

KING COUNTY TREE INVENTORY REPORT

Puget Sound Energy – Energize Eastside Project

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Acronyms and Abbreviations

APS	APS Survey & Mapping, LLC
DBH	Diameter at 4.5 feet above the surface of the ground
I-90	Interstate-90
ISA	International Society of Arboriculture
KCC	King County Code
PSE	Puget Sound Energy
ROE	Right of entry
ROW	Right-of-way
TWC	The Watershed Company

PSE 230kV Route
King County Tree Inventory Report

KING COUNTY TREE INVENTORY REPORT

PUGET SOUND ENERGY – ENERGIZE EASTSIDE

1 EXECUTIVE SUMMARY

The Watershed Company conducted a field-based tree inventory from March 23, 2015 to November 9, 2015, collecting data on a total of 6,166 trees and 328 groupings of small trees along the 18-mile-long Willow and Oak routes. This inventory provides baseline information and does not represent the number of trees that could be pruned or removed as a result of the Energize Eastside project.

This is the King County report, summarizing the findings for the two, very small sections of Segment N within the limits of unincorporated King County between the Cities of Newcastle and Renton. Approximately 0.25 miles of Segment N is located in unincorporated King County. This is a part of Phase 2 DEIS Segment 3. A total of 14 trees were tagged and assessed in the County, one of those meets the County definition of “significant”.

The study area covered by the tree inventory is an approximately 100-foot wide easement in Segments N with existing pole structures and overhead 115kV transmission lines.

All vegetation with a potential to reach a height of 15 feet or more was included in this study. All significant trees were marked with a small, numbered aluminum tag with either a nail or wire tie. All landscaped tree or shrub that would achieve a maximum potential height of 15 feet, regardless of trunk diameter at the time of the assessment, was tagged. Thickets of small, non-significant weedy trees were grouped in polygons and assessed as a unit. Hedges were mapped and assessed using the polygon method as well.

One parcel in King County was skipped when the person occupying the home asked that the TWC field crew not enter the yard. At least one significant tree located in the study area portion of the yard was missed by this inventory. More detailed parcel data (including records of refusal) were collected and tracked by Enviro Issues and PSE during the field work.

2 INTRODUCTION

The purpose of this tree inventory is to quantify and characterize all significant trees, as well as vegetation with the potential to reach greater than 15 feet in height along the 18-mile-long subject corridor consisting of the routes known as “Willow” and “Oak”. This inventory provides baseline information and does not represent the number of trees that could be pruned or removed as a result of the Energize Eastside project. These routes have been identified by Puget Sound Energy (PSE) as part of the Energize Eastside project. This report summarizes the findings for the King County portion of the Willow and Oak routes. The overall project crosses through a total of five local jurisdictions, including King County and the Cities of Bellevue, Redmond, Newcastle, and Renton. Trees inventoried in other jurisdictions as part of this study are summarized in separate reports.

2.1 Background

The Energize Eastside project proposes to build a new electric substation and higher capacity transmission lines to serve homes and businesses on the Eastside. Current route options include Oak and Willow routes that will extend from Redmond to Renton (Figure 1). Only a small portion of Segment N is located in unincorporated King County. This is a portion of Phase 2 DEIS Segment3.

2.2 Defined Study Area

The length of the study area in King County is approximately 1,700 linear feet, made up of two sections between SE 95th Way and approximately 126th Avenue SE (Figure 2). These sections are located in Segment N. The study area includes two existing sets of 115kV transmission lines spaced approximately 50 feet apart on center; H-frame pole structures carry three conductors (wires) each. The study area corridor is approximately 100 feet wide through the King County study area.

