CITY OF RENTON 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
ISA	International Society of Arboriculture
PSE	Puget Sound Energy
RMC	Renton Municipal Code
ROE	Right of entry
ROW	Right-of-way
WSDOT	Washington State Department of Transportation
TWC	The Watershed Company

CITY OF RENTON 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 357 groupings of small trees along the 18-mile-long Willow and Oak routes. Data gathered from the study is included in the spreadsheet file that will be delivered along with this and the other project reports. 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 report summarizes the portion of the route through the City of Renton. All of Segment N and a portion of Segment M are located within the Renton City limits. These Segments make up Phase 2 DEIS Segment 3. A total of 574 trees were tagged and assessed in the City. Of those trees, 367 meet the City's definition of "significant tree". Seven are large enough to be considered "landmark trees".

The study area is an approximately 100-foot wide easement where overhead transmission lines currently exist. The subject lines in Segment N pass over a large valley (Cedar River valley) where no inventory was conducted for several hundred linear feet as no project work would need to occur in that area.

All vegetation with a potential to reach a height of 15 feet or more were evaluated under this study. Any landscaped tree or shrub meeting this criteria, regardless of trunk diameter or height, was marked with a small, numbered aluminum tag with either a nail or wire tie. Clusters of small, non-significant weedy trees were grouped in a polygon and assessed as a unit. Hedges were mapped and assessed using the polygon method as well.

The tree totals reported here are an underestimate of the total number of trees subject to the inventory criteria in the study areas. Trees located in parcels where crews were refused entry were not tagged, assessed or located. Several parcels in the City of Renton refused entry to the Watershed field crew. More detailed

parcel data (including records of refusal) were collected and tracked by Enviro Issues and PSE during the field work.

2 INTRODUCTION

This report summarizes the findings for the City of Renton portion of the Willow and Oak routes. 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. 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. Data collected during the study is compiled in an Excel spreadsheet.

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 the Sammamish substation in Redmond to the Talbot substation in Renton (Figure 1). The two routes diverge only though a portion of the City of Bellevue. Each route option includes a set of Segments, as follows: The Oak route comprises Segments A, C, E, G2, I, K2, M, and N. The Willow route comprises Segments A, C, E, J, M, and N.

2.2 Study Area

The length of the study area corridor in the City of Renton is approximately 3.7 miles beginning south of May Creek at SE 95th Street and continuing south to the Talbot Hill substation (Figure 2). A total of approximately 850 linear feet of the route at the bottom of the Cedar River valley was excluded where the lines are far above the valley floor. Pole structures are located on the north and south edges of the valley; the study area extended past the structures at either edge of the valley by several hundred feet. The study area is defined as follows: on the south side of the Cedar River valley, survey limits included the area approximately 425 feet north of the existing pole structure(s); and on the north side of the ravine, survey limits included the area approximately 250 feet south beyond the existing pole structure(s).

The study area corridor is an approximately 100-foot-wide easement that includes two existing sets of 115kV transmission lines. These sets, consisting of three conductors (wires) each, are spaced approximately 50 feet apart on center; H-frame pole structures carry each set of transmission lines. As the lines enter the Talbot substation, the two sets diverge and become wider than 50 feet apart, but only for a relatively short distance.

3 Site Description

The study area corridor in the City of Renton is dominated by urban land uses. The majority of the corridor passes through parcels zoned residential, commercial, or industrial. Within the residential areas, the corridor passes through distinct neighborhoods; from north to south, these include Glencoe, Honey Creek Ridge, Sunset, Liberty Ridge, and Shadow Hawk. The largest patch of remaining undeveloped land is located adjacent to the Cedar River and zoned Resource Conservation (RC). The study area corridor in the City of Renton is located in Township 23N, Range 05E, Sections 4, 9, 16, 20, and 21.

