" (Average monthly cost per payee)

# of payees	20-Year Financing		40-Year Financing	
	"A" Rated Bond*	"A" Rated Bond (plus 2%)**	"A" Rated Bond*	"A" Rated Bond (plus 2%)**
100 payees	$896	$1,073	$601	$810
1,000 payees	$90	$107	$60	$81
10,000 payees	$9	$11	$6	$8
100,000 payees	$0.90	$1.07	$0.60	$0.81

* Assumes "A" rated municipal bond rates = 2.47% yield for 20-year bond, and 2.95% for 40-year bond; and 5% collection charge.

** Assumes "A" rated municipal bond rates (see above) plus 2% (200 basis points); and 5% collection charge.

Source: analysis by FCS GROUP using trade weighted curve bond yields as of 8/30/2016; costs are in 2016 dollars.

Table 3.10-6. Sensitivity Analysis: $25 million in "Undergrounding Costs" (Average monthly cost per payee)

# of payees	20-Year Financing		40-Year Financing	
	"A" Rated Bond*	"A" Rated Bond (plus 2%)**	"A" Rated Bond*	"A" Rated Bond (plus 2%)**
100 payees	$1,399	$1,677	$939	$1,266
1,000 payees	$140	$168	$94	$127
10,000 payees	$14	$17	$9	$13
100,000 payees	$1.40	$1.68	$0.94	$1.27

* assumes "A" rated municipal bond rates = 2.47% yield for 20-year bond, and 2.95% for 40-year bond; and 5% collection charge.

** assumes "A" rated municipal bond rates (see above) plus 2% (200 basis points); and 5% collection charge.

Source: analysis by FCS GROUP using trade weighted curve bond yields as of 8/30/2016; costs are in 2016 dollars.

This analysis of the costs of undergrounding is not intended to indicate what would or would not be a significant impact, as there is no policy basis or context to make that assessment. As is clear from the analysis, the burden on a very small number of payees would be considerable, while the cost for a single mile when shared among 100,000 payees could be on the order of $20 per year or less.

3.10.4.3 Tree Cover Along Transmission Line Corridor

Alternative 1 would require tree removal along the existing corridor and new corridor. 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. The loss of tree cover varies by scenario and is presented in Table 3.10-7. Bypass Option 1 would result in the largest losses in ecosystem services.

- The project corridor would lose 140–800 tons of carbon stored in trees, and a loss of 13–30 tons of carbon sequestered per year (depending on the scenario).
- The project corridor would lose its ability to remove less than 1 ton of air pollutants annually, valued at $4,000 to $7,500 per year (depending on the scenario).
- Without tree canopy to reduce stormwater runoff volume, the municipalities within the study area must manage an additional 55,000–117,000 cubic feet of stormwater per year, valued at $3,900–$7,800 (depending on the scenario).

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 Alternative 1:

- 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 Alternative 1, 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.

Table 3.10-7. Loss of Ecological Value by Scenario

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	
Ex. Corridor – Willow 1	4,016	540	71,391	5,539,226	5,610,617	20.4	2,668	76,390	5,109	0.5	4,904	12,681
Ex. Corridor – Willow 2	4,626	666	88,130	6,803,428	6,891,558	24.6	3,219	93,127	6,228	0.61	5,989	15,436
Ex. Corridor – Oak 1	4,021	633	83,709	6,153,578	6,237,287	22.4	2,936	84,124	5,626	0.55	5,364	13,926
Ex. Corridor – Oak 2	4,588	696	92,182	6,922,824	7,015,006	25	3,277	96,427	6,448	0.63	6,216	15,941
Bypass 1 – Willow 1	5,203	1,037	137,462	9,338,116	9,475,578	33.9	4,463	115,264	7,708	0.77	7,035	19,206
Bypass 1 – Willow 2	5,813	1,162	154,202	10,602,517	10,756,719	38.1	5,014	131,925	8,821	0.87	8,138	21,973
Bypass 1 – Oak 1	5,208	1,129	149,780	9,952,467	10,102,247	35.9	4,731	123,064	8,229	0.82	7,494	20,454
Bypass 1 – Oak 2	5,775	1,193	158,254	10,721,713	10,879,967	38.5	5,072	135,194	9,040	0.89	8,362	22,474
Bypass 2 – Willow 1	4,656	916	121,387	8,462,290	8,583,677	29.8	3,919	103,679	6,933	0.69	6,382	17,234
Bypass 2 - Willow 2	5,266	1,042	138,127	9,726,691	9,864,818	34	4,470	120,356	8,049	0.79	7,485	20,004
Bypass 2 – Oak 1	4,661	1,008	133,705	9,076,641	9,210,346	31.9	4,188	111,433	7,453	0.74	6,839	18,480
Bypass 2 – Oak 2	5,228	1,072	142,179	9,845,887	9,988,066	34.4	4,529	123,634	8,268	0.81	7,708	20,505

3.10.5 Summary

For the scenarios evaluated, impacts to property taxes associated with reduced property values is expected to be a less-than-significant impact.

The cost of undergrounding, using a worst-case scenario, could be a significant impact if a relatively small number of property owners/payees share the cost. The cost would likely be less than significant if a large number of property owners share the cost.

Ecosystem Services are not expected to be significantly impacted by the project, even for the option that results in the highest number of trees being removed.

3.10.6 Mitigation Measures

Mitigation for economic impacts from a project is not required under SEPA; however, potential impacts to City revenues due to decreased assessed value for property could be mitigated by an adjustment to the mil rate for all taxpayers or a reduction in expenditures to match the reduced revenues.

4

Short-term (Construction) Impacts and Potential Mitigation

energize EASTSIDE EIS

CHAPTER 4. SHORT-TERM (CONSTRUCTION) IMPACTS AND POTENTIAL MITIGATION

This chapter describes short-term (construction) impacts that could result from construction of Alternative 1. Under the No Action Alternative, no construction would occur; therefore, the No Action Alternative is not evaluated below. For the purposes of this Phase 2 Draft EIS, impacts associated with routine maintenance of the existing transmission lines (e.g., occasional replacement or repair of poles, wires, and related equipment) are assessed as part of Chapter 3, *Long-Term (Operation) Impacts and Potential Mitigation*.

4.1 LAND USE AND HOUSING

4.1.1 Short-term (Construction) Impacts Considered

The magnitude of 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.

4.1.2 Short-term (Construction) Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

Construction of the project would entail the installation of poles and stringing of conductor wires. According to PSE, pole installation requires 3–7 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. Any nuisance caused by the construction activities of Alternative 1 would be less-than-significant.

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4.2 SCENIC VIEWS AND THE AESTHETIC ENVIRONMENT

4.2.1 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.

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 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 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).

4.2.2 Short-term (Construction) Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

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 this Phase 2 Draft EIS.

4.3 WATER RESOURCES

4.3.1 Short-term (Construction) Impacts Considered

The project has the potential to cause minor 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 determined 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 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 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 Team used the same mapping methods used for long-term (operation) impacts to determine the short-term (construction) impacts. Impacts were also 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.

4.3.2 Short-term (Construction) Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

4.3.2.1 Richards Creek Substation

Construction of the Richard Creek substation facilities would require clearing and grading of approximately 2 acres. Clearing would expose bare soils and stormwater runoff from these areas could cause increased sedimentation and turbidity to Wetland BC and streams 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 Richards Creek substation would not be in a wetland or require wetland fill, but portions of the substation, including the access road, would be in the Wetland BC buffer. Any impacts to the buffer would be mitigated in compliance with City of Bellevue requirements (Bellevue City Code 20.25H). See Section 3.3.5.2 for more discussion of wetland buffer impacts. The access road would cross Stream C, and constructing the road crossing 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.

To avoid the wetland, 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 4.3.2.2. Pump tests would be determined 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.

The large area of clearing could reduce shading of the wetland, its buffer, and the stream segments located off-site. These water resources are already in degraded condition, and the clearing would cause little additional impact. Replanting of areas following construction and buffer enhancement would be required and make these impacts temporary and less-than-significant.

Table 4.3-1 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 4.3.2.2.

4.3.2.2 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 line 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.

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. Some of the options are along a new corridor, and installing the transmission line would require disturbance of more streams, wetlands, and buffers than in the existing corridor. PSE would utilize existing roads for access and existing developed areas for staging to the extent possible, but it is likely that some new roads and staging areas would be required.

The preliminary design indicates that some of the poles would be in wetlands or buffers, although PSE would try to avoid this whenever feasible. Where unavoidable, installing poles in wetlands could require fill or disturbance of the wetland, which could potentially cause a loss of wetland acreage and/or function. Impacts to the acreage and function of wetlands and buffers are described as long-term impacts in Section 3.3.3.

Construction would require clearing of trees and vegetation within the clear zone (in the managed right-of-way), which could negatively affect the function of wetlands and buffers and reduce stream riparian vegetation. Clearing would also 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 3.4 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. 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 4.3-1. 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. Construction would not require diversion or dewatering of any 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 pole installation 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. Generally, PSE will use already developed areas for staging, minimizing the need to clear new areas, but some new areas will likely 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.

4.3.2.3 Short-term (Construction) Impacts by Segment

Table 4.3-1 summarizes the short-term (construction) impacts for the Richards Creek substation and transmission line segments and options.

Table 4.3-1. 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 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	No construction would occur in Wetland BC, but would occur within its wetland buffer. Construction in the buffer could increase erosion and sedimentation in Wetland BC. Construction of the access road crossing of Stream C 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 4.3.2.2, *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 four poles would be located in wetlands and approximately seven poles would be located in buffers. 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 one stream and the buffers of two others. 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 4.3.2.2, *Impacts Common to All Segments.*	Less-than-Significant
Impacts to streams and wetlands	No transmission poles would be located in streams, wetlands, or buffers, so no impacts would occur.	No Impact
Number of stream crossings	The transmission line would cross three streams in the existing corridor. 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

Location/Segment	Short-term Effect	Impact
Bellevue Central Segment, 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 4.3.2.2, *Impacts Common to All Segments*	Less-than-Significant
Impacts to streams and wetlands	No transmission poles would be located in streams, wetlands, or buffers, so no impacts would occur.	None
Number of stream crossings	The transmission line would cross three streams in this option in the existing corridor. 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
Bellevue Central Segment, Bypass Option 1		
Sediment and turbidity Contamination from accidental spills and leaks Contamination from dewatering Impacts to groundwater flows or water levels Reduced groundwater infiltration	See Section 4.3.2.2, *Impacts Common to All Segments.*	Less-than-Significant
Impacts to streams and wetlands	Two poles would be in wetlands and three in stream buffers in this option. 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 nine streams. Stringing the wires across the streams would not cause impacts because no construction activities would occur in the streams. The new stream crossings would be cleared, potentially impacting streams. Impacts would be less-than significant because mitigation would minimize impacts.	Less-than-Significant

Location/Segment	Short-term Effect	Impact
Bellevue Central Segment, Bypass 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 4.3.2.2, *Impacts Common to All Segments.*	Less-than-Significant
Impacts to streams and wetlands	Six poles are proposed in wetlands and three in stream buffers, some in the new corridor. 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 six streams. Stringing the wires across the streams would not cause impacts because no construction activities would occur in the streams. The new stream crossings would be cleared, potentially impacting streams. Impacts would be less-than-significant because mitigation would minimize impacts.	Less-than-Significant
Bellevue South Segment, Oak 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 4.3.2.2, *Impacts Common to All Segments.*	Less-than-Significant
Impacts to streams and wetlands	No transmission poles would be in streams, wetlands, or buffers, so no impacts would occur.	No Impacts

Location/Segment	Short-term Effect	Impact
Number of stream crossings	The corridor would cross 12 streams. The route parallels Coal Creek and would likely require crossings and buffer clearing. Stringing the wires across the streams would not cause impacts because no construction activities would occur in the streams. The new stream crossings would be cleared, potentially impacting streams. Impacts would be less-than significant because mitigation would minimize impacts.	Less-than-Significant
Bellevue South Segment, Oak 2 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 4.3.2.2, *Impacts Common to All Segments.*	Less-than-Significant
Impacts to streams and wetlands	Impacts would be the same as Oak 1.	Less-than-Significant
Number of stream crossings	The corridor would cross 15 streams. The route parallels Coal Creek and would likely require crossings and buffer clearing. Stringing the wires across the streams would not cause impacts because no construction activities would occur in the streams. The new stream crossings would be cleared, potentially impacting streams. Impacts would be less-than-significant because mitigation would minimize impacts.	Less-than-Significant
Bellevue South Segment, 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 4.3.2.2, *Impacts Common to All Segments.*	Less-than-Significant

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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. Three poles are proposed in buffers compared to seven existing. 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
Bellevue South Segment, Willow 2 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 4.3.2.2, *Impacts Common to All Components.*	Less-than-Significant
Impacts to streams and wetlands	Impacts would be the same as Willow 1.	Less-than-Significant
Number of stream crossings	The corridor would cross nine 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
Newcastle 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 4.3.2.2, *Impacts Common to All Components.*	Less-than-Significant
Impacts to streams and wetlands	No poles are proposed in wetlands, streams, or buffers, so no impacts would occur.	None

Location/Segment	Short-term Effect	Impact
Number of stream crossings	The corridor would cross two 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
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 4.3.2.2, *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	One pole is proposed in a wetland buffer. Impacts from installing a pole in a wetland buffer would be less-than-significant.	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.	Less-than-Significant

4.3.3 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 to reduce construction-related impacts to water resources. However, some of the required and potential mitigation measures discussed in Section 3.3.6, such as compliance with critical areas ordinances, also have the potential to mitigate construction-related impacts.

4.3.3.1 Regulatory Requirements

All of the segments and options 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 appealable.

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), and
  - 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.

4.4 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 the various project segments and options 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.

4.4.1 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:

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.

- **Less-than-Significant**–Impacts to fish and wildlife would be 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.

4.4.2 Short-term (Construction) Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

4.4.2.1 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 construction activities would not cause excessive noise disturbances, and protected wildlife species are not known to occupy habitat within the study area. In addition, complying with environmental permit requirements would minimize the potential for impacts, such as avoiding construction during sensitive periods (i.e., nesting and breeding seasons). In addition, construction BMPs would be implemented for Alternative 1 to eliminate or substantially reduce such impacts.

Most of the construction activities would occur in discrete locations (i.e., individual pole locations) dispersed along the existing corridor and new 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, either the existing wires would be transferred to the new poles, or 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. Although no additional vegetation clearing is typically required, some minor grading or ground disturbance would sometimes be necessary, 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 and options avoid critical areas and their buffers, there are a few instances where pole placements could result in potential impacts. 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, 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.

4.4.2.2 Short-term (Construction) Impacts by Component and Segment

While the extent and duration of construction activities would vary among segments and options, the types of construction impacts would be similar for each. The primary difference between segments and options would be the number of construction sites (pole locations) within the segment or option, ranging from 11 to 104 poles per segment/option, and the availability and condition of access routes. For example, access along the Bellevue Central Bypass Options would generally be from existing roadways, and result in little or no access-related impacts, while access to the north portion of the Redmond Segment could require access through a vegetated greenbelt with wetland habitat features. 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 4.4-1.

Table 4.4-1. Impacts to Plants and Animals by Segment and Option

Location/Segment	Short-term Effect	Impact
Richards Creek Substation		
Noise disturbance from ground-clearing activities	Increased noise levels could disturb or displace species on or near the site. Noise-generating 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, and protected species are not known to occupy habitat in the vicinity.	Less-than-Significant
Habitat loss (temporary)	Much of the existing site is already disturbed, and used as a pole-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. Direct impacts to aquatic habitat would be avoided, and compliance with appropriate construction BMPs 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 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 35 poles (12 less than existing) would be installed, potentially including up to 11 in wetlands and wetland buffers. Impacts to available habitat from installing new poles would be less-than-significant because the segment is in the existing corridor and timber mats would be used to access the pole locations to minimize ground disturbance.	Less-than-Significant

Location/Segment	Short-term Effect	Impact
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 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Loss of habitat (temporary)	An estimated 21 poles (17 less than existing) would be installed, but no poles would be located in wetlands. 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 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
Bellevue Central Segment, Existing Corridor Option		
Noise disturbance from ground-clearing activities	See Section 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 11 transmission poles (14 less than existing) would be installed. Available access to these and other pole sites would minimize potential ground disturbance impacts to available habitats.	Less-than-Significant

Location/Segment	Short-term Effect	Impact
Impacts to aquatic species	Several protected fish species occur in the streams in this option. However, no poles would be located in streams 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
Bellevue Central Segment, Bypass Option 1		
Noise disturbance from ground-clearing activities	See Section 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 52 new poles would be installed for this option, potentially including some in wetland buffer habitats, but access to most poles along corridor would be from existing roadways. Although critical area buffer impacts are currently unknown, because delineation surveys have not been completed, installing new poles would be less-than-significant because mitigation would minimize short-term impacts to available habitats.	Less-than-Significant
Impacts to aquatic species	This option crosses nine streams, including several that support protected fish species. However, impacts to aquatic species would be less-than-significant with the implementation of construction BMPs, and access to most pole locations would be from existing roadways.	Less-than-Significant
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant
Bellevue Central Segment, Bypass Option 2		
Noise disturbance from ground-clearing activities	See Section 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 64 new poles would be installed for this option, potentially including some in wetland or buffer habitat; however, access to these sites would be from existing roadways, thereby minimizing potential short-term effects to available habitat.	Less-than-Significant

Location/Segment	Short-term Effect	Impact
Impacts to aquatic species	Six streams are located in this option area, including several that support protected species, and new poles would likely be installed adjacent to these streams. As a result, new stream crossings and buffer clearing could be required. However, access to these sites would be from existing roadways, thereby minimizing potential short-term effects to available habitat.	Less-than-Significant
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant
Bellevue South Segment, Oak 1 Option		
Noise disturbance from ground-clearing activities	See Section 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 86 poles would be installed for this option (20 more than existing), potentially including up to 4 additional poles in wetland habitat, adjacent to a small stream, or within wetland and/or stream buffers. Access to these sites would be from existing roadways, thereby minimizing potential short-term effects to available habitat.	Less-than-Significant
Impacts to aquatic species	Twelve streams occur along this segment. The segment parallels Coal Creek and may require stream crossings and buffer clearing. Impacts would be less-than-significant because access to construction sites would be from existing roadways, and mitigation measures would minimize impacts.	Less-than-Significant
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant
Bellevue South Segment, Oak 2 Option		
Noise disturbance from ground-clearing activities	See Section 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	Impacts would be the same as the Oak 1 Option.	Less-than-Significant
Impacts to aquatic species	Impacts would be the same as the Oak 1 Option.	Less-than-Significant

Location/Segment	Short-term Effect	Impact
Invasive plant control	Impacts would be similar to the Redmond Segment.	Less-than-Significant
Bellevue South Segment, Willow 1 Option		
Noise disturbance from ground-clearing activities	See Section 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 40 poles (26 less than existing) would be installed for this option, potentially including up to 6 poles in wetlands or wetland and stream buffers. Impacts from installing new poles would be less-than-significant because the option 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 option, 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
Bellevue South Segment, Willow 2 Option		
Noise disturbance from ground-clearing activities	See Section 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 76 poles (55 less than existing) would be installed for this option, potentially including up to 6 poles in wetlands or wetland and stream buffers. Impacts from installing new poles would be less-than-significant because a portion of this option is in the existing corridor, and mitigation would minimize short-term impacts to available habitat.	Less-than-Significant
Impacts to aquatic species	Impacts would be similar to those for Oak 1 and Willow 1. 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

Location/Segment	Short-term Effect	Impact
Newcastle Segment		
Noise disturbance from ground-clearing activities	See Section 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 24 poles (same as existing) would be installed for this segment, and no poles are proposed in wetland habitat or buffers. Impacts from installing new poles 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	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 4.4.2.1, *Short-term Impacts Common to All Components.*	Less-than-Significant
Habitat loss (temporary)	An estimated 45 poles (24 less than existing) would be installed in this segment. Potentially one pole is proposed in a wetland buffer. Impacts from installing new poles 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

4.4.3 Mitigation Measures

As described above for long-term impacts (Section 3.4.6), 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. In addition, to mitigate for short-term impacts discussed in this chapter, the following mitigation measures would be used during construction to reduce construction-related impacts:

4.4.3.1 Regulatory Requirements

The following measures are required to comply with regulations and are not appealable.

During Construction

- Minimize impacts to critical areas and buffers, including Fish and Wildlife Conservation Areas, to the extent practicable.
- Mitigate impacts to critical areas to the levels established by the appropriate jurisdictions and environmental permit requirements.
- 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.

4.4.3.2 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 these 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.

4.5 GREENHOUSE GASES

4.5.1 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.

4.5.2 Short-term (Construction) Impacts: Alternative 1 (New Substation and 230 kV Transmission Lines)

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, Alternative 1 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 Alternative 1 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 Alternative 1. 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 exact number of foundations is not known at this time because PSE is still evaluating which poles can be directly embedded, avoiding the need for concrete foundations. A conservative estimate assuming of approximately 18 miles of transmission lines and a typical spacing between poles of 600 feet, suggests that approximately 180 pole foundations would need to be installed. 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 109 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.

4.5.3 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.

4.5.3.1 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.

4.6 RECREATION

4.6.1 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 7 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.

4.6.2 Alternative 1: New Substation and 230 kV Transmission Lines

4.6.2.1 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.

4.6.2.2 Impacts Common to All Segments and Options

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 7 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.

Trees and vegetation may be removed within the clear zones 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 3.6, *Recreation*.

Construction vehicles may utilize parking spaces or adjacent street parking during active construction. 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 4.6-1. As shown, there would be no impacts or less-than-significant impacts at all recreation sites in the study area.

Table 4.6-1. 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 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 2 months.	Less-than-Significant
Willows Creek Neighborhood Park	Construction would not be visible from the park, and there would be no disturbance to the park itself.	No Impact

Recreation Sites	Short-term Effect	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 temporarily cleared to facilitate construction. Five 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 1 month. 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 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 7 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
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 7 days.	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
Bellevue Central Segment		
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 seven 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 temporary 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) 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 restrictions. Between SE 1st 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.	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
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 is near the entrance to the park, access to the park may be closed for 3 to 7 days within 2 months.	Less-than-Significant
Richards Valley Greenway	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, ERC, West Kelsey Open Space, Woodridge Open Space, Richards Creek Open Space, Bannerwood Ballfield Park, and Richards Valley Open Space	The Existing Corridor Option is not near these parks.	No Impact
Bypass Option 1		
Bel-Red Mini Park	There would be no construction work in or immediately adjacent to Bel-Red Mini Park.	No Impact
McDowell House	There would be no construction work in or immediately adjacent to the McDowell House.	No Impact
Eastside Rail Corridor (ERC)	The ERC is not yet developed for recreation; however, some individuals may use the ERC informally. Access would be limited until all seven poles are installed between SE 1st and the Lake Hills Connector. Temporary vegetation clearing to facilitate construction may also occur. Construction on the ERC would be completed in less than 2 months.	Less-than-Significant
Wilburton Hill Park and Bellevue Botanical Gardens	There would be two new poles on the north side of the Lake Hills Connector adjacent to Wilburton Hill Park. Access to the trailhead at the intersection of SE 7th Pl and the Lake Hills Connector would be affected during construction activities (including temporary vegetation clearing), which could take up to 14 days.	Less-than-Significant
West Kelsey Open Space	There would be no construction work in or adjacent to West Kelsey Open Space.	No Impact

Recreation Sites	Short-term Effect	Impact
Kelsey Creek Park	There would be six new poles on the north side of the Lake Hills Connector adjacent to Kelsey Creek Park. There are no trail access points, and park users would not be able to see construction from within the park. Access for pedestrians and bicyclists adjacent to the park would likely be limited during construction.	Less-than-Significant
Woodridge Open Space	There would be no construction work in or adjacent to Woodridge Open Space.	No Impact
Richards Creek Open Space	There would be one new pole on the south side of the Lake Hills Connector adjacent to Richards Creek Open Space. There are no trail access points, and park users would not be able to see construction from within the park. Access for pedestrians and bicyclists adjacent to the park would likely be limited during construction.	Less-than-Significant
Bannerwood Ballfield Park	There would be one new pole on the south side of the Lake Hills Connector adjacent to Bannerwood Ballfield Park. There are no trail access points, and park users would not be able to see construction from within the park. Access for pedestrians and bicyclists adjacent to the park would likely be limited during construction.	Less-than-Significant
Unnamed Trails along the Existing Corridor between SE 10th St and SE 20th St	Impacts would be the same as for the Existing Corridor Option, except there would be five pole sites, all of which PSE would access from the south; the trail could be affected for up to 25 non-consecutive days within 2 months in addition to site preparation.	Less-than-Significant
Richards Valley Greenway	Temporary lane and sidewalk closures during construction along Lake Hills Connector are likely and would inconvenience users of the proposed greenway. Work along this section of road could take up to 2 months. Additionally, the greenway may be temporarily closed for 1 day during restringing of lines along the existing corridor.	Less-than-Significant
Skyridge Park	Same impacts as the Existing Corridor Option.	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
Unnamed Trail (on Corridor at Bel-Red Rd and NE Spring Blvd), SE 3rd Trail, Highland-Glendale Property, Glendale Country Club (private), and Richards Valley Open Space	Bypass Option 1 would not be near these sites.	No Impact
Bypass Option 2		
Unnamed Trail (on Corridor at Bel-Red Rd and NE Spring Blvd)	There are no pole sites located near the trail; however, access to the trail may be restricted for up to 1 day while the wires are restrung.	Less-than-Significant
Bel-Red Mini Park	Same impact as Bypass Option 1.	No Impact
Eastside Rail Corridor (ERC)	Same impact as Bypass Option 1.	Less-than-Significant
McDowell House	Same impact as Bypass Option 1.	No Impact
Wilburton Hill Park and Bellevue Botanical Gardens	Same impact as Bypass Option 1.	Less-than-Significant
West Kelsey Open Space	There would be no construction work in or adjacent to West Kelsey Open Space. Same impact as Bypass Option 1.	No Impact
Kelsey Creek Park	There would be four new poles on the north side of the Lake Hills Connector adjacent to Kelsey Creek Park. There are no trail access points, and park users would not be able to see construction from within the park. Access for pedestrians and bicyclists adjacent to the park would likely be limited during construction.	Less-than-Significant
Woodridge Open Space	There would be three new poles on the west side of Richards Rd adjacent to the Woodridge Open Space. One pole would be located at the trailhead for the Woodridge Trail. Vegetation may also be cleared to facilitate construction. Trail access would be blocked while the pole is installed and wires are strung. Access for pedestrians and bicyclists adjacent to the park would likely be limited during construction.	Less-than-Significant
Richards Creek Open Space	There would be no construction work in or adjacent to Richards Creek Open Space.	No Impact

Recreation Sites	Short-term Effect	Impact
Richards Valley Open Space	Bypass Option 2 would pass the south end of Richards Valley Open Space; however, there would be no construction in the park and there are no access points near the proposed route. Users of the open space would not be affected.	No Impact
Richards Valley Greenway	Temporary lane and sidewalk closures during construction along Lake Hills Connector and Richards Rd are likely and would inconvenience users of the proposed greenway. Road work along Lake Hills Connector could take up to 2 months plus, and work along the greenway portion of Richards Rd could take an additional 5 weeks.	Less-than-Significant
Highland-Glendale Property, Glendale Country Club (private), SE 3rd Trail, Unnamed Trails along the Corridor (between SE 10th St and SE 20th St), Bannerwood Ballfield Park, and Skyridge Park	Bypass Option 2 would not be near these sites.	No Impact
Bellevue South Segment		
Oak 1 Option		
Mountains to Sound Greenway I-90 Trail	No poles are located on the trail. Although unlikely, it is possible that trails may be temporarily closed for up to 1 day during restringing of lines across the trail.	Less-than-Significant
Newport High School	One pole site would be located at the intersection of Factoria Blvd SE and Coal Creek Parkway SE on the same side of the road as the ballfield. Construction would not disturb recreation activities but may be visible from the field.	Less-than-Significant
Forest Drive Open Space	The open space is adjacent to the corridor but would not be affected during construction.	No Impact

Recreation Sites	Short-term Effect	Impact
Coal Creek Natural Area	North of Coal Creek, park users would not be affected because the new corridor is on the opposite side of the road from the natural area. Temporary lane closures during active construction along Coal Creek Parkway are likely and may inconvenience people driving to Coal Creek Natural Area. The Lower Coal Creek Trailhead near Forest Dr SE, the trailheads near the parking lot north of Coal Creek, and the parking lot itself should not be affected by construction. Where the corridor crosses through the natural area, access would be limited while the poles at three sites are replaced, as access for construction vehicles would be along the corridor and trail. Vegetation may also be temporarily cleared to facilitate construction. Construction through the natural area could take up to 3 weeks. *(Impacts would be the same for the Oak 1, Oak 2, and Willow 2 Options.)*	Less-than-significant
Newport Hills Mini Park	Access to the park would be limited during active construction, which would take 3 to 7 days. Vegetation disturbance would be minimal as existing vegetation is primarily lawn grass. *(Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.*)	Less-than-Significant
Waterline Trail (between SE 60th St and 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 2 pole sites north of SE 63rd St and 3 to the south, access may be limited to segments of trail up to 2 and 3 weeks, respectively. (*Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)*	Less-than-Significant
Tyee Middle School, Somerset North Slope Open Space, Forest Hill Neighborhood Park Open Space, and Somerset Recreation Club	The Oak 1 Option is not near these sites.	No Impact
Oak 2 and Willow 2 Options		
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 lines across the trail.	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
Tyee Middle School	Access to 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. *(Impacts would be the same for the Oak 2, Willow 1, and Willow 2 Options.)*	Less-than-Significant
Somerset North Slope Open Space	This open space is not open to the public.	No Impact
Newport High School	In addition to impacts described for the Oak 1 Option, Oak 2 would also have five poles along the east side of 124th Ave SE. Construction would be visible from the sports fields but would not affect recreation opportunities and uses. For the Willow 2 Option, impacts would be the same as the Oak 1 Option.	Less-than-Significant
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. Vegetation may also be temporarily cleared to facilitate construction. Although unlikely, it is possible that the club may be temporarily closed for up to 1 day during restringing of lines. PSE would work with the club to avoid disturbance to recreation activities. *(Impacts would be the same for the Oak 2, Willow 1, and Willow 2 Options.)*	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. *(Impacts would be the same for the Oak 2, Willow 1, and Willow 2 Options.)*	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, and vegetation may be temporarily cleared. Use of the access road as a trail would be limited during active construction, approximately 3 to 7 days. *(Impacts would be the same for the Oak 2, Willow 1, and Willow 2 Options.)*	Less-than-Significant
Coal Creek Natural Area	See the Oak 1 Option description. *(Impacts would be the same for the Oak 1, Oak 2, and Willow 2 Options.)*	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
Newport Hills Mini Park	Access to the park would be limited during active construction, which would take 3 to 7 days. Vegetation disturbance would be minimal; existing vegetation is primarily lawn grass. *(Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)*	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 for up to 2 and 3 weeks, respectively. (*Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)*	Less-than-Significant
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. *(Impacts would be the same for the Oak 2, Willow 1, and Willow 2 Options.)*	Less-than-Significant
Somerset North Slope Open Space	This open space is not open to the public.	No 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. *(Impacts would be the same for the Oak 2, Willow 1, and Willow 2 Options.)*	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
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. *(Impacts would be the same for the Oak 2, Willow 1, and Willow 2 Options.)*	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 7 days. *(Impacts would be the same for the Oak 2, Willow 1, and Willow 2 Options.)*	Less-than-Significant
Coal Creek Natural Area	The Willow 1 Option does not follow Coal Creek Parkway but follows the existing easement south of Forest Dr SE, as do the other options. 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 poles 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 7 days. Vegetation disturbance would be minimal; existing vegetation is primarily lawn grass. *(Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)*	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. *(Impacts would be the same for the Oak 1, Oak 2, Willow 1, and Willow 2 Options.)*	Less-than-Significant
Newport High School and ERC	The Willow 1 Option is not near these sites.	No Impact

Recreation Sites	Short-term Effect	Impact
Newcastle Segment		
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 7 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. The trail is not located 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
Honey Creek Open Space	There is one pole site 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. Vegetation may be temporarily cleared to facilitate construction.	Less-than-Significant

Recreation Sites	Short-term Effect	Impact
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. 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

4.6.3 Mitigation Measures

Required and potential mitigation measures described in Section 3.6.5 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.

4.6.3.1 Regulatory Requirements

The following measure is required to comply with regulations and is not appealable.

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).

4.6.3.2 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 in which 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.
- Notify local jurisdictions, schools, or private owners, 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.

4.7 HISTORIC AND CULTURAL RESOURCES

4.7.1 Alternative 1: New Substation and 230 kV Transmission Lines

4.7.1.1 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 3.7.

4.7.1.2 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 3.7. 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 3.7.

4.8 ENVIRONMENTAL HEALTH - ELECTRIC AND MAGNETIC FIELDS

Electric and magnetic fields (EMF) 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.

4.9 ENVIRONMENTAL HEALTH – PIPELINE SAFETY

4.9.1 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 the project corridor. Risks during construction were assessed by EDM Services using the same risk assessment methodology described in Section 3.9.5.1 (and described further in Appendix I) 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.

4.9.1.1 Significance Thresholds

As described in Chapter 3, 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 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 pipeline release or fire during construction that could result in public safety impacts or damage to property and environmental resources.

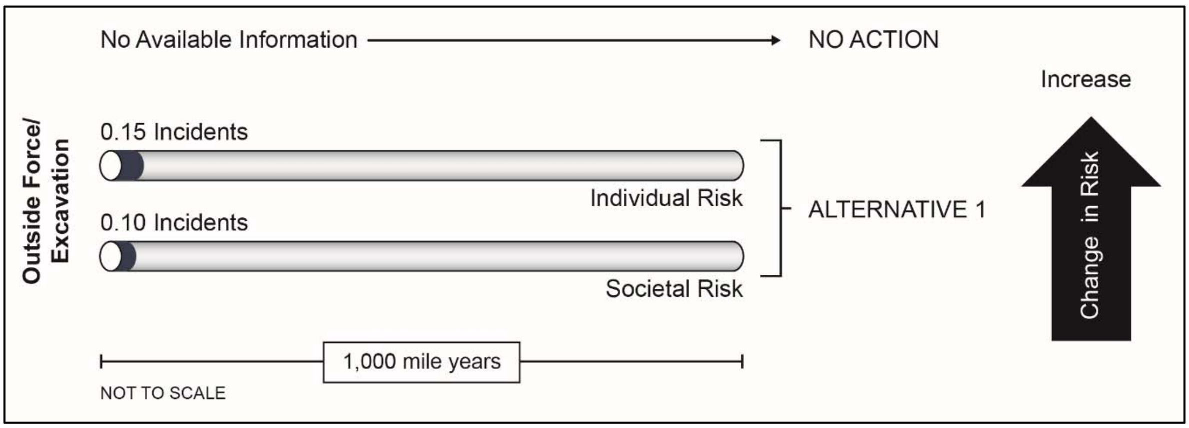
4.9.1.2 Risk Assessment Results

The results of the risk assessment developed by EDM Services (as described in Section 3.9.5.1, *Methodology*) are presented in this section beginning with the incident frequency for the main category of construction-related pipeline damage (i.e., outside force/excavation). This frequency was used to develop the final risk assessment results, which follow.

Figure 4.9-1 summarizes the results of the risk assessment for outside force/excavation pipeline caused releases during construction of Alternative 1. The potential frequency of incidents (or estimated number of incidents per 1,000 mile years) was developed for individuals (individual risk) and groups of people (societal risk) and compared to the national incident frequencies for this same category. The change in the anticipated frequency of incidents risk is presented on the right side of the figure. Because there would be no construction activity for the No Action Alternative, no incident frequency is presented.

Mile Years

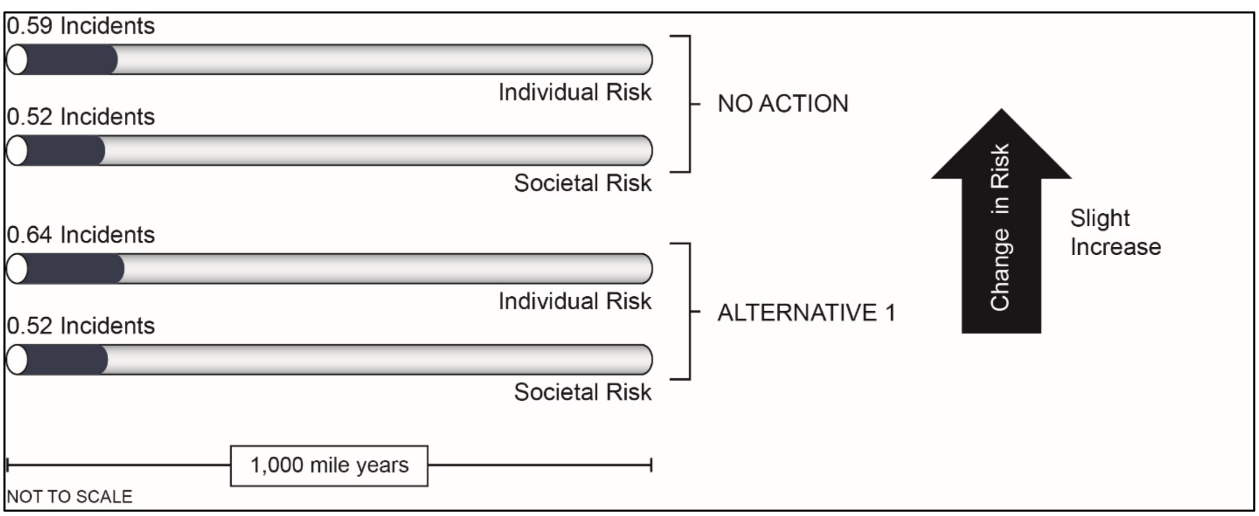
A means of predicting the number of incidents for a given length of line, over a given period of time. For example, if one considered an incident rate of 1.0 incident per 1,000 mile years, one would expect one incident per year on a 1,000-mile pipeline.



Source: EDM Services, 2017.

Figure 4.9-1. Change in Incident Frequency

In consideration of the separate individual risk and societal risk incident frequencies developed for outside force/excavation, Figure 4.9-2 presents the anticipated additional frequency of incidents that could be present during construction of Alternative 1. For this, Alternative 1 is compared to the existing operational baseline (No Action Alternative) results presented in Section 3.9.5.3 to identify the change in anticipated frequency that would be present during construction.



Source: EDM Services, 2017.

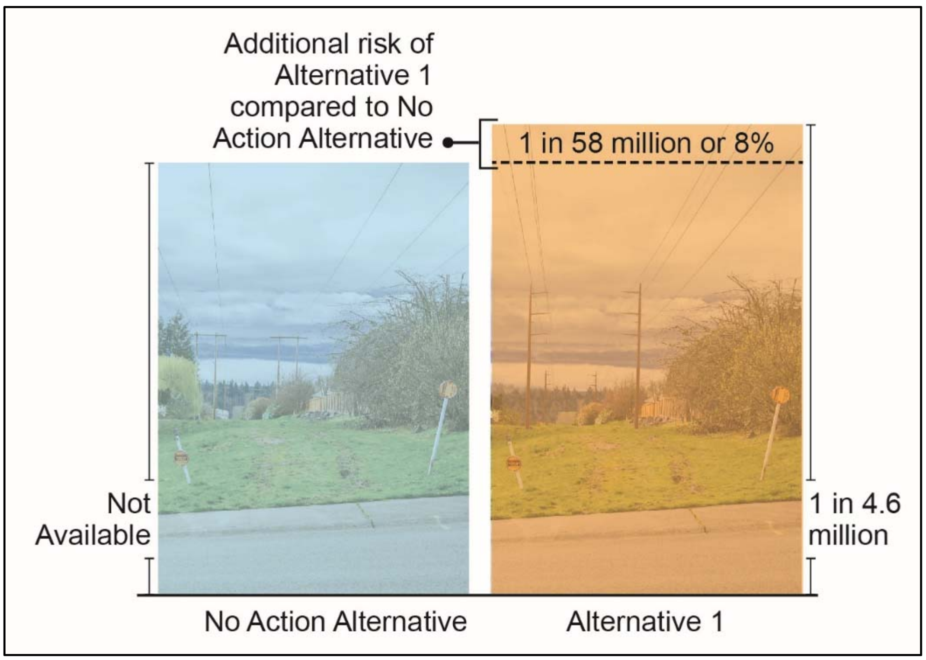
Figure 4.9-2. Change in Incident Frequency During Construction (Combined)

Using the additional construction incident frequency results above, the individual risk and societal risk results for Alternative 1 are presented below.

The annual individual risk of fatality during construction of the 230 kV lines within the corridor is 1 in 4.6 million (Figure 4.9-3). In other words, it is estimated that there could be a 1 in 4.6 million likelihood that an individual at a specific location would be fatally injured over a 1-year construction period. These results are below the common threshold of 1 in 1.0 million used by Santa Barbara County, the California Department of Education, and other jurisdictions in determining unacceptable and acceptable risk. Based on the results of the risk assessment, the individual risk (during construction) for the proposed 230 kV lines would incrementally increase over that posed by the existing 115 kV lines (No Action). This increase in risk is slight, approximately 1 in 58 million. In other words, the assessment estimates that there would be an approximately 8 percent increase in individual risk during operation of Alternative 1. Because the risk level is already very low, this 8 percent increase is not considered substantial.

What is meant by the "increase in risk"?

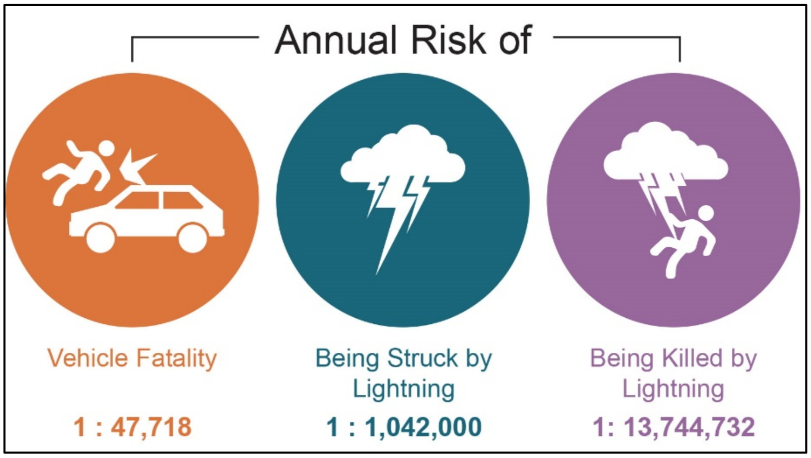
Risk is characterized as a 1 in x chance of a specified event occurring. The "increase in risk" is the chance that the specified event (e.g., an individual fatality from an unintentional release from the pipeline) would occur that would not have occurred if the project had not been built. In this case, there is an estimated 1 in 58 million chance that an individual fatality would occur during construction that would not have occurred if the project was not built.



Source: EDM Services, 2017.

Figure 4.9-3. Alternative 1 Individual Risk (of fatality) Results

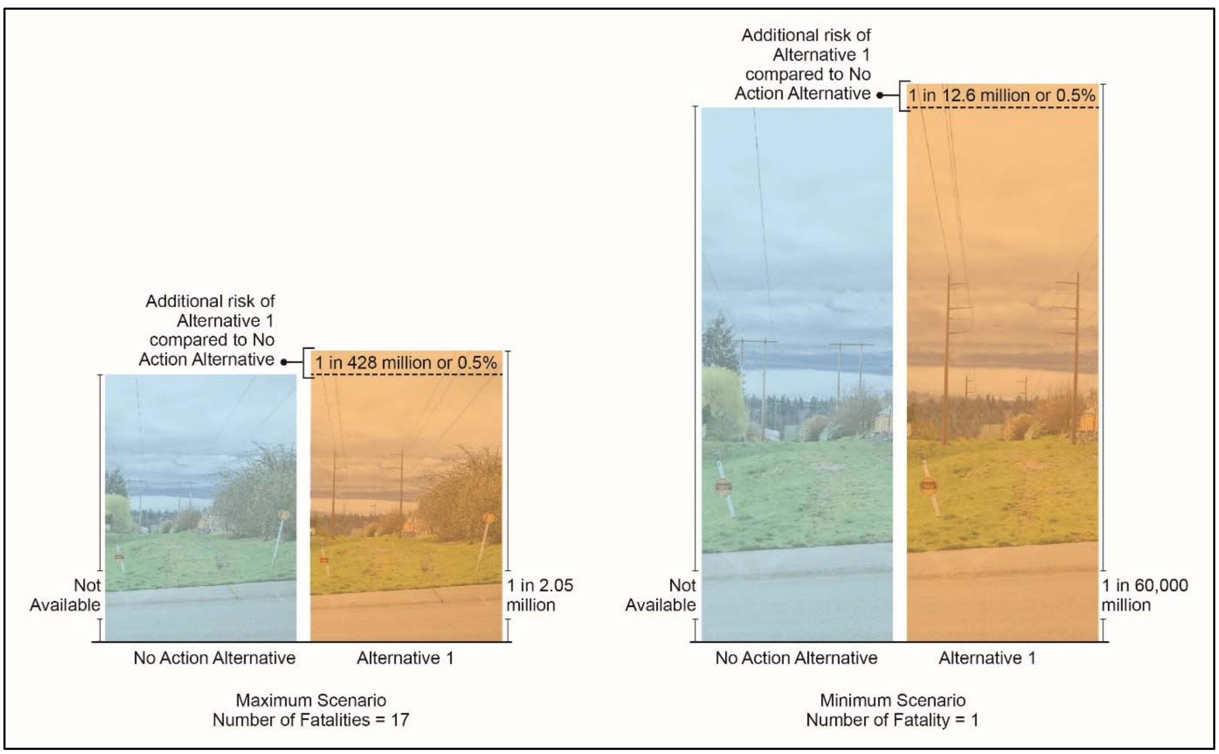
To put individual annual risk results in context, Figure 4.9-4 illustrates the annual risks for a relatively common type of incident (vehicle fatality) and a relatively uncommon type of incident (being struck or being killed by lightning).



Source: Insurance Information Institute, 2013; National Weather Service, 2017.

Figure 4.9-4. Annual Risk of Other Incidents, for Comparison

The assessment also considered the broader societal risk, or risk to groups of people, which takes into account the number of individuals who may be present near the project corridor at any given time and the duration of their presence. See Section 3.9.5.1 for additional information on societal risk. Societal risk takes into account multiple release scenarios. The societal risk results are presented below in Figure 4.9-5 for the maximum and minimum fatalities under the possible release scenarios, which are further described in *Pipeline Safety Technical Report* (Appendix I).



Source: EDM Services, 2017.

Figure 4.9-5. Alternative 1 Societal Risk Results

During construction, there is a one in 2 million probability of an event resulting in 17 fatalities occurring in any 1-year time period, and a one in 60,000 probability of a single-fatality event occurring in any 1-year period. These results are above the thresholds for negligible impacts, and below the thresholds for intolerable impacts, that are used by Santa Barbara County and the California Department of Education for school siting purposes.

Based on the results of the assessment, the increased societal risk during construction of the proposed 230 kV lines over that posed by the existing 115 kV lines (No Action) is 1 in 428 million (for a scenario resulting in 17 fatalities), and 1 in 12.6 million (for a scenario resulting in one fatality). In other words, the assessment estimates that there would be a less than a 0.5 percent increase in societal risk during construction of Alternative 1.

4.9.2 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 3.9.5.4.

4.9.3 Risks During Construction: Alternative 1 (New Substation and 230 kV Transmission Lines)

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 3.9.6. The *Pipeline Safety Technical Report* was used as resource in this evaluation. See Appendix I for additional detailed information included in this analysis. In the EIS, the pipeline owner and operator are collectively referred to simply as Olympic.

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.

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 pipeline, 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 pipeline, 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 4.9.4, *Mitigation*). Therefore, unintentional damage to the pipelines from project-related construction would be unlikely.

Vibrations from operation of equipment to excavate for their 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 that 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 Pipelines from heavy equipment, crane matts, 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 4.9.4, *Mitigation*). Therefore, pipeline damage caused by surcharge loads would be unlikely.

As described in Section 3.9.3.3, "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 4.9.4, 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 4.9.4, these risks would likely be even lower.

Alternative 1 Impacts Conclusions

Based on the results of the risk assessment, there could be an increased risk of a pipeline release and fire during construction when compared with the No Action Alternative (see Section 4.9.1.2). Based on the results, and in consideration of project safeguards, the probability of a pipeline release and fire remains low under Alternative 1. However, the potential environmental health and safety impacts are significant if this unlikely event were to occur.

The individual and societal risks described above would be similar across all Alternative 1 segments and options. There would be reduced risk in segments and options where fewer miles of the transmission line are co-located with the Olympic Pipelines. These include Bypass Options 1 and 2, and the Willow 1 and Willow 2 Options. See Table 3.9-5 for the length of the Olympic Pipelines (both the 20-inch and 16-inch diameter pipelines) co-located with the PSE transmission lines in the segments and options.

With the implementation of additional measures to mitigate potential excavation and surcharge loading risks, the construction risks could be even lower (see Section 4.9.4, *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 Alternative 1, see the *Pipeline Safety Technical Report* (Appendix I).

4.9.4 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 3.9.7 (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 their pipelines in accordance with or to exceed PHMSA's Minimum Federal Safety Standards in 49 CFR 195. The regulations are intended to ensure adequate protection for 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). These requirements have been shared with PSE.

As part of ongoing coordination between PSE and Olympic, additional mitigation measures may be identified during final design. Appendix I includes a "frequently asked questions" sheet, summarizing steps that PSE and Olympic will take during construction for corridor safety.

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 topics/actions, including construction.

4.9.4.1 Regulatory Requirements

PSE construction activities within all the segments and options 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 their 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 pipeline 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 pipeline 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 pipeline 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 pipeline.
- 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).

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.

- As part of Olympic's general construction requirements for all work proposed near the pipeline (see Appendix I), comply with all other applicable requirements, including the following requirements:
  - No excavation or construction activity will be permitted in the vicinity of a pipeline until all appropriate communications have been made with Olympic's field operations and their 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 their 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 pipeline, 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 pipeline, the Damage Prevention Team would be on-site at all times to monitor excavation.

4.9.4.2 Proposed Mitigation Measures

Potential mitigation measures are summarized below based on recommendations of EDM Services (2017) and measures the EIS Consultant Team has proposed to provide additional safety assurances.

- Continue to coordinate with Olympic and include safeguards in the project construction and access plans to protect nearby pipelines from excavation activities and surcharge loads.
- 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).
- Utilize 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.
- 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.
- Prior to construction of the Energize Eastside project, file a mitigation and monitoring report with the Partner Cities documenting all 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.

4.10 ECONOMICS

The economic aspects of the project that are evaluated in this Phase 2 Draft EIS do not relate to construction impacts; no further detail is provided in this chapter.

5

Cumulative Impacts

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CHAPTER 5. CUMULATIVE IMPACTS

"Cumulative impact" is not defined in the SEPA rules, but it is defined under federal rules implementing 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 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).

5.1 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 electrical reliability 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.

5.2 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.

5.3 WATER RESOURCES

No long-term impacts to water resources would occur as a result of Alternative 1, 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.

5.4 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 are likely to improve habitat. The 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).

5.5 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).

5.6 RECREATION

In general, there is pressure on recreation areas from development and increased use. The significant impacts to recreation sites from Alternative 1 could contribute to the degradation of existing recreation resources and limit the ability for municipalities to provide additional recreation opportunities, unless mitigation is provided. 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. 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 anticipated to occur between 2015 and 2021. Construction for the Energize Eastside project may occur during this same period; however, construction could be planned to avoid working in the same areas concurrently. Construction activity throughout the region could result in potential impacts to parks and other recreation sites. 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.

5.7 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.

5.8 ENVIRONMENTAL HEALTH– ELECTRIC AND MAGNETIC FIELDS

The project would reduce magnetic fields along existing transmission line corridor; therefore, there would be no cumulative effect. In new corridors associated with the Bypass Options, and Oak 1, Oak 2, and Willow 2 Options, the project would add a new source of magnetic fields to existing sources, such as other overhead electrical lines, but no adverse cumulative effects are expected because existing sources combined with magnetic fields associated with the project are expected to be well below industry guidelines.

5.9 ENVIRONMENTAL HEALTH – PIPELINE SAFETY

No significant adverse impacts to environmental health related to pipeline safety are likely from the Energize Eastside project. The likelihood 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.

5.10 ECONOMICS

The economic impacts of the project have not been fully evaluated in this EIS. 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 services would be replaced through replacement trees, reducing the net impact of development. Temporal losses could also be offset with additional mitigation.

6

Significant Unavoidable Adverse Impacts

CHAPTER 6. SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

6.1 LAND USE AND HOUSING

Construction of the 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 Alternative 1 would be less-than-significant. Long-term impacts would also be less-than-significant for Alternative 1 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.

6.2 SCENIC VIEWS AND THE AESTHETIC ENVIRONMENT

The project could have significant adverse impacts to the aesthetic environment as a result of the Bypass Options 1 and 2, the Willow 1 Option, and the Newcastle Segment. There would be no significant adverse impacts to scenic views (Figure 6-1).

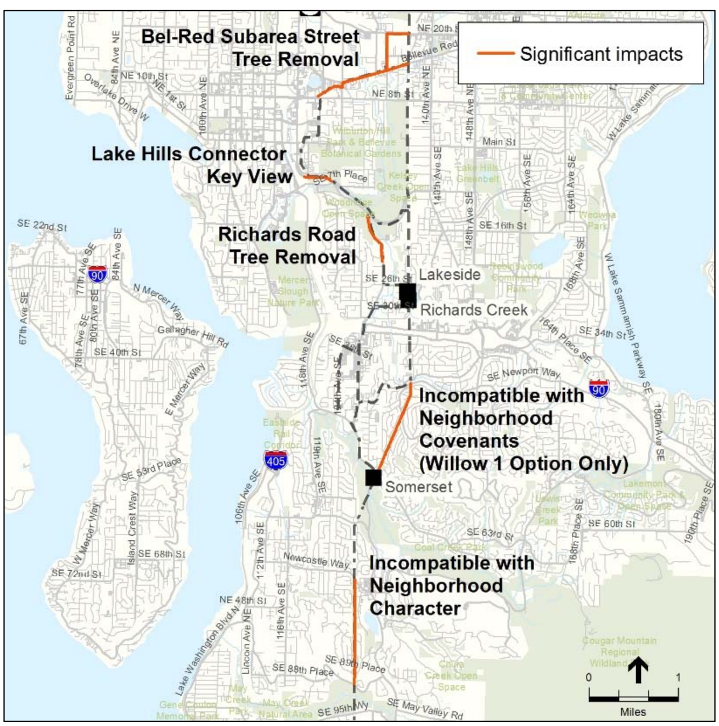

Figure 6-1. Areas with Significant Impacts to the Aesthetic Environment

Significant aesthetic impacts associated with Bypass Options 1 and 2 would occur where the project would be inconsistent with subarea plan policies: (1) along roadways in the Bel-Red Subarea, where street trees would need to be removed and could not be replanted; (2) where transmission line infrastructure would be introduced in key views identified in subarea plans; and (3) where the transmission line would be placed along Richards Road and would require substantial vegetation removal.

Impacts along roadways in the Bel-Red Subarea and along Richards Road could be reduced through mitigation. For instance, if PSE were to place the poles closer to the roadway and cantilever the wires so that minimal vegetation removal would be required and street trees could be planted and maintained, impacts would be less-than-significant. Both of the Bypass Options would result in adverse aesthetic impacts to three key views: NE 5th Street, NE 8th Street, and the Lake Hills Connector. Impacts to these view corridors could only be mitigated if the line were placed underground. Significant impacts to the aesthetic environment could also be avoided by selecting the Existing Corridor Option for the Bellevue Central Segment.

Significant aesthetic impacts associated with the Willow 1 Option 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 result in increased viewer awareness of the impact. The increased pole height under Willow 1 would contrast substantially with this unique neighborhood of low buildings and vegetation. Impacts could be avoided by selecting a different 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 closer to residential streets and homes and 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. This inconsistency with the Newcastle Comprehensive Plan could be mitigated if: (1) a different pole configuration were selected that placed poles more centrally within the transmission corridor and had shorter pole heights, or (2) the transmission line were placed underground.

6.3 WATER RESOURCES

Impacts from construction of Alternative 1 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 impacts to water resources.

6.4 PLANTS AND ANIMALS

Although the overall magnitude of impacts would vary by segment and option, Alternative 1 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.

6.5 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 Alternative 1 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 impacts to greenhouse gas emissions.

6.6 RECREATION

For Bypass Options 1 and 2, and the Oak 1, Oak 2, and Willow 2 Options of Alternative 1, PSE may need to acquire easements within the following parks, which would result in a significant unavoidable impact:

- **Bellevue Central Segment, Bypass Option 1**: Wilburton Hill Park and Bellevue Botanical Gardens, Kelsey Creek Park, Eastside Rail Corridor, Richards Creek Open Space, and Bannerwood Ballfield Park.
- **Bellevue Central Segment, Bypass Option 2:** Wilburton Hill Park and Bellevue Botanical Gardens, Kelsey Creek Park, Eastside Rail Corridor, Richards Creek Open Space, and Woodridge Open Space.
- **Bellevue South Segment, Oak 1, Oak 2, and Willow 2 Options**: Coal Creek Natural Area

These potentially significant impacts would be avoided if easements were not granted and poles were moved to the right-of-way, or if an alternate route such as the Existing Corridor Option is utilized.

6.7 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.

6.8 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 unavoidable significant impacts under SEPA would occur.

6.9 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 3.9.1 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 Sections 3.9.7 and 4.9.4, any increase in risks within the corridor can be fully mitigated. As a result, no significant unavoidable adverse impacts have been identified.

6.10 ECONOMICS

The economic aspects of the project that are evaluated in this Phase 2 Draft EIS do not relate to construction impacts. Long-term impacts to economics are expected to be less-than-significant.

The change in assessed property value would be relatively small compared to the total assessed value in any of the communities potentially affected, including the smallest community, the City of Newcastle. The City of Newcastle could maintain adequate public services without additional revenue, or if necessary, could maintain current funding levels through a minor change in the mil rate.

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. 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.

Alternative 1 would require tree removal along the existing corridor and new corridor; however, the value of total ecosystem services lost as a result of tree removal would be minimal.

7

Errata

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CHAPTER 7. ERRATA

This chapter addresses errors and corrections to the text of the Phase 1 Draft EIS and is organized by Draft EIS chapter, section, and page number.

1) Chapter 1 – Introduction and Summary:

a) **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.

b) **Page 1-3, Figure 1-1:** The legend should read "Customers potentially affected by rotating outages" rather than "Customers affected by rotation outages."

c) **Page 1-31, Affected Environment, 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)" has been replaced with "Hazardous materials are likely in electrical infrastructure (e.g., oil-containing transformers)."

d) **Page 1-32, Mitigation Measures, Bullet One:** PSE has stated that their transformers would not use SF6. Therefore, the following text: "use vegetable-based oil for transformers rather than petroleum based oil or SF6," has been replaced with "use vegetable-based oil for transformers rather than petroleum-based oil."

e) **Page 1-54, Table 1-3:** Impacts for Recreation under Alternative 2 were incorrect and should have been stated as "Negligible to Minor" to reflect the findings of the recreation chapter.

2) Chapter 2 – Description of Project and Alternatives:

a) **Page 2-40, Paragraph 2**: To provide clarity, when using the term "storing," the text should refer to the MWh rating (225.6), rather than the power rating of 121 MW.

b) **Page 2-41:** The heading numbering scheme for the Peak Generation Plant Component and Construction subsections is incorrect. The headings have been changed from "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.

3) Chapter 3 – Earth:

a) **Page 3-16, Paragraph 2, Lines 3-4:** Water and sewer pipelines may also need to be provided. Text has been changed from "Depending on location, this could include replacing major gas mains to increase natural gas supply capacity" to "Depending on location, this could include replacing major gas mains (to increase natural gas supply capacity) and providing water and sewer pipelines."

b) **Page 3-17, Paragraph 5, Lines 5-7:** PSE would only need to integrate information and recommendations prepared by a geotechnical engineer. Text has been changed from "For the substation expansions under Alternatives 1 and 3, prior to the issuance of grading permits, 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" to "For the substation expansions under Alternatives 1 and 3, prior to the issuance of grading permits, 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."

c) **Page 3-17, Paragraph 5, Lines 8-12:** Text has been revised to increase clarity. Text has been changed from "All grading and construction would adhere to the specifications, procedures, and site conditions contained in the final design plans, which would be fully compliant with the seismic recommendations of the Washington State Building Code and any local building code amendments. The required measures would encompass site preparation and foundation specifications." To "All grading and construction would adhere to the specifications, procedures, and site conditions contained in the final design plans, which would be fully compliant with the seismic requirements of the Washington State Building Code and any local building code amendments. The required measures would encompass site preparation and foundation specifications."

4) Chapter 6 – Plants and Animals:

a) **Page 6-11, Figure 6-6:** Corrected naming convention by renaming it Figure 6-7.

b) **Page 6-14, Paragraph 4, Lines 1–2:** The figure reference needed to be updated per change 4a. In addition, PSE's Vegetation Management Program removes mature trees equal or greater than 25 feet, not 15 feet. Text has been changed from "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)" to "PSE's Vegetation Management Program would continue under the No Action Alternative (Figure 6-7). 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)."

c) **Page 6-15, Figure 6-6:** To increase clarity, Figure 6-6 has been moved (now Figure 6-7 per change 4a) "PSE Vegetation Management Program Zones" to Section 6.6.3.

5) Chapter 8 – Environmental Health and Safety:

a) **Use of SF6 (throughout Chapter 8):** PSE does not use SF6 (a gas sometimes used for insulation of electrical equipment) in transformers. However, SF6 is used in high-voltage circuit breakers, which are designed to protect an electrical circuit from damage caused by overcurrent/ overload or short circuit. Due to environmental and cost concerns over insulating oil spills, most new breakers use SF6 gas. SF6 gas absorbs free electrons, forms a negative ion, and quenches the arc between the fixed and moving contact of the circuit breaker. Special equipment is used when charging equipment with SF6 gas to prevent release to the atmosphere.

b) **Page 8-9, Sidebar:** SF6 is not a highly toxic gas. Deleted the following text: "SF6 is a highly toxic gas."

c) **Page 8-11, Paragraph 2, Line 1**: Incorrect reference was used. Changed reference from "Section 8.1.1" to "Section 8.3.1"

d) **Page 8-35, Paragraph 5, Line 3**: According to PSE, NESC does not direct how to shield lines with lightning protection. Deleted "according to NESC guidelines."

e) **Page 8-40, Paragraph 3, Lines 6-8:** The codes PSE designs to include IBC, ASCE, and ACI. The public utility commission is not involved in establishing code requirements. Text has been changed from "In addition, the 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." To "In addition, PSE would meet the structural requirements set by the IBC, ASCE, and ACI."

6) Chapter 9 – Noise:

a) **Use of "maintenance yards":** Throughout the chapter, the term "maintenance yards" should be "utility yards." Utility yards is the more commonly used term.

b) **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: 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. Text has been changed from "Electrical substations are exempt from the maximum permissible noise levels established in Chapter 173-60 of the Washington Administrative Code" to "Although electrical substations are subject to the noise state noise limits between the hours of 10:00 PM and 7:00 AM, they are not subject to the 10 dBA reduction (WAC 173-60-040(2)(b))."

7) Chapter 10 – Land Use:

a) **Page 10-24, Paragraph 1, Lines 1-2:** PSE owns the land that would be used for the Lakeside substation expansion. Changed text from "If the Lakeside site were chosen, PSE would need to purchase and develop land adjacent to the existing substation" to "If the Lakeside site were chosen, PSE would need to develop land adjacent to the existing substation."

b) **Page 10-26, Paragraph 1, Table 10–2:** Newcastle Use Restriction information was incorrect. It has been changed to say "utility facilities allowed in" rather than "utility yards not allowed in."

c) **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."

d) **Page 10-27, Paragraph 6, Lines 2–3**: 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 sentence has been deleted: "An underground transmission line would have the same potential constraints as Option A's overhead line regarding co-location with OPLC's pipeline."

8) Chapter 11 – Views and Visual Resources:

a) **Page 11-20, Paragraph 3, Lines 2-5:** The following information has been updated with locally specific information provided by PSE. The text has been changed from: "The 12.5 kV lines distribute electricity directly to consumers. These lines are commonly constructed of wood poles up to approximately 60 feet tall; the shorter poles make the lines less visible from a distance (Antunes et al., 2006)." To "The 12.5 kV lines distribute electricity directly to consumers. These lines are commonly constructed of wood poles up to approximately 34 to 40 feet tall; the shorter poles make the lines less visible from a distance (PSE, 2016)."

b) **Page 11-20, Paragraph 4, Lines 1-3:** The following information has been updated with locally specific information provided by PSE. The text has been changed from: "Typically, 115 kV lines are suspended on single wood poles and are generally 70 to 90 feet above ground (Corbin, 2007). " to "Typically, 115 kV lines are suspended on single wood poles and are generally 60 to 80 feet above ground (PSE, 2016)."

c) **Page 11-21, Paragraph 1, Lines 1-2:** New information from PSE suggested that the following clarifying text should be added: "However, depending on the function of the conductor, configuration, and number of circuits, such poles could be less than 70 feet tall (PSE, 2016)."

d) **Page 11-21, Paragraph 4, Line 2:** The Westminster substation was a proposed substation. The following text has been deleted: "the Westminster substation and…"

e) **Page 11-34, Paragraph 4, Lines 4-6:** The following information has been updated with locally specific information provided by PSE. The text has been changed from: "Depending on topography the pole height may vary, with the tallest height being approximately 135 feet if a highway is crossed (Corbin, 2007)" to "Depending on topography, the pole height may vary, with the tallest height being approximately 130 feet if a highway is crossed (PSE, 2016)."

f) **Page 11-37, Paragraph 4, Line 4:** SCL has two 230kv lines in its existing corridor. Text changed from "The SCL corridor already contains a 230 kV transmission line," to "The SCL corridor already contains two 230 kV transmission lines,"

9) Chapter 12– Recreation:

a) **Page 12-2, Table 12-1.** Parks and Recreation Plans for Study Area Communities: Redmond's Transportation Master Plan, which includes pedestrian and bicycle system plans (2013), was not originally included in Table 12-1.

10) Chapter 15– Public Services:

a) **Page 15-13, Paragraph 1, Lines 1-2:** Water and sewer pipelines may also need to be extended to the peak generation plants. Text has been changed from: "Construction of peak generation plants would require construction similar to a substation, but would likely also require replacing or extending major gas mains for natural gas supply" to "Construction of peak generation plants would require construction similar to a substation, but would likely also require replacing or extending major gas mains for natural gas supply, and potentially extending water and sewer pipelines to the peaking facilities."

11) Chapter 16 – Utilities:

a) **Page 16-16, Paragraph 5, Line 1:** Error in text states that two substations may be needed. Changed text from "two new substations may be needed" to "two new transformers may be needed."

b) **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.

c) **Page 16-20, Paragraph 4, Lines 1-2:** The text incorrectly implies that the Westminster and Vernell substations are existing facilities. Text has been changed from: "The expansion of the Lakeside substation or the Westminster or Vernell substation sites would require construction of underground foundations to support the new transformer" to "The expansion of the Lakeside substation or the development of the Westminster or Vernell substation sites would require the construction of underground foundations to support the new transformer."

12) Appendix B – Potential Construction Equipment:

a) **Table B-1:** Crane added as a piece of equipment being considered for Alternative 1 (Options A and B) and Alternative 3 for the removal of existing wooden poles.

8

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Distribution List

CHAPTER 9. DISTRIBUTION LIST

The following parties have received the Draft EIS by electronic link, compact disc, or printed copy:

Federal Agencies

Army Corps of Engineers

Environmental Protection Agency

Federal Highway Administration

Postal 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

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

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Acronyms and Glossary

energize EASTSIDE EIS

CHAPTER 10. ACRONYMS AND GLOSSARY

ACRONYMS AND ABBREVIATIONS

AC	alternating current
ACGIH	American Council of Governmental Industrial Hygienists
AV	assessed value
BCC	Bellevue City Code
BMPs	Best Management Practices
BP	BP Pipelines-North America
BPA	Bonneville Power Administration
Btu	British thermal unit
C&PSRR	Columbia & Puget Sound Railroad
CAG	Community Advisory Group
CAP	Corrective Action Plan
CENSE	Coalition of Eastside Neighborhoods for Sensible Energy
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
ERC	Eastside Rail Corridor
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
F-N	frequency-number
FTA	Federal Transit Administration
G	gauss
GHG	greenhouse gas
GIS	geographic information system
HB	House Bill
HVAC	high voltage alternating current
Hz	hertz
I-405	Interstate 405
I-90	Interstate 90
ICES	International Committee on Electromagnetic Safety
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IDP	Inadvertent Discovery Plan
IEEE	Institute of Electrical and Electronics Engineers
INGAA	Interstate Natural Gas Association of America
K4C	King County-Cities Climate Collaboration
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
NH_4	methane
NMC	City of Newcastle Code
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTSB	National Transportation Safety Board
NWI	National Wetlands Inventory
Olympic	Olympic Pipe Line Company
OPGW	optical ground wire
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
SCADA	supervisory control and data acquisition
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
UK-HSE	Health and Safety Executive of the United Kingdom
USC	United States Code
USDA	U.S. Department of Agriculture
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
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
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WSDOT	Washington State Department of Transportation

GLOSSARY

Term	Description
AC Current Density	A measure of electrical interference adjacent to the pipeline.
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.
Bulk Power System	A system for bulk transfer of electrical energy, from generating power plants to electrical substations located near demand centers. This is distinct from the local wiring between high-voltage substations and customers, which is typically referred to as electric power distribution.
Carbon Sink	A natural environment that absorbs more carbon dioxide than it releases.
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.

Term	Description
Certificate of Appropriateness (COA)	The entitlement required to alter an individual landmark and any property within a landmark district.
Clear Zone	Area where vegetation has been removed to construct a new facility, create an access road, or meet design criteria for operation of transmission lines.
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.
Danger Tree	Trees at risk of falling and likely to come in contact with nearby wires.
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.
Duct Bank	An assembly of conduits installed underground between buildings, structures, or devices to allow installation of power and communication cables. They may either be directly buried in earth, or encased in concrete (sometimes with reinforcing rebar).
Eastside	An area of King County, Washington, roughly defined as extending from Renton in the south to Redmond in the north, and between Lake Washington and Lake Sammamish.
Ecosystems 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.
Electrocutions	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.
Ethnographic	The scientific description of the customs of individual people and cultures.
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 pipeline to corrode (or rust) on the outside of the pipe.
Exurban	A region or area outside a city or its suburbs and that often is inhabited primarily by affluent families.
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.

Term	Description
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.
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.
Frequency	The number of cycles that occur in 1 second, measured in hertz (Hz).
Generator	Machine for converting mechanical energy into electricity.
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 Consequence Area (HCA)	A location that is specifically defined in pipeline safety regulations as an area where pipeline releases could have greater consequences to health and safety or the environment. Regulations require a pipeline operator to take additional steps to ensure the integrity of a pipeline for which a release could affect an HCA.
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.

Term	Description
Historic Register-listed Resources	Resources 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.
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 (IRP)	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. Typically it is the agency proposing the project, but lead agency status may be transferred to another agency through an agency agreement.

Term	Description
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.
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.
Material Failure	Defects in the pipeline as a result of the pipe manufacturing process, stress on the pipeline handling during transport, or weld failures.
Mile Years	A means of predicting the number of pipeline incidents for a given length of line, over a given period of time. For example, if one considered an incident rate of 1.0 incidents per 1,000 miles years, one would expect one incident per year on a 1,000 mile pipeline.
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 considered necessary for worker and public safety under specific conditions, including electrical grounding and protection from lightning strikes.
National Pollutant Discharge Elimination System (NPDES)	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 Pipelines	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.
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.
Power Line Faults	Faults (or fault currents) are any abnormal current flow from the standard intended operating conditions.

Term	Description
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.
Problem Nests	When nest material on utility towers touches energized equipment, potentially conducting electricity when wet and igniting, resulting in outages and hazards to the nesting birds.
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.
SCADA	In the pipeline industry, SCADA systems are used to collect data from pipeline sensors in real time and display these data to humans (controllers) who monitor the data from remote sites. Controllers, in turn, can use the SCADA system to input commands that remotely operate pipeline control equipment, such as valves and pumps.
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.
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.

Term	Description
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 (SPCC) 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 (SWPPP)	A plan describing best management practices (BMPs) to control and treat stormwater.
Study Area Communities	Bellevue, Newcastle, Redmond, Renton.
Substation	Facility with equipment that switches, changes, or regulates electric voltage.
Supervisory Control And Data Acquisition System (SCADA)	A pipeline control system, usually computerized, designed to gather information such as pipeline pressures and flow rates from remote locations and regularly transmit this information to a central control facility where the data can be monitored and analyzed. Through this same system, the central control facility can often issue commands to the remote sites for actions such as opening and closing valves and starting and stopping pumps.
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.
Telecommunication 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.

Term	Description
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	To dig a long cut or trench into the ground.
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.
Turbine	A machine that generates rotary mechanical power from the energy produced by a stream of fluid (such as water, steam, or hot gas).
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 Locates	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 (VCE)	Occurs when there is a sudden release of flammable vapor, it mixes with air, and then 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.

Term	Description
Viewer Exposure	Considers the viewers proximity, extent, and duration of views.
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.
Views	The observation of a visual resource from a particular location, such as a private residence or a public park.
Visual Character	The aggregate of the visible attributes of a scene or object, including natural (topography, water bodies, vegetation) and built (building height and form, types of infrastructure) features.
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 often 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.