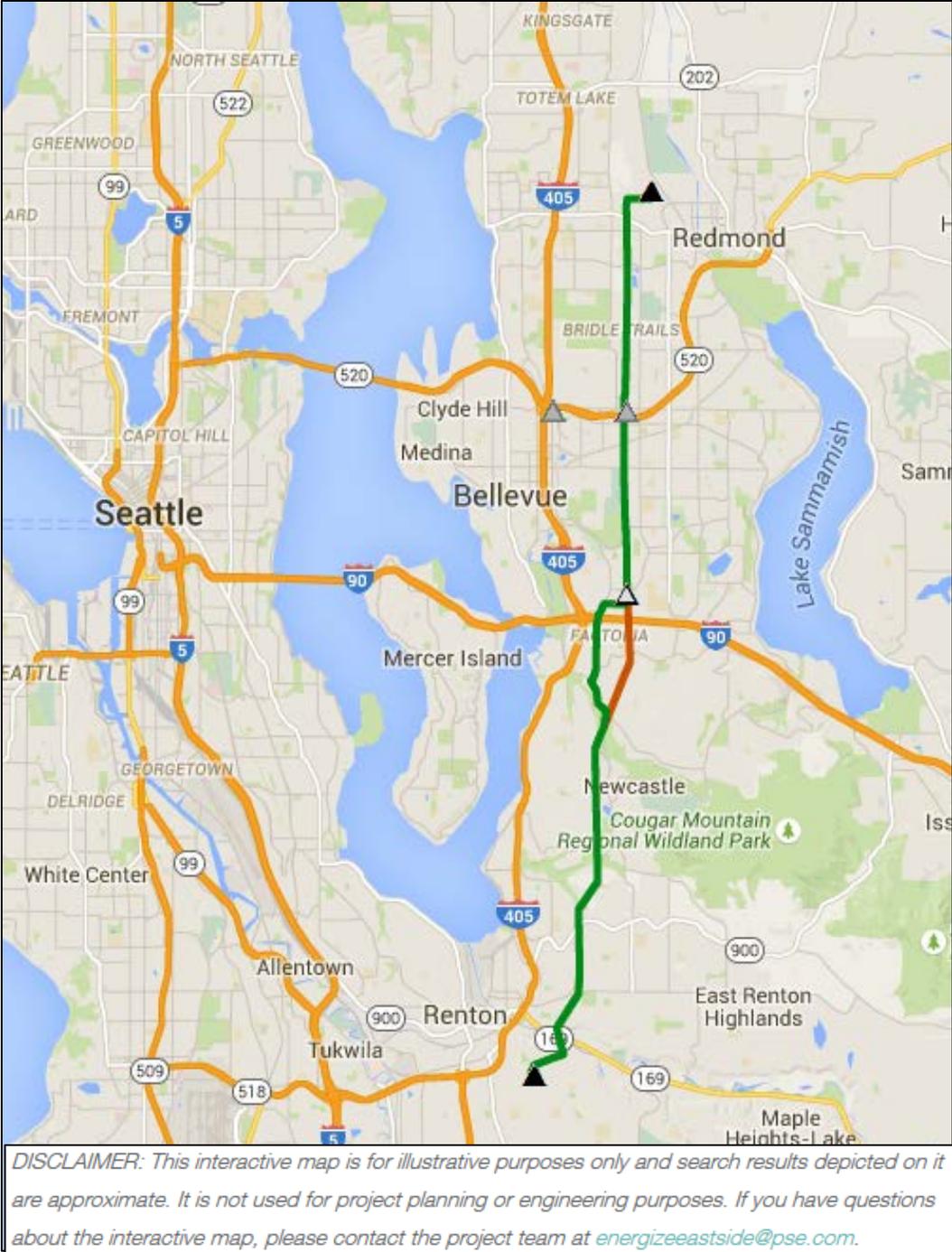


Figure 1 - Map of proposed Oak and Willow routes from the Energize Eastside website. The Oak route is depicted in green while the Willow route variation is shown in orange.