Most of Segment M is characterized by residential and commercial landscaping, with a forested ravine (Honey Dew Creek) near the northern limit. Segment N is mostly non-landscaped weedy or forested areas beneath the existing powerlines, with a few roadways and parking areas also present. A few forested patches are limited to topographically low regions near the Cedar River and Honey Dew Creek.

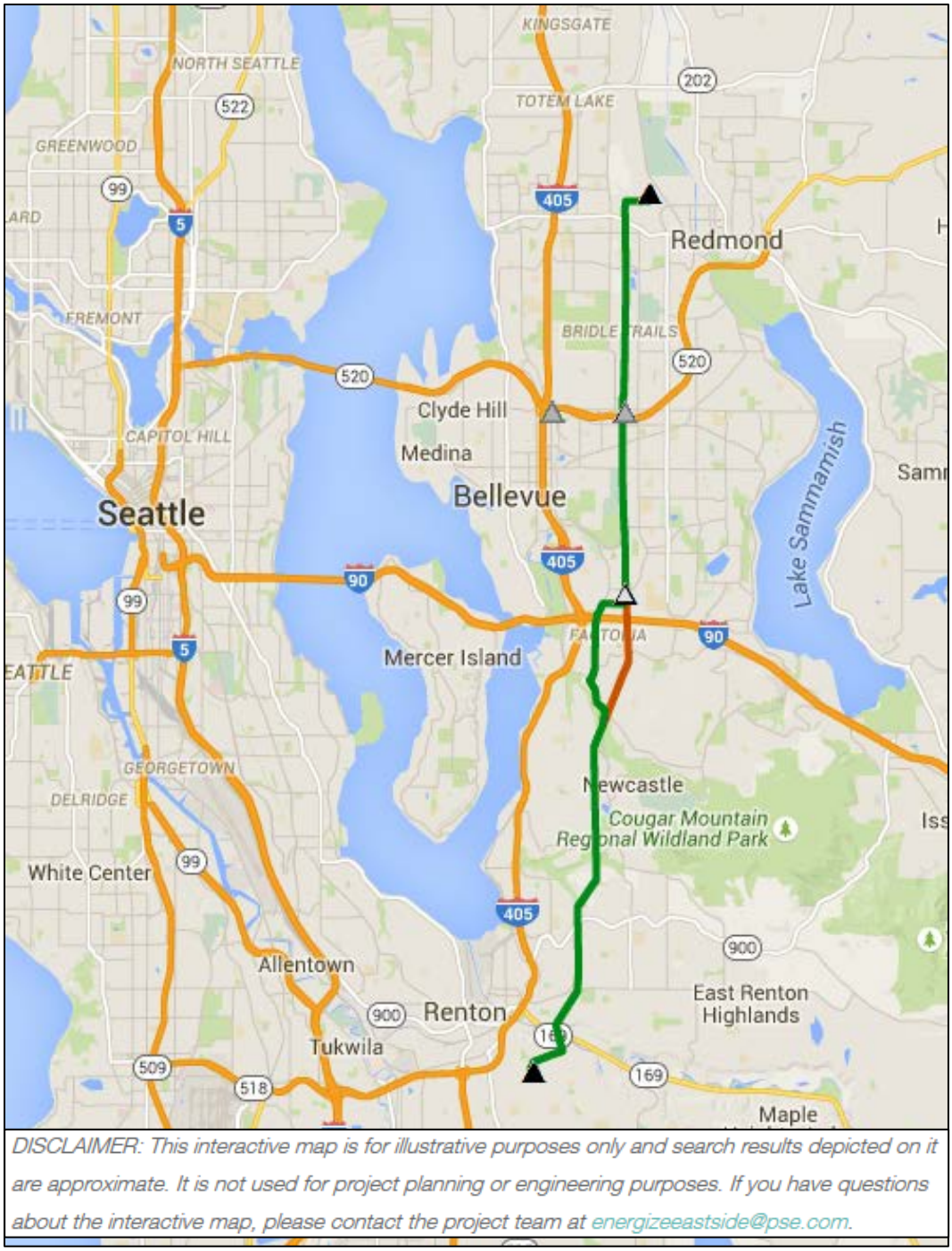

Figure 1 - Map of proposed Oak and Willow routes from the Energize Eastside website. The Oak route is depicted in green while the Willow route variation is shown in orange.

