

# Vegetation Inventory & Management Plan Report for the North Bellevue Segment

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## PSE ENERGIZE EASTSIDE PROJECT CITY OF BELLEVUE

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Prepared for:

City of Bellevue  
Environmental Planning Manager  
Development Services Department  
450 110th Avenue NE  
Bellevue, WA 98004

Prepared on behalf of (applicant):

Ryan Wieder  
PSE Energize Eastside  
PO Box 97034, EST 3W  
Bellevue, WA 98009



*Title-page image: Transmission line corridor conditions in the North Bellevue segment, February 2020.*

The information contained in this report is based on the application of technical guidelines currently accepted as the best available science and in conjunction with the manuals and criteria outlined in the methods section. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, state and federal regulatory authorities. No other warranty, expressed or implied, is made.



750 Sixth Street South  
Kirkland, WA 98033

p 425.822.5242

f 425.827.8136

[watershedco.com](http://watershedco.com)

Reference Number: 111103.12

Contact: Katy Crandall, PWS

*Ecologist and ISA Certified Arborist®*

# Table of Contents

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<b>1</b>	<b>Introduction.....</b>	<b>1</b>
1.1	Background Purpose .....	1
1.2	Project Location .....	2
<b>2</b>	<b>Methods .....</b>	<b>2</b>
2.1	Study Area .....	2
2.2	Attribute data collection.....	2
2.3	Vegetation Inventory .....	6
2.3.1	Significant Trees.....	6
2.3.2	Non-Significant Trees and Shrubs .....	7
2.3.3	Authority.....	7
2.4	Vegetation Mapping .....	8
2.5	Data Management .....	8
2.5.1	Updates to the Dataset.....	9
<b>3</b>	<b>Limitations .....</b>	<b>9</b>
<b>4</b>	<b>Vegetation Inventory Results.....</b>	<b>10</b>
<b>5</b>	<b>Vegetation Removal and Management.....</b>	<b>12</b>
5.1	Significant Tree Impacts.....	13
<b>6</b>	<b>City of Bellevue Tree Regulations.....</b>	<b>14</b>
<b>7</b>	<b>Adaptive Tree Replacement.....</b>	<b>16</b>
7.1	Onsite Mitigation .....	16
7.1.1	Private Property: Landscape Plans.....	16
7.1.2	Private Property: Secondary Planting Areas .....	17
7.1.3	PSE-owned Property .....	18
7.2	Offsite Mitigation: Tree Planting Options .....	18
7.3	Programmatic Mitigation Strategies .....	19

## Appendix A

Outreach Maps and Public Tree Removal Maps

## Appendix B

Tree Table

## Appendix C

Vegetation Impact Assessment Methods

**Appendix D**

Conceptual Landscape and Tree Retention Plan

**Appendix E**

Sample Plant Palettes

## List of Figures

---

Figure 1. Vicinity map of North Bellevue Segment study area. ....	4
Figure 2. Vegetation impact analysis parameters illustration (cross section view). ....	12

## List of Tables

---

Table 1. Attributes recorded for all inventoried vegetation.....	5
Table 2. Total number of significant trees in the North Bellevue Segment by tree type with the top five most common significant tree species listed.....	11
Table 3. Significant trees proposed for removal categorized by tree location and overlapping critical area type. ....	13
Table 4. Tree replacement ratios for the Energize Eastside Project in North Bellevue (not including public right-of-way tree removals). ....	15

# 1 Introduction

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## 1.1 Background Purpose

Beginning in 2015, The Watershed Company (Watershed) conducted a vegetation inventory along the existing Talbot Hill - Lakeside transmission line corridor, spanning from the Sammamish Substation in the City of Redmond to the Talbot Hill Substation in the City of Renton, for the Puget Sound Energy (PSE) Energize Eastside Project (the Project). The Project includes building a new electric substation and replacing the existing transmission lines in the corridor with higher capacity transmission lines to serve homes and businesses on the Eastside.

The 2015 inventory quantified and characterized all vegetation with the potential to reach greater than 15 feet in height along the Project corridor. Findings of the inventory in the City of Bellevue were documented in 2016 in the *City of Bellevue Tree Inventory Report: Puget Sound Energy – Energize Eastside Project* (The Watershed Company 2016; hereafter the ‘2016 Tree Inventory Report’).

This document is an update from the 2016 Tree Inventory Report, and is for the North Bellevue Project Segment specifically. The 2016 report covered both North and South Bellevue Segments. This document supersedes that previous version and is intended to serve as a stand-alone document for local permitting in North Bellevue. The purpose of this report is to:

- Document trees and large shrubs with a maximum potential height of greater than 15 feet in the North Bellevue Segment of the Project corridor using the tree inventory and data management methods described herein.
- Provide a summary of estimated impacts to vegetation in the North Bellevue Segment from the Project.
- Describe the Adaptive Tree Replacement approach proposed by PSE to mitigate for impacts to vegetation from the Project.