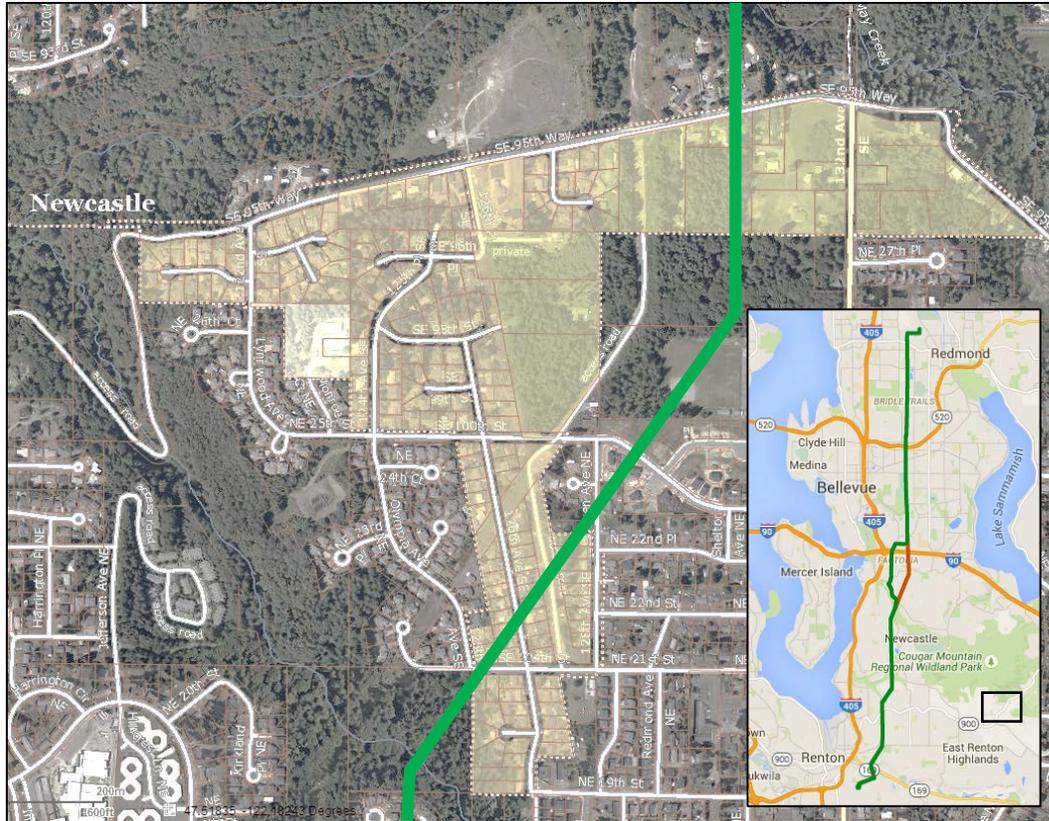


Figure 2 - Overview of the Segment M study area corridor (green line) in unincorporated King County jurisdiction (highlighted in yellow).+

3 SITE DESCRIPTION

The corridor in unincorporated King County comprises a total of three parcels zoned residential (R-4 and R-6). The northern-most parcel contains a single-family residence (parcel number 3345100450) and is located in Township 24N, Range 05E, and Section 33. The two southerly parcels are King County Parks-owned (parcel numbers 0423059313 and 0428000290) and are located in Township 23N, Range 05E, and Section 4.

Vegetation under the powerlines through the study area corridor is generally mowed herbaceous vegetation or Himalayan blackberry thickets.

4 PHOTOS



Figure 3 - Looking south along the boundary between Renton and King County. (Photo taken May 6, 2015)



Figure 4 - Weedy vegetation south of SE 95th Way. (Photo taken May 6, 2015)

5 METHODS

Watershed Company ISA-certified arborists conducted a field-based inventory from March 23, 2015, to November 9, 2015 using the methods detailed below. Proposed methodology was developed, written and submitted to PSE in a Technical Memorandum dated March 13, 2015 for review and approved prior to field work. The methodology was developed to comprehensively identify, describe (by collecting attribute data), and mark (i.e., flagging to assist survey in locating subject trees), all vegetation greater than 15 feet tall, or that had the potential to reach a mature height of 15 feet or taller. The following methodology is based on the memorandum. Any deviation due to specific conditions encountered during field work is noted and described below.

5.1 Significant Trees

In King County, a significant tree is defined as an existing healthy tree that is not a hazard tree (i.e. a tree that does not have a high probability of imminently falling due to a debilitating disease or structural defect) and that, when measured four and one-half feet above grade, has a minimum diameter of eight inches for evergreen trees or twelve inches for deciduous trees (KCC 21A.06.1167). King County does not define or regulate “landmark” trees, or trees with a DBH of 30 inches or greater.

In order to achieve a more inclusive look at what trees existing in the corridor, any tree with a diameter of six inches at four-and-a-half feet above the surface of the ground (DBH) was tagged in the field and included. A round one-and-one-quarter-inch-wide, numbered aluminum tag was affixed to the trunk of significant trees using a two-and-one-quarter-inch long aluminum nail. Where property owners would not allow nailing, a small wire tie was used to affix the tag to a lateral branch or smaller shoot near the trunk. For a majority of the tags, a length of pink- and black-stripped flagging was included behind the tag to aid survey crews in visually locating the subject trees. Survey crews removed the bright flagging once the tree was survey-located.

Aluminum tags are intended to remain on the tree in perpetuity; however, they will eventually be consumed by the expanding radius of the tree trunk. Some tags may have been removed by property owners after the inventory work was completed.

5.2 Non-Significant Trees and Shrubs

Small, non-significant trees and shrubs with a potential maximum height of 15 feet or more (regardless of height during the study) were assessed and mapped according to the following methods:

5.2.1 Landscaped trees and landscaped tall shrubs

Any landscaped or maintained tree or shrub with a potential maximum height of over 15 feet in a landscaped bed or maintained yard, regardless of trunk diameter or current height was inventoried. A numbered aluminum tag was affixed to the trunk with a nail where possible. If the trunk diameter was smaller than two inches, generally the aluminum tag was affixed to the trunk or a branch near the trunk using a wire tie.

5.2.2 Weedy non-significant trees and tall shrubs; DBH between 3 and 6 inches

Any weedy, non-significant tree or shrub exhibiting a trunk diameter of between three and six inches, with a potential maximum height of over 15 feet, was tagged similar to Section 5.2.1.

5.2.3 Weedy non-significant trees and tall shrubs; DBH less than 3 inches

Groups of weedy, non-significant trees and tall shrubs (i.e., from seed [not-planted] and not maintained) composed of species with a potential maximum height of greater than 15 feet, but with stem diameters smaller than three inches, were mapped and recorded as a polygon instead of as several individual points. Attribute data was averaged and recorded for the group of vegetation. No significant trees were inventoried using this method. Attribute data was collected for each polygon per Section 5.5 below and is included in the data table.

5.2.4 Hedges

Landscaped hedges were also described and mapped using polygons instead of tagging the individual plants that make up the hedge. Groupings of trees and shrubs with a potential maximum height of greater than 15 feet growing in a row with contiguous and trimmed foliage, regardless of the maintained height, were assessed as a polygon. Attribute data was collected for each polygon per Section 5.5 below and is included in the data table.

5.3 Authority

Online resources were referenced to determine the maximum height of the various species of tree and shrub encountered in the subject area. For landscape trees and shrubs (plants not native to Washington State), the Oregon State University Department of Horticulture online landscape plant database (Oregon State University, 2016) was referenced. Native trees and shrub maximum heights were verified using the University of Washington WTU herbarium website (University of Washington, 2016) and the USDA plant database (United States Department of Agriculture, 2016). These resources were used for both the scientific names and the common names for the spreadsheet reporting.

5.4 Vegetation Mapping

APS Survey and Mapping, LLC (APS) survey-located all TWC-tagged vegetation, except for a subset of non-significant trees in the Bridal Trails neighborhood (see below). The Watershed Company provided hand-drawn sketches of the tag locations to APS survey crews after every day or two days of tagging to assist in finding all subject trees. Generally, APS survey-located tagged vegetation within three days following the TWC inventory.

Polygons maps for vegetation described in Sections 5.2.3 and 5.2.4 were hand-drafted on aerial imagery in the field. The sketched polygon locations were converted into AutoCAD in the office by The Watershed Company.

5.5 Attribute data collection

The attributes collected during the field survey are listed and described in Table 1, below. The Microsoft Excel spreadsheet database contains all the information collected during the field visit. General attributes documented for all inventoried vegetation include the date of assessment, unique identification number of tree or polygon, location (parcel number), and name of plant species. Physical attributes include number of stems, stem diameter (DBH), height, canopy radius, condition, and notes. For polygons, approximate number of individual trees or large shrubs within a polygon was recorded instead of stem number, and other physical attributes for vegetation within polygons were recorded as averages.

Diameter of all subject trees was measured at four-and-a-half feet above the surface of the ground at the trunk (DBH) where possible; however, some stems were measured differently due to size or branching structure. Very small trees without a defined stem at four-and-a-half feet above the ground were measured using the caliper-method, where the stem is measured six inches above the ground. For trees with major branching at or below four-and-a-half feet, the smallest portion of the trunk below major branching was measured.

Methodology for measuring diameter of trees with major leans, on steep slopes, and with multiple trunks or stems generally followed those outlined in the *Guide for Plant Appraisal* (Gooding, et al., 2000). Other attributes collected are listed and described below.

5.6 Data Management

Data were recorded in the field using paper field data sheets or a Trimble GeoXH GPS unit. Data were entered into a Microsoft Excel spreadsheet in the office and subsequently reviewed, corrected, and organized into a searchable database. The spreadsheet file will be delivered along with this report. Polygons were hand-drawn on maps in the field, manually entered into ArcGIS, reviewed and corrected before being converted to AutoCAD. Polygon features will be delivered with this report as a .dwg file.

Table 1. Attributes recorded for all inventoried vegetation and that are presented in the spreadsheet database.

ATTRIBUTE	DESCRIPTION OF ATTRIBUTE
DATE OF ASSESSMENT	Date that the Watershed Company field crew tagged and assessed the tree or shrub.
ID NUMBER	Unique number assigned to an assessed tree or polygon. This number corresponds to the tag number in the field or the polygon number on the maps.
PARCEL NUMBER	Parcel number(s) in which the subject tree or polygon is located. In some cases, the parcel number corresponds to the closest parcel if the tree is in a City right-of-way.
SCIENTIFIC NAME	Formal scientific name conforming to the International Code of Nomenclature.
COMMON NAME	Name that is based on normal or common language of the Pacific Northwest.
DECIDUOUS/EVERGREEN	Notes whether a tree is considered deciduous or evergreen.
STEMS	Number of trunks or shoots that contribute significantly to the canopy.
DBH	Diameter at Breast Height; or 4.5 feet from the ground surface. See Section 5.5 for variations.
DBH2	DBH of secondary and other minor stems.
HEIGHT	Approximate distance from the ground surface at the trunk to the highest point of the subject tree as visually estimated. Average height for polygons.
CANOPY RADIUS	Measurement from the stem to the average drip line, or end of branches.
CONDITION	Health rating of an assessed tree using a 5-tier system as follows: 1 – Excellent: No apparent problems with the tree. Form is exemplary for the species. 2 – Good: Few minor defects such as crossed branches, minor foliage die-back, minor trunk damage, or unbalance canopy. 3 – Fair: Several minor problems exist. 4 – Poor: Major defects visible such as significant trunk decay, codominant leaders with included bark, significant canopy die-back, major cracks in a stem or major limbs, and/or other structural problems. Topped trees are generally considered poor. 5 – Dead or dying: Tree is dead or is in a state of significant decline.
NOTES	Additional comments relating to assessment of the tree or polygon unit.

5.6.1 Data Summary

Summary data reported in the Findings section below was derived from querying the tree spreadsheet using Excel formulas. The King County definition of significant tree was used to tally data from the spreadsheet. Any evergreen tree with a diameter of eight inches or greater and that has a condition rating of *excellent*, *good*, *fair*, or *poor* was counted. This total was added to the number of deciduous trees in the County with a diameter of 12 inches or greater and that have a condition rating of *excellent*, *good*, *fair*, or *poor*.

6 LIMITATIONS OF STUDY

The number of trees reported here is an under-representation of the total number of subject trees in King County. TWC and APS were denied entry to one parcel containing trees in the subject easement. Property information regarding field work refusals were collected and tracked by EnviroIssues and PSE during the field work.

Tree identification was done using the identifiable characteristics present at the time of the inventory. Some trees and shrubs may be misidentified. Some trees and shrubs were unidentifiable, although most were identified to genus and species, or to at least genus. Some taxa, such as the “cherry” genus, contain many species and botanical varieties that were not identifiable without all characteristics present. Where genus was known, but species was not, the species was indicated with “sp.” in the spreadsheet. An unknown cherry tree, for example, was indicated as “*Prunus* sp.” If an uncommon tree was simply not identifiable (for lack of leaves or flowers), an “unk.”, or “unknown” was entered into the name column of the spreadsheet and any descriptor that would aid in identification was added to the notes field.

Some reported parcel numbers in the spreadsheet may not be correct; the survey should be used as the authority. Trees and polygons located on the edge of parcel boundaries were assigned a parcel number based on field observations. However, fence lines sometimes do not exactly match parcel lines and the parcel boundary overlay on aerial imagery used in the field was sometimes inaccurate. Determining exact parcel boundary locations in the field was not possible. The survey should be referenced to determine the exact ownership and location of any particular tree.

7 TREE INVENTORY RESULTS

A total of 14 trees were tagged and assessed for the tree inventory; one of these trees meets the criteria for a significant tree by King County (Table 2). In addition, a total of six polygons containing smaller trees and shrubs or landscaped hedges were assessed along the corridor in unincorporated King County. Three of these polygons are landscaped hedges of cherry laurel (p149 – p151) ranging from seven to 20 feet in height. Weedy vegetation characterizes the other three, each with fewer than ten common hawthorns, plum or bitter cherry trees no more than 15 feet tall.

Table 2. Summary of the tree inventory in King County.

SEGMENT	NUMBER OF TAGGED TREES	NUMBER OF SIGNIFICANT ¹ TREES	NUMBER OF POLYGONS ² DESCRIBED
N ³	14	1	6
KING COUNTY TOTAL	14	1	6

¹ According to KCC 21A.06.1167, King County defines a significant tree as an existing healthy tree that is not a hazard tree and that, when measured four and one-half feet above grade, has a minimum diameter of eight inches for evergreen trees or twelve inches for deciduous trees.

² Does not indicate number of trees included in each polygon. See spreadsheet for more information.

³ Indicates partial Segments; only the portion of the Segment in the King County is included in the tree total numbers

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