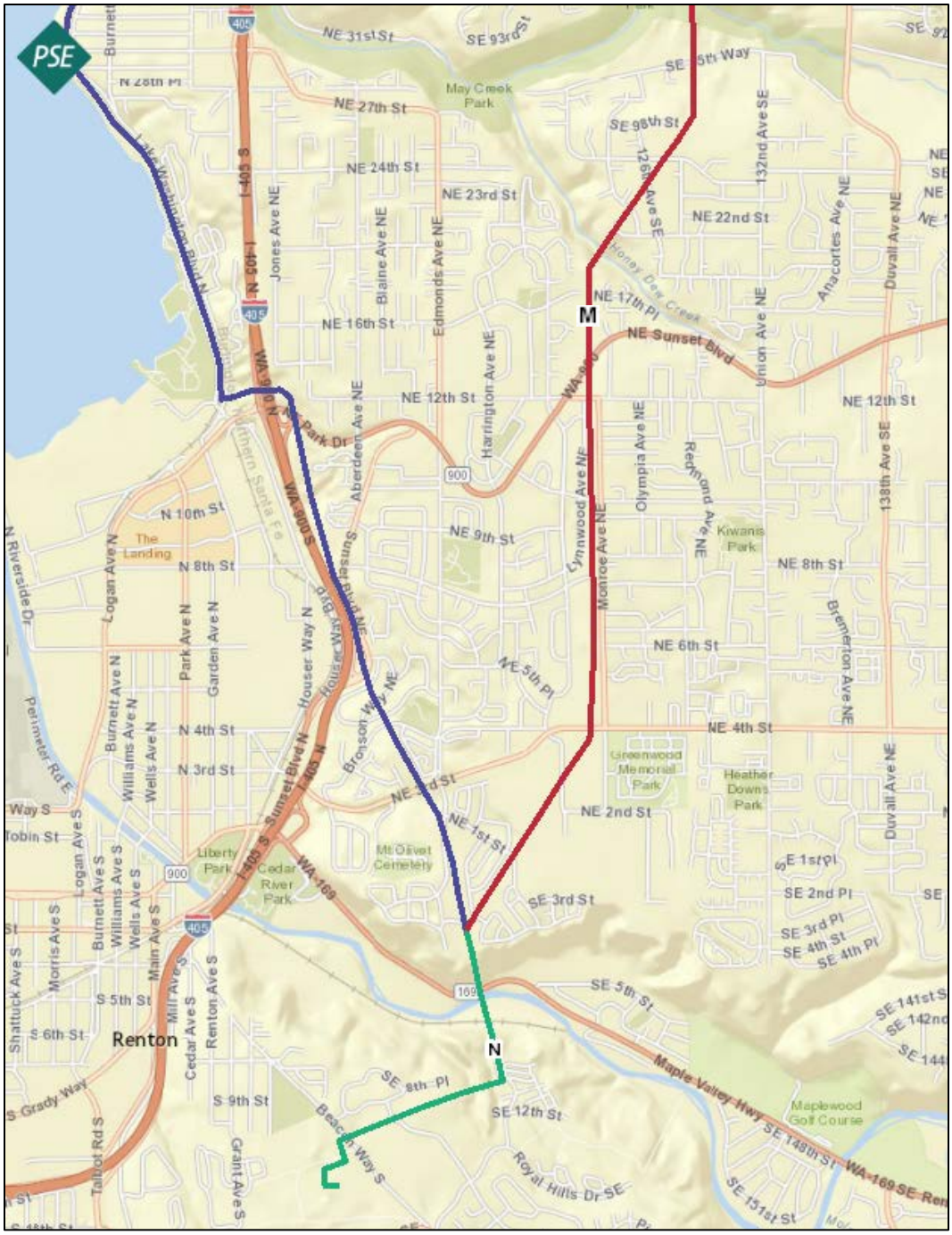

Figure 2 - Overview of the study area corridor in the City of Renton including the southern portion of Segment M (red) and Segment N (green).

4 PHOTOS

Figure 3 - A five-inch DBH apple tree tagged in Segment M in the City of Renton. (Photo taken April 17, 2015)

Figure 4 – A 0.75-inch caliper fruiting cherry tree that was recently installed in a residential back yard in the City of Renton (#917). This tree, although small, has a maximum potential height of 25 feet. (Photo taken April 20, 2015)

Figure 5 – A typical hedge of cherry laurel in Segment M in the City of Renton that was assessed and mapped as a polygon (polygon number p106). (photo taken April 20, 2015)

Figure 6 – Segment N: The Cedar River Valley from the north rim looking south. (photo taken May 18, 2015)

Figure 7 - Cedar Ridge Dr SE in Segment N with the existing transmission lines overhead, looking east. (photo taken May 22, 2015)

Figure 8 - Larger trees growing in the Segment N easement on the north wall of the Cedar River valley, looking south. (photo taken August 27, 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

The City of Renton defines a significant tree as a tree with a caliper of at least six inches, or an alder or cottonwood tree with a caliper of at least eight inches. Trees qualified as dangerous are not considered significant. Trees planted within the most recent ten years also qualify as significant trees, regardless of the actual caliper (RMC 4-11-200). A landmark tree is defined as a tree with a caliper of thirty inches or greater (RMC 4-11-200).

Any tree with a diameter of six inches at four-and-a-half feet above the surface of the ground (DBH) was tagged and included in the inventory. 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 (Figure 3). 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 (Figure 4). 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 height at the time of the field work, 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 (Figure 4).

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

In residential areas, 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 4.2.1.

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. These polygons were not survey-located. 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 (Figure 6). Maintained contiguous groupings of trees and shrubs with a potential maximum height of greater than 15 feet growing in a row as a hedge, 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 potential 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 Talbot area of Segment N (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 tress. 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.

PSE- and City of Renton-owned parcels in Segment N
Many common hawthorn, beaked hazelnut and Cascara trees exhibiting trunk diameters of between three and six inches punctuate the large parcels near the Talbot substation. Some of these trees were tagged by TWC; however, none were survey-located by APS. APS survey crews had passed through to collected data (including six inch and larger tree locations) in this portion of Segment N before the TWC inventory work. APS was not contracted to revisit this area to pick up the small trees. Therefore, some trees with a diameter of between three and six inches in Segment N appear in the Excel spreadsheet database, but are not included in the survey.

5.5 Attribute data collection

The attributes collected during the field survey are described in Table 1 below. The Microsoft Excel spreadsheet database contains the data collected for each tree and polygon inventoried. 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 at 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.

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 4.5 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 Data Management

Data were recorded in the field using paper field data sheets. Data were entered into a Microsoft (MS) 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.

5.6.1 Data Summary

Summary data reported in the *Tree Inventory Results* section below was derived from querying the tree spreadsheet using Excel formulas. The City of Renton definition of a "significant tree" was used to tally data from the spreadsheet. Any tree other than red alder or black cottonwood, no matter the condition rating, with a diameter of six inches or greater was tallied. Red alders and black cottonwoods with a diameter of eight inches or greater were added to the tally.

Additionally, Renton considers any tree "planted within the most recent ten years" significant. Stem size was used as a surrogate for *time since planting*. Only tree species that were likely purchased and installed exhibiting a caliper of between zero and three inches were considered "recently planted". Any tree that likely grew from seed – red alder, black cottonwood, common hawthorn, beaked hazelnut, cascara, sour cherry or Douglas-fir – were excluded. Table 2 shows the list of species encountered along the corridor through Renton that were considered to have been installed in a manner consistent with the significant tree definition.

Table 2 – A list of species found in the City of Renton that were assumed to have been planted.

Apple	Leyland cypress
Apricot	Mountain hemlock
Asian pear	Oriental dogwood
Callery pear	Pear
Cherry plum	Plum
Colorado blue spruce	Plum species
European filbert (red leaf)	Redbud
Landscaped Fir	Rocky Mountain maple
Flowering crabapple	Star magnolia
Flowering dogwood	Sugar Maple
Fruiting Cherry	Sweet cherry
Ginkgo	Vine maple
Japanese flowering cherry	Weeping hemlock
Japanese maple	Walnut
Japanese snowbell	Western serviceberry

6 Limitations of Study

The number of trees reported below is an under-representation of the total number of subject trees along the City of Renton portion of the Willow and Oak routes. TWC and APS were denied entry to a few residential parcels in the City and were unable to identify, assess, map or tally the trees in those parcels. The details of which parcels were not inventoried were collected and tracked by EnviroIssues and PSE during the field work.

Tree identification was done using the identifiable vegetative 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 given the time limitation of the inventory. 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 always possible. The survey should be referenced to verify the exact ownership and location of any particular tree.

7 TREE INVENTORY RESULTS

Within the City of Renton, 574 trees were tagged and assessed for the tree inventory; 367 of these trees are significant under the City of Renton definition of "significant tree" (Table 3).

A total of seven assessed trees would be considered "landmark" by the City of Renton. At 38.4 inches in diameter, tree number 990 – A Deodar cedar - is the largest. It, along with number 932 – a 'Crimson King' Norway maple with a 32.7-inch diameter – are in a residential part of Segment M. Both are topped to maintain height below the existing lines. The other five landmark trees (numbers 3298, 3317, 3321, 3323 and 3325) are located on the undeveloped, forested slopes of Segment N in the Cedar River valley.

A total of 48 polygons containing smaller trees and shrubs were assessed and mapped along the corridor. Three large polygons delineate large tracts of weedy vegetation along most of the route in Segment N. Much of the area contains a mix of Himalayan blackberry thicket with beaked hazelnut, cascara, bitter cherry, red elderberry, red alder, common hawthorn, and vine maple saplings. The vegetation captured in these large polygons ranges from 0.25 to three inches in diameter and between 10 and 20 feet tall.

Table 2 - Number of tagged and significant trees located on designated PSE segments in the City of Redmond.

SEGMENT	NUMBER OF TAGGED TREES	NUMBER OF SIGNIFICANT[1] TREES	LANDMARK[2] TREES	NUMBER OF POLYGONS[3] DESCRIBED
M[4]	406	254	2	45
N	168	113	5	3
REDMOND TOTAL	574	367	7	48

Many of the polygons in Segment M describe landscape hedges composed of arborvitae, cherry laurel, and Fraser photinia (Figure 6). But some non-hedged beaked hazelnut, black cottonwood, red alder and common hawthorn are also captured.

1 According to RMC 4-11-200 *Definitions T*, The City of Renton defines a significant tree as a tree with a caliper of at least six inches, or an alder or cottonwood tree with a caliper of at least eight inches. Trees qualified as dangerous are not considered significant. Trees planted within the most recent ten years also qualify as significant trees, regardless of the actual caliper (RMC 4-11-200D)

2 A landmark tree is any healthy tree with a diameter of 30 inches or larger (RZC 21.78).

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

4 Indicates partial Segments; only the portion of the Segment in the City of Renton is included in the tree total numbers

Subject trees in the Honey Dew Creek ravine and possibly in other locations along the route may be located in wetland or stream buffers. See the *City of Renton Critical Areas Delineation Report: Puget Sound Energy – Energize Eastside Project* for more information on the location of critical areas. (The Watershed Company, 2016).

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