This report quantifies the number of trees to be removed throughout North Bellevue based on the best currently available information, including trees to be removed from critical areas (*i.e.*, wetlands, geologic hazard areas), as well as applicable critical area buffers and/or setbacks; and proposes compensation for removal based upon tree size.<sup>1</sup> Vegetation impacts occurring in critical areas and associated mitigation activities are also described in the *North Bellevue Critical*

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<sup>1</sup> The total trees removed during construction may vary slightly due to onsite changes since the time of the original inventory. Changes to the original tree inventory dataset commonly include removal of vegetation that has died or been removed by the property owner, addition of vegetation that has been planted, and updates to vegetation attributes.

*Area Report* (The Watershed Company 2021a), where specific critical area requirements are addressed.

## 1.2 Project Location

The North Bellevue study area spans an urban landscape setting. Most of the corridor is zoned single-family residential at various densities; exceptions include the Bel-Red area, generally zoned commercial and office. In North Bellevue, the Project corridor passes through or adjacent to (from north to south) the Bridle Trails, Bel-Red, Wilburton, Crossroads, Woodridge, Lake Hills, and Eastgate neighborhoods. The corridor is in the following public land survey sections: Sections 15, 22, 27, and 34 of Township 25N, Range 05E; and Sections 3 and 10 of Township 24N, Range 05E.

The North Bellevue Segment study area is in the Cedar-Sammamish Watershed (WRIA 8) and spans three City of Bellevue-defined drainage basins, which include (from north to south) the Valley Creek, Kelsey Creek, and Richards Creek basins.

# 2 Methods

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## 2.1 Study Area

The North Bellevue Segment study area is an existing linear transmission line corridor that averages 100 feet in width and includes two existing overhead 115 kV transmission lines (Appendix A). It begins at the northern city limit boundary at the Bridle Crest Trail near NE 60th Street and extends south to the existing Lakeside Substation property for a corridor length of approximately 5.2 miles (Figure 1). Limits of the study area corridor were determined in the field using aerial maps, GPS, and by measuring 25 feet out from the center of each existing pole set or set of transmission lines when poles were not nearby.

## 2.2 Attribute data collection

The attributes collected during the field survey are described in Table 1, below. The tree table (Appendix B) displays the list of trees included in the dataset with select attributes. 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 at breast height (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.

DBH of all subject trees was measured at approximately four-and-a-half feet above the surface of the ground at the trunk; 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).

Vegetation Inventory & Management Plan Report for the North Bellevue Segment  
PSE Energize Eastside Project

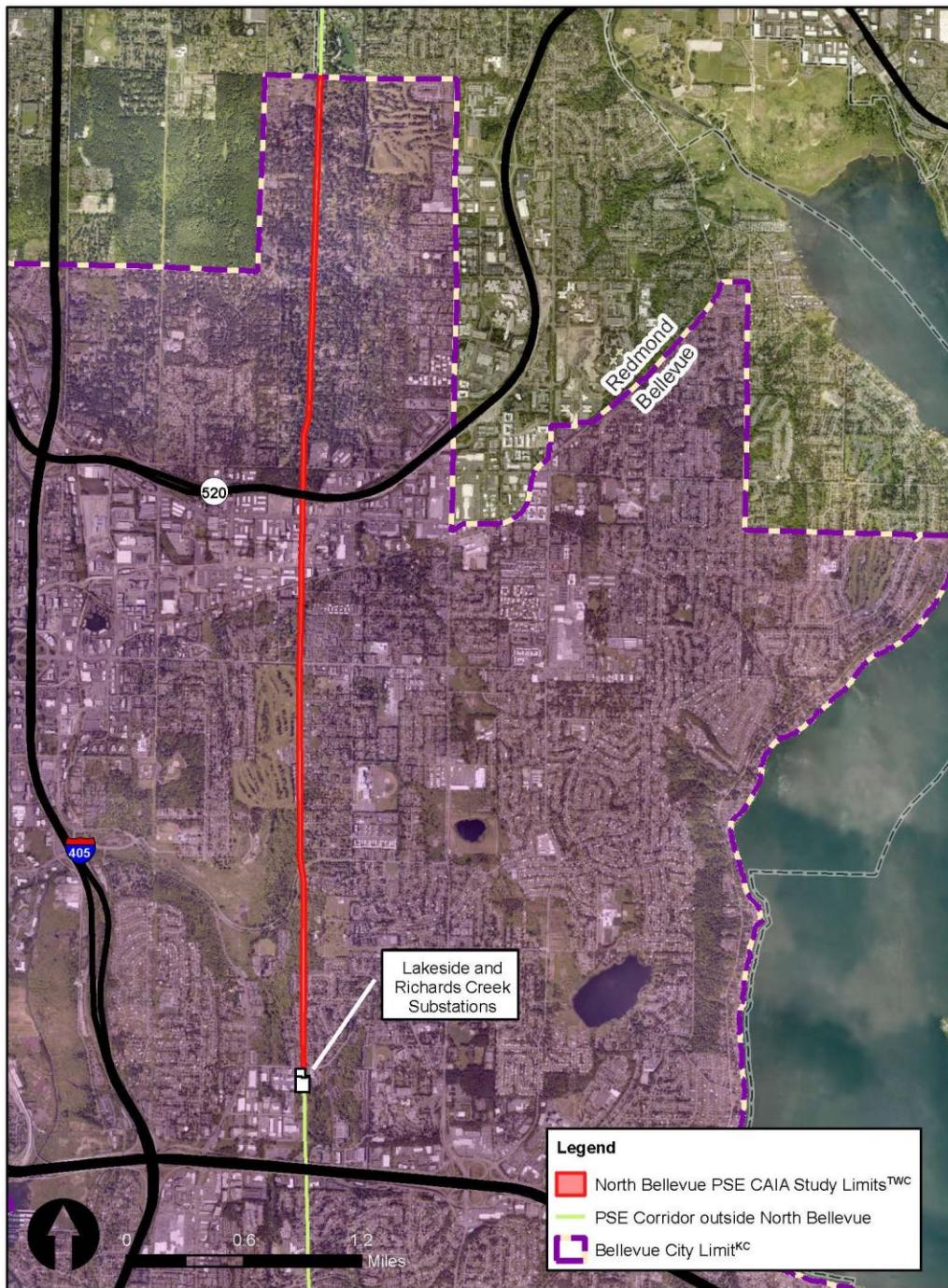


Figure 1. Vicinity map of North Bellevue Segment study area.

Table 1. Attributes recorded for all inventoried vegetation.

ATTRIBUTE	DESCRIPTION
<b>Date of Assessment</b>	Date that The Watershed Company field crew tagged and assessed the tree or shrub.
<b>ID Number</b>	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.
<b>Parcel Number</b>	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 of Bellevue right-of-way.
<b>Scientific Name</b>	Formal scientific name conforming to the International Code of Nomenclature.
<b>Common Name</b>	Name that is based on normal or common language of the Pacific Northwest.
<b>Deciduous/Evergreen</b>	Notes whether a tree is considered deciduous or evergreen.
<b>Stem</b>	Stem is typically a synonym for trunk, e.g. multi-stem tree is a tree with more than one trunk but stem may also refer to the main support for shrubs.
<b>DBH</b>	Diameter at Breast Height; or 4.5 feet from the ground surface. See Section 2.2 for variations.
<b>DBH2</b>	DBH of secondary and other minor stems.
<b>Height</b>	Approximate distance from the ground surface at the trunk to the highest point of the subject tree as visually estimated. Average height for polygons.
<b>Canopy Radius</b>	Measurement from the stem to the average drip line, or end of branches.
<b>Condition</b>	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.
<b>Notes</b>	Additional comments relating to assessment of the tree or polygon unit.

## 2.3 Vegetation Inventory

ISA Certified Arborists conducted a field-based inventory of vegetation within the defined study area in the City of Bellevue in 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.

### 2.3.1 Significant Trees

According to City of Bellevue Land Use Code (LUC 20.50.046), a significant tree is defined as a healthy evergreen or deciduous tree, eight inches in diameter or greater, measured four feet above existing grade. The Director of the Development Services Department may authorize the exclusion of any tree which for reasons of health, age or site development is not desirable to retain.

For the purposes of the inventory, any tree with a diameter of six inches DBH<sup>2</sup> or larger was tagged and assessed. 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-striped 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 or fall off due to natural processes. This has occurred in some instances, particularly for tags affixed to fast-growing species like red alder. Some tags may have been removed by the public after the inventory work was completed.

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<sup>2</sup> Six inches DBH was established as a threshold for vegetation tagging and inventory during the initial scoping of the vegetation inventory work because it represents the minimum tree size that would be regulated by jurisdictions within the Project area. PSE wanted to establish a consistent approach to inventorying and replacing vegetation potentially impacted by the Project, across jurisdictions.

### 2.3.2 Non-Significant Trees and Shrubs

Small, non-significant trees and shrubs with a potential maximum height of 15 feet or more were assessed and mapped within the corridor according to the following methods:

- **Landscaped trees and landscaped tall shrubs:** Any landscaped or maintained tree or shrub with a potential maximum mature 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.
- **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 mature height of over 15 feet, was tagged similar to landscaped trees and tall shrubs.
- **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 were averaged and recorded for the group of vegetation. These polygons were not survey-located. No significant trees were inventoried using this method. Attribute data were collected for each polygon per Section 2.2.
- **Hedges:** Landscaped hedges were also described and mapped using polygons instead of tagging the individual plants that make up the hedge. Maintained contiguous groupings of trees and shrubs with a potential maximum height of greater than 15 feet (e.g., cherry laurel, Portuguese laurel, and arborvitae) that are growing in a row with contiguous and trimmed foliage were assessed as a polygon. Attribute data were collected for each polygon per Section 2.2.

### 2.3.3 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 verifying both the scientific and common names for reporting.

## 2.4 Vegetation Mapping

APS Survey and Mapping, LLC (APS) and David Evans Associates (DEA) survey-located Watershed-tagged vegetation except for a subset of non-significant trees in the Bridle Trails neighborhood (see below). The Watershed Company provided hand-drawn sketches of the tag locations to APS survey crews after every one to two field days to assist in subject tree location. Generally, surveyors located tagged vegetation within three days following Watershed's inventory.

### *Sketched Tree Points*

A small subset of Watershed-tagged tree points were mapped based on field sketches and aerial photos and not survey-located by a professional surveyor. In a portion of the North Bellevue Segment, Watershed inventoried trees in August and September of 2015, several months after the APS survey crew collected data. APS, per their scope of work, had only tagged and survey-located trees with six-inch stems and larger. Watershed crews passed through later to collect attribute data for the significant trees that APS had tagged. Further, Watershed tagged and assessed the smaller trees (less than six inches DBH) in accordance with the methods described herein, and hand-sketched their location on a paper copy of the survey in the field. The new "sketched" tree points were digitized in AutoCAD and provided to PSE and APS in January 2016.

In July 2018, the tree data set for the North Bellevue Segment was comprehensively reviewed and updated as necessary after small discrepancies were noted between tree attribute tables and geospatial data. During this update, some trees points were sketched and digitized in AutoCAD using field notes, aerial photos, and field observations.

### *Survey-only Tree Points*

Occasionally, trees were surveyed by APS and associated attribute data were not collected by Watershed field crews. This occurred under the following circumstances:

- Survey crews were granted access to a parcel and Watershed was not.
- Watershed defined or estimated study area boundaries differently from the survey crew.
- Survey crews located vegetation Watershed had not inventoried.

As a result, some of the mapped tree points have little to no attribute information, only what was provided by the surveyor.

## 2.5 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,

differentially corrected using GPS Pathfinder Office Program, and organized into a searchable database. The tree table (Appendix B) was exported from the spreadsheet file.

Polygons were hand-drawn on maps in the field, manually entered into ArcGIS, reviewed, and differentially corrected before being converted to AutoCAD. Polygon features have been shared with PSE as an AutoCAD (.dwg) file.

### 2.5.1 Updates to the Dataset

Following the original tree inventory, tree data have been updated periodically (2016-present) in conjunction with ongoing work including individual property owner meetings and critical area assessments. Furthermore, as stated previously, the dataset has been comprehensively reviewed and corrected as small data discrepancies were identified with ongoing work.

#### *Property Owner Meetings*

Since 2017, PSE has been sending invitations to property owners and tenants to meet and discuss vegetation replacement options along the Project corridor. Project arborists have attended numerous onsite meetings to discuss site-specific landscaping and tree management/replacement strategies which will eventually lead to the development of customized landscape plans (example provided in Appendix D). The tree inventory data subset for each property is confirmed or updated during property owner meetings to accurately reflect the most up-to-date site conditions. Changes to the original tree inventory dataset commonly include removal of vegetation that has died or been removed by the property owner, addition of vegetation that has been planted, and updates to vegetation attributes.

## 3 Limitations

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The number of trees reported here is an under-representation of the total number of subject trees along the North Bellevue Segment. Watershed and/or survey crews were denied entry by property owners to some parcels in the study area within which crews were unable to identify, assess, map or tally subject trees. These parcels were mostly residential. In a few instances, Watershed was asked to leave during an inventory of a specific parcel. Thus, trees in some parcels were either not inventoried or only partially inventoried. The details of which parcels were not inventoried were collected and tracked by EnviroIssues, a company that specializes in community engagement and works closely with PSE staff on Project outreach, and PSE during the field work.

Trees were identified using the 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 and without all characteristics present. Where genus was known, but species was not, the species was indicated with “sp.” in the tree table. 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 tree table and any descriptor that would aid in identification was added to the notes field.

This document and the associated dataset represent the latest summary of tree distribution and condition in the North Bellevue Segment of the Project corridor. The original 2015 inventory serves as the basis of the tree dataset which has undergone periodic updates as more refined field information is gathered and data are analyzed. