

BEFORE THE PUBLIC UTILITY COMMISSION
OF THE STATE OF OREGON

PCN 6

Petition for a Certificate of Public
Convenience and Necessity

PORTLAND GENERAL ELECTRIC COMPANY

REDACTED Direct Testimony of

Larry Bekkedahl

April 17, 2024

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I. Introduction

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Q. Please state your name, business address, and present position with Portland General Electric (PGE or the Company).

A. My name is Larry Bekkedahl. My business address is 121 SW Salmon Street, Portland, OR 97204. My current position at PGE is Senior Vice President, Strategy and Advanced Energy Delivery.

Q. Briefly describe your educational background and relevant licenses or certificates.

A. I have a Bachelor of Science degree in Electrical Engineering from Montana State University.

Q. Please describe your work experience.

A. I have more than four decades of work and leadership experience in the energy industry. Before joining PGE, I was Senior Vice President for Transmission Services at the Bonneville Power Administration and held leadership positions at Clark Public Utilities, PacifiCorp, and Montana Power Company. I joined PGE in 2014 as Vice President of Transmission & Distribution. In my current position, I oversee PGE’s daily grid operations, strategic system architecture, and system upgrades, which will serve as the foundation for the smart grid of the future. This includes initiatives related to system integration and operations, smart cities, enabling distributed energy resources, energy storage, dispatchable standby generation, transmission system performance and market interfaces, as well as research and development. I also serve on the Electric Power Research Institute Research Advisory Committee, the Stanford University Bits and Watts Advisory Council, the Pacific Northwest National Laboratory Advisory Board, and the Grid Wise Alliance Board.

1 **Q. What is the purpose of your testimony in this proceeding?**

2 A. The purpose of my testimony is to present the justification for the Rosemont-
3 Wilsonville Transmission Line (the Rosemont-Wilsonville Line), which is an
4 overhead, 115-kilovolt (kV) transmission line totaling 7.4 miles in length. The line is
5 located within Clackamas and Washington Counties, with the line's termini being the
6 existing Rosemont and Wilsonville Substations. The Rosemont-Wilsonville Line is a
7 critical component of what is called the Tonquin Project. The Tonquin Project includes
8 significant upgrades to PGE's distribution and transmission systems, including the new
9 Tonquin Substation in Washington County. The Rosemont-Wilsonville Line is the
10 only portion of the Tonquin Project for which PGE requires a Certificate of Public
11 Convenience and Necessity (CPCN). However, all components of the Tonquin Project,
12 including the distribution and transmission upgrades, are designed as an integrated
13 solution. Accordingly, while my testimony will focus on the Rosemont-Wilsonville
14 Line, I will address the justification for the entire Tonquin Project.

15 **Q. What are the benefits resulting from the construction and operation of the**
16 **Tonquin Project, including the Rosemont-Wilsonville Line?**

17 A. The benefits from the Tonquin Project and the Rosemont-Wilsonville Line include grid
18 reliability/resiliency and increased transmission capacity necessary to support load
19 growth in Tualatin, Sherwood, and Wilsonville. The Tonquin Project, including the
20 Rosemont-Wilsonville Line, will maintain reliability of the transmission system in
21 Portland's south metropolitan area, including Tualatin, Sherwood, Wilsonville, West
22 Linn, Lake Oswego, and unincorporated areas of Clackamas County and Washington

1 County (hereinafter, South Metro area¹) by adding additional high-capacity bulk
2 electric facilities designed with the most up-to-date engineering standards and
3 increasing the available load serving capability in the service areas noted above.
4 Furthermore, the Rosemont-Wilsonville Line development area has been designed to
5 accommodate load from newly constructed crucial public infrastructure, allow for
6 future economic development, provide capacity to avoid load shedding and outages to
7 customers, as well as resiliency during major ice storm events or wildfires.

8 Because PGE's proposed route maximizes the use of existing rights-of-way,
9 PGE has minimized the impacts associated with construction and operation of the
10 Rosemont-Wilsonville Line. In evaluating route options for the Rosemont-Wilsonville
11 Line, PGE thoroughly analyzed potential impacts to various resources, including
12 impacts to hydrologic features such as streams and wetlands, wildlife habitat,
13 agricultural land, and cultural resources. In sum, the Rosemont-Wilsonville Line is
14 justified because the benefits of the line to the public in maintaining system reliability
15 and allowing for future economic development outweigh the impacts, which have been
16 minimized to the extent feasible by relying on existing utility corridors and rights-of-
17 way. The selected route also minimizes the impacts to the fewest number of
18 landowners.

19 **Q. Please describe the local population growth and load growth in the South Metro**
20 **area that the Tonquin Project, including the Rosemont-Wilsonville Line,**
21 **addresses in more detail.**

¹ Direct Testimony of Dr. Ian Beil (PGE/100, Beil/2-5). Technically, this area refers to the southern portions of PGE's western and eastern service regions.

1 A. From 1990 to 2023, the population of Wilsonville has grown 289 percent;² the
2 population of Tualatin has grown 86 percent;³ the population of West Linn has grown
3 67 percent;⁴ the population of Sherwood has grown 575 percent;⁵ and the population
4 of Lake Oswego has grown 35 percent.⁶ Overall, the population of Clackamas County
5 has grown 52 percent in the same period.⁷ No new transmission has been built in the
6 area since 1970. As discussed in the direct testimony of Dr. Ian Beil and later in my
7 testimony, the existing system can no longer handle the load increase of the area.
8 Numerous commercial and multifamily housing units have been built throughout the
9 South Metro area along with major shopping stores like Costco, Home Depot, Fred
10 Meyer, and other shopping centers. New industrial buildings are springing up around
11 the South Metro area, including semiconductor manufacturing and technology, and
12 PGE anticipates electric vehicles and vehicle charging along Interstate 5 and Interstate
13 205. The South Metro area will soon surpass loading criteria for the existing
14 transmission lines, which may result in rolling outages for customers during high heat
15 events in the summer and cold winter periods.

²Portland State University, Center for Population Research and Census, *1990 Census Count of Oregon Counties, Cities, and Census Designated Places by Race and Age* at 8 (Feb. 28, 1991), available at <https://pdx.edu/population-research/sites/g/files/znlldhr3261/files/2020-07/1990%20Census.pdf> (Population of Wilsonville was 7,106 in 1990) [hereinafter, “1990 Census Count”]; compare with Portland State University, Center for Population Research and Census, *2023 Certified Population Estimates* (Dec. 15, 2023), available at <https://www.pdx.edu/population-research/middle-east-studies/population-estimate-reports> (Population of Wilsonville was 27,634 in 2023) [hereinafter, “2023 Census Count”].

³ 1990 Census Count at 8 (Population of Tualatin was 15,013 in 1990); compare with 2023 Census Count (Population of Tualatin was 27,910 in 2023).

⁴ 1990 Census Count at 8 (Population of West Linn was 16,367 in 1990); compare with 2023 Census Count (Population of West Linn was 27,360 in 2023).

⁵ 1990 Census Count at 7 (Population of Sherwood was 3,093 in 1990); compare with 2023 Census Count (Population of Sherwood was 20,868 in 2023).

⁶ 1990 Census Count at 6 (Population of Lake Oswego was 30,576 in 1990); compare with 2023 Census Count (Population of Lake Oswego was 41,396 in 2023).

⁷ 1990 Census Count at 3 (Population of Clackamas County was 278,850 in 1990); compare with 2023 Census Count (Population of Clackamas County was 424,043 in 2023).

1 **Q. Has PGE also taken environmental justice considerations into account in siting**
2 **the Rosemont-Wilsonville Line?**

3 A. Yes. As discussed in further detail below, the Company's analysis indicates that the
4 Rosemont-Wilsonville Line will not have disproportionate impacts on environmental
5 justice (EJ) communities.

6 **Q. Does a balancing of the costs and benefits support construction of the Rosemont-**
7 **Wilsonville Line as compared to alternatives?**

8 A. Yes. As discussed in more detail below, PGE thoroughly analyzed the practicability
9 and feasibility of the proposed alignment for the Rosemont-Wilsonville Line and
10 determined that the proposed route is the least costly and least impactful to landowners
11 and the environment as compared to the two transmission route alternatives that PGE
12 considered in depth. In addition to the two alternative routes that PGE considered in
13 depth, PGE also considered, but eliminated at earlier stages, other potential route
14 alternatives due to input from the Oregon Department of Transportation (ODOT), with
15 greater impacts and constructability challenges. Finally, PGE considered
16 undergrounding the line, but ultimately decided that the Rosemont-Wilsonville Line
17 should be overhead transmission due to the significant costs of undergrounding that
18 would be borne by all customers within PGE's service territory, significant ground
19 disturbance along Stafford Road, and operational challenges associated with
20 underground transmission facilities.

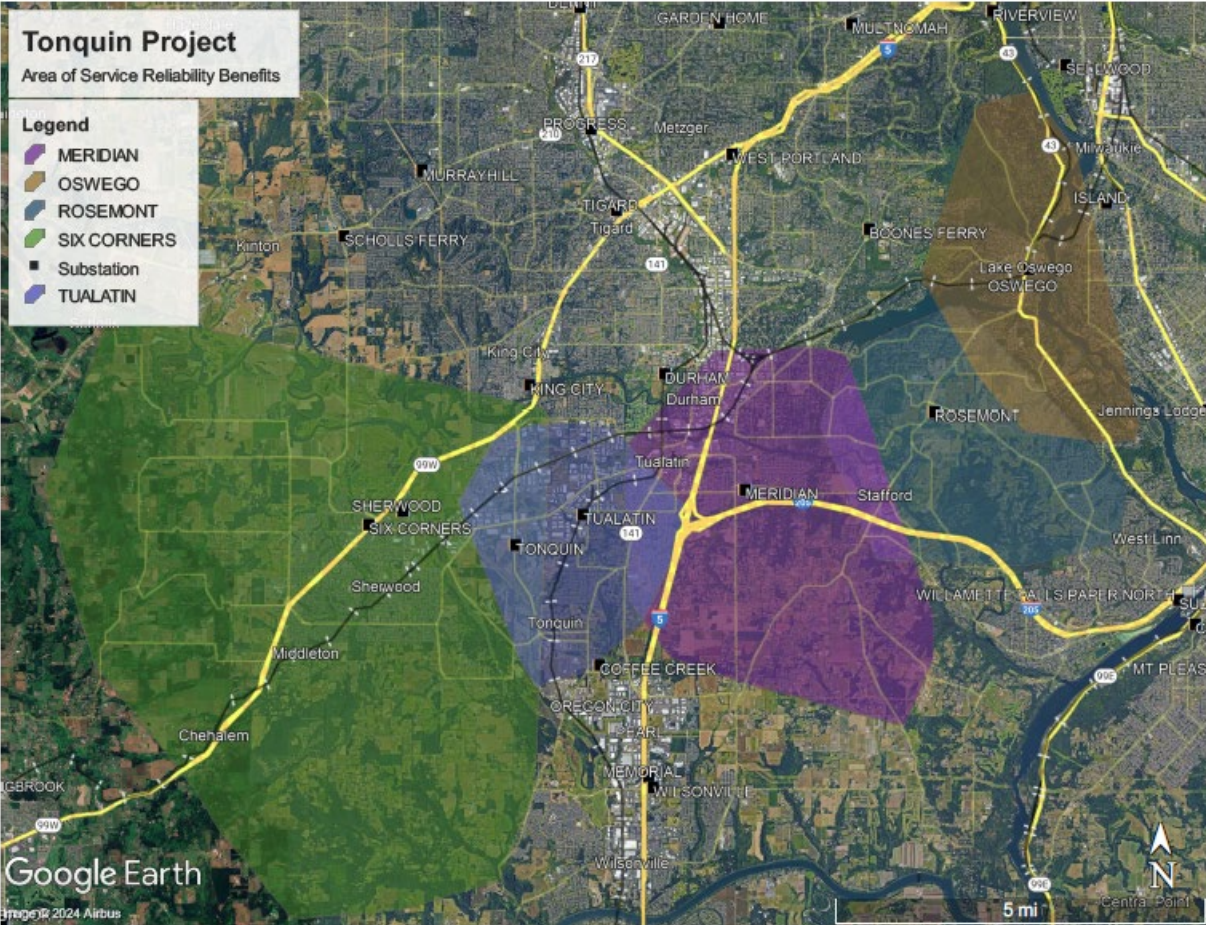
1 **II. Justification for the Tonquin Project and Rosemont-Wilsonville Line**

2 **A. Grid Reliability/Resiliency**

3 **Q. Please explain how the Tonquin Project, including the Rosemont-Wilsonville**
4 **Line, will contribute to the reliability and resiliency of the grid.**

5 **A.** As discussed in the direct testimony of Dr. Beil, the Tonquin Project, including the
6 Rosemont-Wilsonville Line, will provide necessary reliability improvements to the
7 transmission system in the South Metro area by adding additional high-capacity bulk
8 electric facilities designed with the most up-to-date engineering standards and by
9 increasing the available load serving capability.

Figure 1: Map of Reliability Benefits



1 The Tonquin Project, including the Rosemont-Wilsonville Line, is necessary to resolve
 2 and reduce multiple modeled double outage scenarios resulting in significant overloads
 3 of transmission lines in the surrounding areas.⁸ These modeled outage scenarios include
 4 **Begin Highly Protected** [REDACTED]
 5 [REDACTED]
 6 [REDACTED]
 7 [REDACTED] **/End Highly Protected** (Highly
 8 Protected Exhibit PGE/106).⁹ This includes overloads as high as **Begin Highly**
 9 **Protected** [REDACTED] **/End Highly Protected** percent of the facility rating.¹⁰ Critically, in
 10 these scenarios, remedial actions such as switching substations to alternate sources or
 11 adjusting generation patterns would not be sufficient to prevent overload—instead,
 12 only direct shedding or curtailing of customer loads will bring the transmission
 13 facilities within rated limits.¹¹

14 Without the Tonquin Project, including the Rosemont Wilsonville Line, in a
 15 **Begin Highly Protected** [REDACTED] **/End Highly Protected** percent overload N-1-1
 16 contingency event, PGE will need to shed 35 megawatts (MW) of load, which equates
 17 to 21,000 residential customers losing power.¹² While shedding load is an acceptable
 18 operational corrective action under North American Electric Reliability Corporation
 19 Reliability Standard TPL-001-5.1, it is a suboptimal outcome for customers as it may
 20 disrupt communications, water, and transportation; close retail businesses, grocery

⁸ PGE/100, Beil/35-36; *see also* Tonquin Power Flow Results Update at 1-2 (Highly Protected PGE/106, Beil/1-2).

⁹ PGE/100, Beil/35-36.

¹⁰ PGE/100, Beil/35.

¹¹ PGE/100, Beil/35-36.

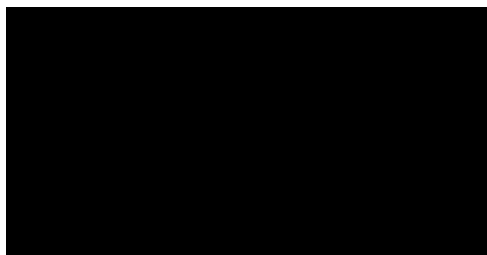
¹² PGE/100, Beil/35.

1 stores, gas stations, ATMs, banks, and other services; and cause food spoilage and
2 water contamination.¹³ PGE attempts to avoid such outcomes as a matter of best
3 practice.

4 **Q. Please identify what benefits the Tonquin Project transmission facilities provide,**
5 **if any, to other transmission already in service in terms of line ratings and**
6 **congestion.**

7 A. As discussed in more detail in the direct testimony of Dr. Beil, constructing the
8 Rosemont-Wilsonville Line and the McLoughlin-Tonquin 115-kV line will alleviate
9 identified congestion under N-1-1 transmission outage conditions on the following
10 transmission facilities:

11 **Begin Highly Protected/**



18 **/End Highly Protected**

19 **B. Local Value in PGE's Service Territory**

20 **Q. Does the Rosemont-Wilsonville Line provide regional transmission benefits?**

21 A. No, the Rosemont-Wilsonville Line is a relatively small transmission line that is part
22 of the Tonquin Project and is not intended to provide regional benefits. Instead, the
23 benefits of the line are localized in the South Metro area.

¹³ PGE/100, Beil/26.

¹⁴ PGE/100, Beil/37-38.

1 **Q. Please describe additional local benefits of constructing the Tonquin Project and**
2 **Rosemont-Wilsonville Line.**

3 A. The Tonquin Project, including the Rosemont-Wilsonville Line, will support future
4 development of new customer load in Tualatin, Sherwood, and Wilsonville and
5 maintain system reliability for the South Metro area. The Rosemont-Wilsonville Line,
6 as one of the Tonquin Project transmission facilities, is intended to address the multiple
7 inquiries for load development that PGE has received. PGE has performed preliminary
8 evaluations of several inquiries for prospective load addition requests in the Tualatin,
9 Sherwood, and Wilsonville areas, including prospective semiconductor manufacturing
10 and technology customers. PGE's ten-year power flow analysis conducted in 2024
11 indicates that once the Rosemont-Wilsonville Line and McLoughlin-Tonquin 115-kV
12 line are constructed, there will be sufficient capacity on both of these lines to avoid any
13 further reconductors through 2034.¹⁵

14 In addition, the Tonquin Project, including the Rosemont-Wilsonville Line, are
15 necessary to accommodate load from essential public infrastructure— i.e., the new
16 water treatment plant—for the Beaverton, Hillsboro, and Tualatin Valley Water
17 District (TVWD) service areas. Construction and operation of the new water treatment
18 plant is essential to the new Willamette Water Supply System (WWSS), which, when
19 complete, will be one of Oregon's most seismically resilient water systems and will
20 produce high-quality, safe, and reliable drinking water for the residents in the
21 Beaverton, Hillsboro, and TVWD service areas. The plant, which will initially produce
22 up to 60 million gallons of water per day (mgd), is planned for an ultimate capacity of

¹⁵ PGE/100, Beil/38.

1 120 mgd to account for future population growth in the area. Moreover, the water
2 treatment plant, which is located on basalt rock and is being constructed to have
3 superior seismic resiliency, will enhance emergency preparedness by being able to
4 produce drinking water for emergency responders and the community within 24 hours
5 of a major seismic event. Although the water treatment plant will have back-up power
6 generation capabilities, it will be dependent upon PGE power service to restore the full
7 water-production capacity at the plant.

8 Furthermore, in emergency scenarios, such as ice storms or wildfires, the
9 Tonquin Project and Rosemont-Wilsonville Line may provide needed capacity to avoid
10 and minimize load shedding and outages to customers. The Rosemont-Wilsonville Line
11 increases connectivity between the Sherwood, Tualatin, and Lake Oswego areas, which
12 can be used to re-route electricity in the event of an outage or capacity constraint on
13 the existing 115-kV lines in these areas during an emergency scenario. Additionally,
14 with the upgrade to the 50-year-old distribution line,¹⁶ PGE will incorporate new
15 monitoring and protection equipment that allows for immediate switching or cut-off to
16 reduce impacts related to overloads, outages (e.g., vehicle collisions, fallen trees or
17 limbs, etc.), or ignitions which could lead to wildfires.

18 Finally, the Rosemont-Wilsonville Line will result in positive economic
19 impacts for the communities in the vicinity of the line in the form of family-wage union
20 construction jobs and an estimated increase of \$400,000 in annual tax benefits in total
21 to the counties for Rosemont-Wilsonville Line-specific property tax dollars.

¹⁶ Some components of the distribution system in the area date back to the 1940's.

1 **C. Route Impact Evaluation**

2 **Q. How did PGE assess route impacts along the Rosemont-Wilsonville Line?**

3 A. PGE performed a desktop review of public data concerning wetlands, streams,
4 vegetation corridors, and other environmental considerations within the transmission
5 corridor. Results of a desktop review provide a representative summary of constraints
6 that may be present in the project area and highlight specific locations where constraints
7 may trigger the need for permits or land use approvals.

8 **Q. What public data sources did PGE use to assess potential environmental**
9 **constraints?**

10 A. PGE identified potential environmental constraints, such as wetlands and sensitive
11 biological areas, using existing publicly available delineations and wetland inventory
12 information, light detection and ranging elevation data, Google Earth imagery, water
13 signatures on aerial photography, and hydric soils information. The Company
14 requested biological data from publicly available sources, such as the United States
15 (U.S.) Fish and Wildlife Service (FWS) Information for Planning and Consultation
16 system and the FWS Environmental Conservation Online System. Restrictive zoning
17 overlays were obtained from local jurisdictions.

18 **Q. Did PGE evaluate the potential impact of the Rosemont-Wilsonville Line on**
19 **hydrological resources?**

20 A. Yes. PGE analyzed the potential hydrological impact of all potential routes for the
21 Rosemont-Wilsonville Line. The selected route crosses six streams and rivers,
22 including the Tualatin River. 353 linear feet of the proposed route crosses National

1 Wetland Inventory-mapped wetland features and 360 linear feet of the route crosses a
2 Federal Emergency Management Agency designated floodplain.

3 **Q. Will the Rosemont-Wilsonville Line require any construction within the identified**
4 **hydrologic features?**

5 A. No. The Rosemont-Wilsonville Line is designed to span any hydrologic features, such
6 as streams and wetlands, crossed along the route. No transmission structure will be
7 constructed within any hydrologic features.

8 **Q. How will PGE minimize impacts to these streams, wetlands, and floodplain?**

9 A. The proposed alignment for the Rosemont-Wilsonville Line follows existing
10 transmission and distribution rights-of-way for much of the route, including the
11 Tualatin River crossing, thereby reducing the impacts to hydrologic features resulting
12 from the Rosemont-Wilsonville Line.

13 **Q. Has PGE proposed mitigation measures for the impacts to streams, wetlands, and**
14 **floodplains?**

15 A. No. Because the Rosemont-Wilsonville Line follows existing rights-of-way when
16 crossing these features and spans all of these features, PGE does not anticipate any
17 mitigation measures will be necessary.

18 **Q. Has PGE analyzed potential impacts to habitat resulting from the Rosemont-**
19 **Wilsonville Line?**

20 A. Yes. During project planning, PGE Environmental personnel assessed potential
21 impacts to wildlife and habitat resources. PGE biologists reviewed available internal,
22 state, and federal data on wildlife and habitat in the vicinity of the Rosemont-

1 Wilsonville Line and the possible impacts of the line. Overall, the area is low risk for
2 sensitive species and habitats.

3 **Q. Is the Rosemont-Wilsonville Line anticipated to impact threatened and**
4 **endangered species and their habitats?**

5 A. No, the proposed route for the Rosemont-Wilsonville Line does not cross any known
6 threatened or endangered species' habitat.

7 **Q. Did PGE consider wildlife habitat in its design for the Rosemont-Wilsonville**
8 **Line?**

9 A. Yes. The proposed Rosemont-Wilsonville Line follows existing roadway and utility
10 corridors, which further minimizes ground disturbance and potential impacts to wildlife
11 species and habitat.

12 **Q. Has PGE adopted measures to reduce potential impacts to avian and bat species?**

13 A. Yes. As discussed immediately above, the use of existing roadway and utility corridors
14 minimizes impacts to wildlife species and habitat, including avian and bat species.

15 Additionally, the Company has adopted multiple Transmission & Distribution
16 (T&D) standards that will reduce impacts to avian and bat species. The Company's
17 Avian Protection, General Requirements T&D Standard (LC11805) (attached as
18 Protected Exhibit PGE/201), and Avian Protection Plan (attached as Protected Exhibit
19 PGE/202), together implement several measures used to evaluate and reduce risks to
20 avian species while increasing system reliability. Key measures include training
21 employees on avian species protection issues and procedures; tracking avian species
22 and nest issues to assist in minimizing impacts; building nest platforms to reduce pole-
23 top nesting and outages; implementing design features to poles and transformers that

1 reduce risk to avian species; and collaborating with the FWS and the Avian Power Line
2 Interaction Committee on strategies that reduce interactions between avian species and
3 power infrastructure.¹⁷

4 PGE will also implement a combination of wildlife protection devices to
5 prevent and minimize avian and bat harm as provided in the Company's Wildlife
6 Protection, Covers and Guard T&D Standard (LC11810) (attached as Protected Exhibit
7 PGE/203). The protection devices available on the PGE system include center-phase
8 covers, covered jumpers, dead-end structure covers, bushing covers, cutout covers,
9 lightning arrester covers, getaway guards, flight diverters, and perch deterrents.¹⁸

10 Where applicable, the Rosemont-Wilsonville Line will also comply with PGE's
11 Osprey Platform Construction T&D Standard (LC11826) (attached as Protected
12 Exhibit PGE/204). This standard provides line crews with information on locating an
13 osprey platform, and on the materials needed and specifications required for
14 constructing the platform.¹⁹

15 Finally, Rosemont-Wilsonville Line personnel will comply with PGE Nest
16 Management, Environmental Work Practice (ENV-COMP-102) (attached as Protected
17 Exhibit PGE/205). This guidance requires PGE personnel to report all bird nest
18 management incidents to a PGE biologist and specifies actions to take upon discovery
19 of different types of bird nests.²⁰

¹⁷ Protected PGE/202, Bekkedahl/4, 13, 16-18, 21.

¹⁸ Protected PGE/203, Bekkedahl/1.

¹⁹ Protected PGE/204, Bekkedahl/1.

²⁰ Protected PGE/205, Bekkedahl/1.

1 **Q. Were potential impacts to cultural, historic, or archaeological resources**
2 **evaluated?**

3 A. Yes. PGE conducted a desktop analysis of the Oregon State Historic Preservation
4 Office's (SHPO) Oregon Archaeological Records Remote Access database and the
5 Oregon Historic Sites database to determine the presence of previously documented
6 cultural resources within one mile of the project. The proposed project area is near two
7 known historic sites and thus PGE intends to conduct archaeological monitoring during
8 ground disturbing activities near these areas. However, there is no federal nexus
9 associated with the project and a cultural resource survey is not recommended as the
10 project location has been significantly impacted by agricultural activities, above/below
11 ground utility installation, and road construction and maintenance. Because the
12 Rosemont-Wilsonville Line makes use of an area that has already been disturbed within
13 existing rights-of-way, PGE does not anticipate that construction will result in impacts
14 to cultural, historic, or archaeological resources.

15 **Q. Has PGE adopted any procedures to be followed in the event cultural, historic, or**
16 **archaeological resources are identified during construction?**

17 A. Yes. The Company will implement and follow the PGE Inadvertent Discovery
18 Procedure (IDP) if any cultural, historic, or archaeological resources are identified
19 during project construction activities. This procedure requires a protection and
20 mitigation protocol for the inadvertent discovery of a cultural resource. Specifically, in
21 the event a cultural resource is discovered during the construction process, all work
22 within the area of discovery will cease immediately. PGE personnel will flag off a
23 buffered area about 200 feet around the discovery if possible and promptly protect the

1 discovery from continued exposure to the weather and from public view.²¹ PGE's
2 Cultural Resources Specialist will conduct an on-site assessment of the inadvertent
3 discovery and coordinate further archaeological fieldwork and reporting required to
4 complete documentation of the inadvertent find.²² If Tribes require repatriation of any
5 cultural resources, PGE's Cultural Resources Specialist will coordinate the effort with
6 stakeholders jointly identified by the SHPO, designated Tribes, and PGE within a
7 reasonable time frame.²³ PGE will follow all appropriate laws and management
8 procedures to properly treat and care for the discovery.²⁴ PGE's Cultural Resources
9 Specialist will confirm with PGE management when the area is cleared for work to
10 resume.²⁵ PGE's IDP is attached as Protected Exhibit PGE/206.

11 **Q. Has PGE considered potential agricultural impacts from the Rosemont-**
12 **Wilsonville Line?**

13 A. Yes. Because the Rosemont-Wilsonville Line is primarily located within existing
14 rights-of-way, PGE does not anticipate agricultural impacts. Nonetheless, PGE will
15 consult with impacted landowners to understand their concerns regarding potential
16 agricultural impacts and, where feasible, will make micro-siting adjustments to reduce
17 impacts and discuss mitigation for any unavoidable impacts.

18 **Q. Has PGE considered potential visual impacts that could result from the**
19 **Rosemont-Wilsonville Line?**

²¹ Protected PGE/206, Bekkedahl/4.

²² Protected PGE/206, Bekkedahl/5.

²³ Protected PGE/206, Bekkedahl/5.

²⁴ Protected PGE/206, Bekkedahl/5.

²⁵ Protected PGE/206, Bekkedahl/5.

1 A. Yes. PGE understands that a transmission line may cause visual impacts and the
2 Company included in its design of the Rosemont-Wilsonville Line features that will
3 mitigate potential visual impacts. First, PGE routed the transmission line, to the extent
4 possible, along rights-of-way with existing power line structures and will site new
5 towers adjacent to the location of the existing structures being replaced. This approach
6 will minimize visual impacts of the Rosemont-Wilsonville Line. Additionally, in
7 locations where a steel structure for the Rosemont-Wilsonville Line will replace an
8 existing wood distribution or transmission structure, the Company will use a weathered
9 steel structure which develops a brown patina to mimic the look of a wood pole. For
10 steel poles, PGE has also opted to require thicker steel, which results in an overall
11 reduction in the pole diameters when compared to poles designed with the minimum
12 steel thickness, thus reducing the visual impact. As to the conductors, PGE will use a
13 non-reflective transmission line to reduce glare and visibility.

14 **Q. Did PGE analyze vehicular traffic impacts that may occur during construction of**
15 **the Rosemont-Wilsonville Line?**

16 A. Yes. As discussed in greater detail in the direct testimony of Kevin Putnam, Dan Nuñez,
17 and Matt Gordanier, PGE's contractors identified locations along the Rosemont-
18 Wilsonville Line that will require careful coordination, preparation, and planning to
19 manage and navigate the vehicle traffic along busy roadways, including Stafford
20 Road.²⁶ PGE will minimize and mitigate these temporary traffic impacts by following
21 ODOT's *Oregon Temporary Traffic Control Handbook* (Exhibit PGE/323) and the

²⁶ PGE/300, Putnam-Nuñez-Gordanier/33-34.

1 Company's Traffic Control Plan (Protected Exhibit PGE/324) for the Rosemont-
2 Wilsonville Line.²⁷

3 **D. Environmental Justice**

4 **Q. Please describe the relevant Oregon statutes addressing EJ issues.**

5 A. Although I am not an attorney, I have reviewed the relevant statutes and developed an
6 understanding of the statutes addressing EJ issues in Oregon. The Commission is
7 required to consider the effects of any actions on "environmental justice issues."²⁸ The
8 Commission's statute, ORS 756.010(4), defines environmental justice as "equal
9 protection from environmental and health hazards and meaningful public participation
10 in decisions that affect the environment in which people live, work, learn, practice
11 spirituality and play."²⁹ ORS 756.010(5) provides that EJ communities include several
12 categories: communities of color, communities experiencing lower incomes, tribal
13 communities, rural communities, coastal communities, communities with limited
14 infrastructure and other communities traditionally underrepresented in public processes
15 and adversely harmed by environmental and health hazards, including but not limited
16 to seniors, youth and persons with disabilities.³⁰

²⁷ PGE/300, Putnam-Nuñez-Gordanier/33-34.

²⁸ ORS 182.545(1).

²⁹ ORS 182.535(3) provides a slightly broader definition: "Environmental justice" means "the equal protection from environmental and health risks, fair treatment and meaningful involvement in decision making of all people regardless of race, color, national origin, immigration status, income or other identities with respect to the development, implementation and enforcement of environmental laws, regulations and policies that affect the environment in which people live, work, learn and practice spirituality and culture."

³⁰ ORS 182.535(4) provides a similar but slightly broader definition: "Environmental justice community" includes "communities of color, communities experiencing lower incomes, communities experiencing health inequities, tribal communities, rural communities, remote communities, coastal communities, communities with limited infrastructure and other communities traditionally underrepresented in public processes and adversely harmed by environmental and health hazards, including seniors, youth and persons with disabilities."

1 **Q. Did PGE analyze whether EJ communities are present in the vicinity of the**
2 **Rosemont-Wilsonville Line?**

3 A. Yes. PGE retained Black & Veatch (B&V) to identify any EJ communities in the
4 project area.³¹ B&V reviewed demographic information on ethnicity, race, economic
5 status, and other factors in the census blocks where the Rosemont-Wilsonville Line is
6 proposed to establish a baseline for assessing potential impacts to EJ communities.

7 **Q. Did B&V identify EJ communities in the vicinity of the Rosemont-Wilsonville**
8 **Line?**

9 A. Yes. As shown in Figures 2 and 3, below, using census block data, B&V identified
10 communities of color,³² communities experiencing lower incomes, and rural
11 communities in the study area for the Rosemont-Wilsonville Line.

³¹ For purposes of B&V's analysis, the project area was defined as a one-mile buffer zone around the project route.

³² For "communities of color" as identified in ORS 756.010(5), B&V relied on the Council on Environmental Quality's (CEQ) guidance on defining "minority" populations for EJ analyses, which is specific to racial and ethnic categories. See CEQ, *Environmental Justice: Guidance Under the National Environmental Policy Act*, Appendix A at 25 (1997), available at https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf ("Minority: Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic."). This definition is still relied upon by federal agencies when conducting environmental justice analyses. See U.S. Env't Prot. Agency, *Technical Guidance Assessing Environmental Justice in Regulatory Analysis* at 6-7 (2016), available at https://www.epa.gov/sites/production/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf. Accordingly, B&V reviewed the following racial and ethnic census blocks as defined by the U.S. Office of Management and Budget in assessing impacts on "communities of color": African American; Native American and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; and Hispanic or Latino. B&V also considered the "Some Other Race" and "Two or More Races" census blocks.

Figure 2. Environmental Justice Communities in the Study Area

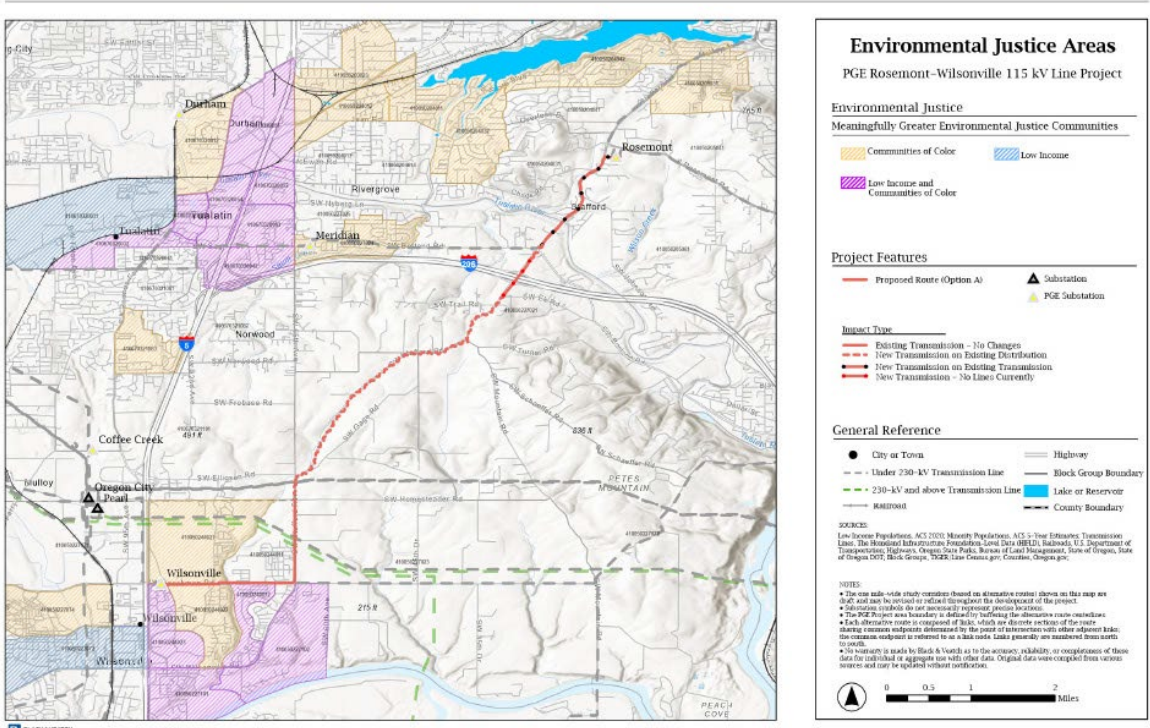
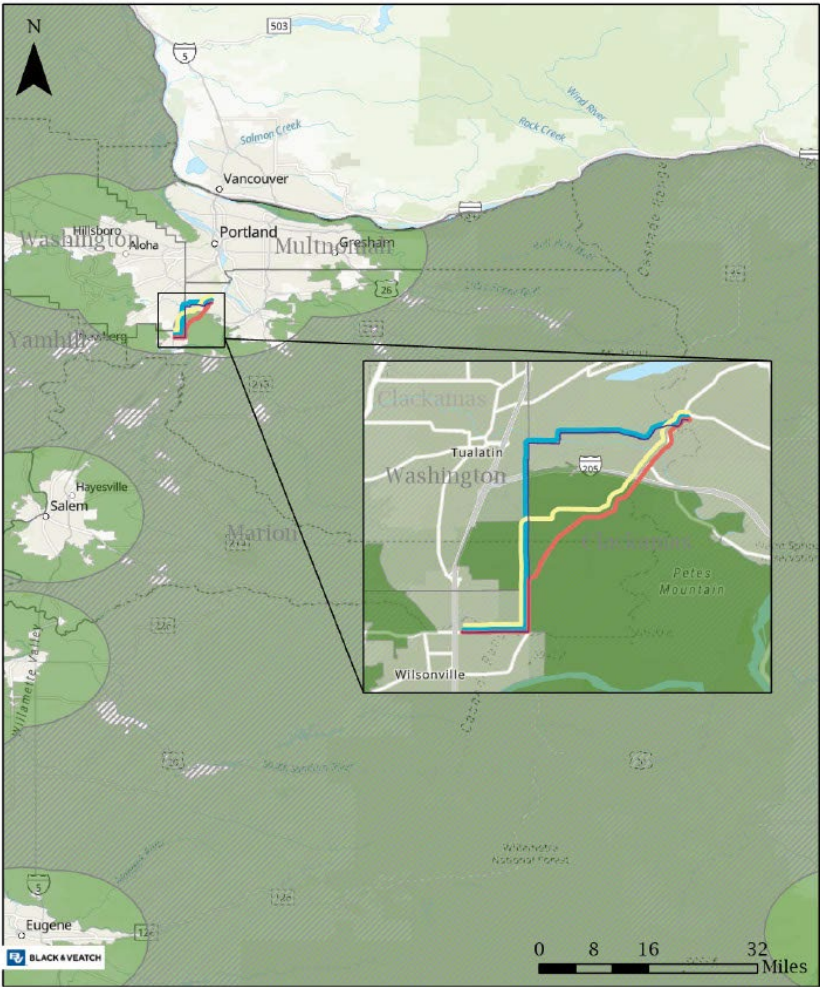


Figure 3. Rural Areas



1 Q. Will the proposed route impact communities of color and communities
2 experiencing lower incomes?

3 A. A short segment of the proposed route would be located within or adjacent to census
4 blocks with a meaningfully greater percentage of communities of color or communities
5 experiencing lower incomes. Importantly, however, the portion of the route that would

1 be located within or adjacent to these communities involves the use of the McLoughlin-
2 Wilsonville 115-kV line, which is an existing and currently operating transmission line.
3 No construction will be required in this area, and no changes in operations of the
4 transmission line are anticipated as this portion of the McLoughlin-Wilsonville 115-
5 kV line is simply being repurposed and tied into the Rosemont-Wilsonville Line. Thus,
6 there would be no change or incremental impacts to these communities from the
7 Rosemont-Wilsonville Line because the use of the existing line is consistent with the
8 existing conditions, and accordingly, no disproportionate impacts to these communities
9 are expected.

10 **Q. Will the proposed route impact rural communities?**

11 A. No, not as defined in Oregon. The Oregon Office of Rural Health (ORH)—whose
12 definition Commission Staff has relied on in past EJ analyses for CPCN dockets—
13 specifically defines rural communities as follows: those areas more than 10 miles from
14 the centroid of a population center of 40,000 people or more.³³ Given the Rosemont-
15 Wilsonville Line’s proximity to Portland, no portion of the proposed route is defined
16 as rural. Therefore, rural EJ populations are not present along the route according to
17 the ORH-specific definition.

33 *Oregon Office of Rural Health Geographic Definitions, About Rural and Frontier Data*, ORH, <https://www.ohsu.edu/oregon-office-of-rural-health/about-rural-and-frontier-data#:~:text=Oregon%20Office%20of%20Rural%20Health%20Geographic%20Definitions,Oregon's%2036%20counties%20as%20frontier> (last visited April 17, 2024). ORH uses population numbers from the Population Research Center at Portland State University for incorporated cities and counties, and numbers from Claritas for Oregon Zip Codes. *See id.* Commission Staff relied on the ORH definition in reviewing Idaho Power’s EJ analysis in docket PCN 5. *In re Idaho Power Company’s Petition for a Certificate of Public Convenience and Necessity*, Docket PCN 5, Opening Testimony of Charles Lockwood at 12 n.15 (Jan. 17, 2023) (Staff/300, Lockwood/12 n.15).

1 However, in order to present the most conservative possible analysis, B&V also
2 applied the U.S. Census Bureau (USCB) definition of rural, which is much broader.

3 That agency defines rural areas as follows:

4 Rural = All population and territory that is not an Urbanized Area (UA)
5 or Urban Cluster (UC).

6 Urbanized Area (UA): Consists of contiguous, densely settled Census
7 block groups and Census blocks, at least 500 people per square mile,
8 that together encompass a population of more than 50,000.

9 Urban Cluster (UC): Consists of contiguous, densely settled Census
10 block groups and Census blocks, at least 500 people per square mile),
11 that together encompass a population of at least 2,500 people but fewer
12 than 50,000 people.

13 As shown in Figure 3, under the USCB definition, much of the proposed route does
14 overlap with rural areas, from its crossing of Interstate 205 south to the Wilsonville
15 area. However, application of even this more conservative screen does not indicate an
16 impact on rural communities that is either inappropriate or significantly greater than
17 the impact on urban communities.

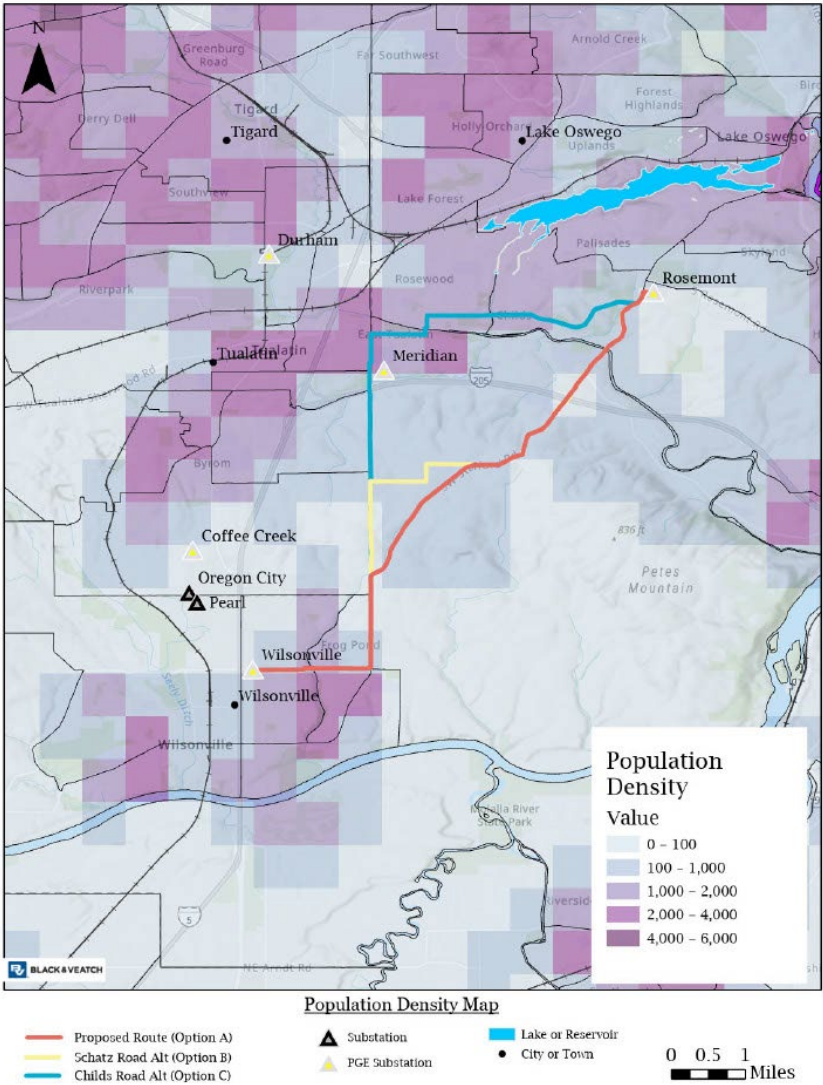
18 The potentially highest impact along the proposed route is where entirely new
19 construction is planned where the route crosses Interstate 205. It is significant that this
20 segment of the line is located at the boundary between USCB-defined urban and rural
21 areas with part of the impact in each. This area of new construction is also in the
22 highway right-of-way, not through USCB-defined rural residential properties. The
23 majority of impacts along the line are very similar whether in the USCB-defined rural
24 or urban areas and involve transmission lines being overbuilt on existing transmission
25 and distribution lines. The types of impact in the USCB-defined rural areas and the
26 fact that most impacts would be very similar whether in the USCB-defined rural or

1 urban areas indicates that communities in the USCB-defined rural area would not bear
2 a disproportionate share of the adverse impacts of the project even if close to half the
3 length of the project is within a USCB-defined rural area.

4 **Q. Are the USCB-defined rural areas densely populated?**

5 A. No. As shown in Figure 4, below, PGE minimized impacts to communities in USCB-
6 defined rural areas by avoiding densely populated areas and by siting the route adjacent
7 to existing roadways.

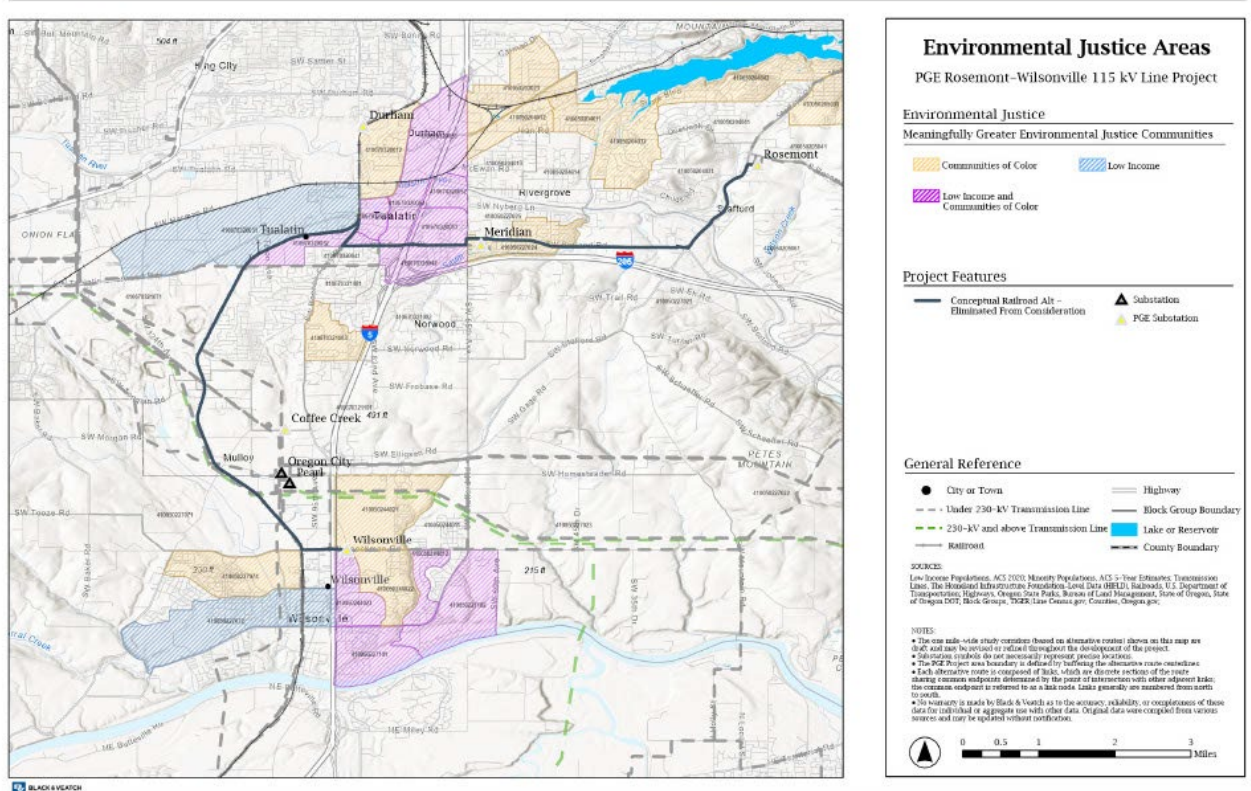
Figure 4. Population Density Mapping



- 1 Q. Would siting the Rosemont-Wilsonville Line in urban areas to avoid USCB-
- 2 defined rural areas result in impacts to different EJ communities?
- 3 A. Likely yes. As shown in Figure 5, below, the Company initially considered a
- 4 conceptual route that would take advantage of railroad rights-of-way and would be

1 located in a more urban area. However, the mapping also shows that the route would
2 likely impact EJ communities.

Figure 5: Conceptual Railroad Alternative and EJ Community Impacts



3 **Q. Based on the data discussed above, do you believe that the proposed route for the**
4 **Rosemont-Wilsonville Line results in a disproportionate impact on the identified**
5 **EJ communities?**

6 **A. No. While EJ communities were identified along the proposed route of the Rosemont-**
7 **Wilsonville Line, construction and operation of the line is not expected to have a**
8 **disproportionate impact on these communities.**

9 **E. Costs and Benefits of the Rosemont-Wilsonville Line Compared to Alternatives**

10 **Q. Did PGE consider undergrounding the Rosemont-Wilsonville Line?**

1 A. Yes. PGE considered undergrounding the line, but ultimately decided that the
2 Rosemont-Wilsonville Line should be constructed overhead due to the significant costs
3 of undergrounding that would be borne by all customers, the significant ground
4 disturbance along SW Stafford Road, and operational challenges associated with
5 underground transmission facilities.

6 **Q. What are the estimated costs of undergrounding the Rosemont-Wilsonville Line**
7 **and how do the costs compare to overhead transmission?**

8 A. The cost to underground a 115-kV transmission line may vary depending on geographic
9 location, design specifications, easement acquisition, and work zone restoration;
10 however generally, the estimated direct cost to underground a 115-kV transmission line
11 is approximately \$15-25 million per mile. Accordingly, the total approximate direct
12 cost to underground the 7.4-mile-long Rosemont-Wilsonville Line is approximately
13 \$111-185 million—about six to 10 times as much as the estimated direct cost for the
14 overhead line configuration.

15 **Q. Please describe the advantages and disadvantages of undergrounding the**
16 **Rosemont-Wilsonville Line.**

17 A. At the outset, I would like to clarify that PGE does underground distribution lines.
18 However, due to the lower voltage, undergrounding distribution lines does not present
19 the same challenges as undergrounding transmission lines, and my discussion below is
20 specific to transmission lines.

21 The primary advantages of undergrounding transmission lines are that they are
22 less susceptible to storm damage and acts of vandalism and therefore provide certain
23 safety and reliability benefits. However, in almost every case, these advantages are

1 outweighed by disadvantages. The main disadvantages of undergrounding the
2 Rosemont-Wilsonville Line include significant increased costs borne by all PGE
3 customers, permitting challenges and complexity of cable system design and
4 construction, increased ground and vegetation disturbance, need for wider and more
5 restrictive easements from a greater number of homeowners due to a greater
6 disturbance area, materials procurement, as well as significant operational challenges
7 for maintenance and repair.

8 **Q. You have already discussed the increased cost of undergrounding transmission**
9 **lines, so please start by describing the disadvantages of undergrounding**
10 **transmission lines with respect to permitting and design.**

11 A. With respect to permitting and design challenges, undergrounding transmission is more
12 complex, costly, and more impactful than constructing overhead transmission.

13 **Q. Please discuss the additional permitting and approvals associated with**
14 **undergrounding transmission lines.**

15 A. In order to excavate a continuous trench for undergrounding the transmission line,
16 PGE would need to acquire permits and approvals for tree removal; for any blasting
17 and soil removal and transport; for transport of any groundwater encountered during
18 trenching; and for boring underneath hydrological features, such as rivers and streams.

19 **Q. Please discuss design and construction challenges associated with undergrounding**
20 **transmission lines.**

21 A. Unlike overhead transmission where the air acts as an efficient cooling mechanism for
22 the line, dissipates heat, and provides insulation that can recover if there is a flashover,
23 underground transmission requires a number of different systems, materials, and

1 construction methods in order to achieve the necessary insulation and heat dissipation.
2 These methods include the use of specialized transmission cable construction,
3 including placing the cables in high-pressure fluid filled or high-pressure gas filled
4 pipes, using self-contained fluid filled conductors that are independent and not placed
5 in pipes, or using a solid, cross-linked polyethylene (XLPE) cable. Furthermore, a
6 specialized soil or backfill material may be needed to dissipate heat away from the
7 conductors. For this reason, the construction design needs to determine the type of soil
8 nearest to the line and a soil thermal survey may be necessary before construction.
9 Finally, different types of specialized cables will require different ancillary facilities
10 that may have a significant footprint. For example, for an XLPE cable, a 10-foot by 30-
11 foot by 10-foot concrete vault may need to be installed underground every 900 to 2,000
12 feet depending on topography and voltage. 115-kV lines will also require aboveground
13 transition structures to connect existing overhead lines to the underground lines.
14 Because of the topography and curvy nature of SW Stafford Road, continuous
15 trenching and installation of necessary ancillary facilities would present significant
16 constructability challenges.

17 **Q. Please describe the increased ground disturbance and other impacts associated**
18 **with underground transmission cable.**

19 A. Undergrounding transmission conductor, which necessitates continuous trenching and
20 significant excavation of subsoil to accommodate the ancillary facilities discussed
21 above, increases ground disturbance and poses issues with existing and proposed
22 vegetation, as well as any other environmental or cultural resources in the area. For
23 example, deep root trees and low-level vegetation will not be allowed to grow above

1 the proposed duct bank and will require a 20-foot buffer from the duct bank and vaults
2 for maintenance and reliability purposes. For safety purposes, PGE might be required
3 to implement more protective measures, such as fencing or other markers to prevent
4 encroachment of the vaults and duct bank.

5 **Q. What about maintenance and repair of underground transmission lines?**

6 A. Maintenance and repair of an underground transmission line can be time-consuming
7 and expensive in comparison to overhead lines. Underground transmission cable is not
8 readily obtained due to the fact that such components are manufactured primarily
9 outside the U.S. and have long lead times (e.g., three years for conductors), and would
10 need to be procured and stocked beforehand in the case of an unplanned outage.
11 Specialized contractors are also required for underground transmission installation and
12 maintenance, and lack of readily available specialized contractors and spare cables and
13 accessories could result in maintenance challenges and long outages to repair a line
14 (e.g., four or more months). Moreover, unlike overhead transmission lines, which are
15 readily visible, underground transmission line faults and malfunctions are generally
16 harder to detect and take longer to repair.

17 **Q. Would undergrounding the Rosemont-Wilsonville Line eliminate the need to**
18 **obtain easements?**

19 A. No. As discussed above, because of the increased area of ground and vegetation
20 disturbance (including the potential removal of more trees), PGE would need to acquire
21 wider and more restrictive easements from a greater number of impacted landowners.
22 In particular, undergrounding could require easements up to 50 feet beyond the existing

1 road right-of-way versus the approximately 10 feet that we expect along the Rosemont-
2 Wilsonville Line,³⁴ thus presenting greater impacts on more adjacent properties.

3 **Q. Please summarize the advantages of the proposed route compared to the**
4 **alternative routes considered by PGE.**

5 A. As discussed in more detail in the direct testimony of Mr. Gordanier and Jordan
6 Messinger, PGE employed a consultant, Power Engineers, Inc. (Power Engineers), to
7 perform a routing and feasibility study, which was completed in December 2020
8 (Exhibit PGE/401).³⁵ Based on that study, PGE determined that the proposed route
9 was the least impactful as compared to the Childs Road Alternative (Option C) and the
10 Schatz Road Alternative (Option B) under the following criteria:

- 11 • The proposed route is the shortest of the three route options at approximately
12 7.4 miles in total length;
- 13 • The proposed route included the shortest distance for constructing the line in a
14 new right-of-way at approximately 0.7 miles;
- 15 • The proposed route crossed the fewest total number of parcels as compared to
16 the alternative routes;
- 17 • The proposed route passed the fewest number of buildings within 100 feet and
18 300 feet compared to the alternative routes;
- 19 • The proposed route was comparable, though nominally better in comparison
20 with the Schatz Alternative (Option B), for the fewest number of schools and
21 parks within 300 feet;
- 22 • The proposed route crossed the fewest number of streams and rivers;
- 23 • The proposed route crossed the shortest length (in linear feet) of wetlands and
24 floodplains/floodways;

³⁴ The width of necessary easements can vary.

³⁵ PGE/400, Gordanier-Messinger/5-13. It is important to note that PGE's route selection was made based on the desktop analysis provided by Power Engineers in December 2020 and while PGE has continued to refine its design for the proposed route, the Company has not done so for the two alternative routes that were considered in depth in the routing study. PGE/400, Gordanier-Messinger/16-17.

- 1 • No route, including the proposed route, crossed threatened or endangered
2 species habitat; and
- 3 • The proposed route was the least costly.³⁶

4 **Q. Were there any other alternative routes that PGE considered but eliminated due**
5 **to constructability challenges?**

6 A. Yes. As discussed in detail in the joint direct testimony of Mr. Gordanier and Mr.
7 Messinger, PGE also considered siting the line along Interstate 5 and Interstate 205,
8 along the McLoughlin-Wilsonville transmission line lattice tower right-of-way, and
9 along an existing railroad.³⁷ However, all these potential alternative routes were
10 eliminated from further consideration at the conceptual stage after preliminary review
11 because of input from ODOT, the large number of environmental, community, and
12 landowner impacts relative to the proposed route, and constructability challenges.³⁸

13 **Q. Does this conclude your testimony?**

14 A. Yes.

³⁶ PGE/400, Gordanier-Messinger/10-13.

³⁷ PGE/400, Gordanier-Messinger/17-18.

³⁸ PGE/400, Gordanier-Messinger/17-18.

List of Exhibits

<u>PGE Exhibit</u>	<u>Description</u>
PGE/201 P	LC11805 – Avian Protection, General Requirements T&D Standard
PGE/202 P	PGE Environmental, Health and Safety, Avian Protection Plan (2020)
PGE/203 P	LC11810 – Wildlife Protection, Covers and Guard T&D Standard
PGE/204 P	LC11826 – Osprey Platform Construction T&D Standard
PGE/205 P	ENV-COMP-102 – PGE Nest Management Environmental Work Practice
PGE/206 P	PGE-00-ENV-ESI-0005 – Inadvertent Discovery Procedure

P – Protected Information

PGE/201 – PGE/206

Contain protected information

and are subject to

General Protective Order 23-132

CERTIFICATE OF SERVICE

I hereby certify that I served a true and correct copy of Portland General Electric Company’s Direct Testimonies of Dr. Ian Beil, Larry Bekkedahl, Matt Gordanier, Jordan Messinger, Kevin Putnam, and Dan Nuñez on the parties to Docket PCN 6 on the date indicated below by email addressed to said person(s) at his or her last-known address(es) indicated below. Copies containing Highly Protected Information and Protected Information are being sent via encrypted zip file to the Filing Center and parties who have signed Modified Protective Order No. 24-087 and General Protective Order No. 23-132.

SERVICE LIST

PCN 6

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DATED: April 17, 2024



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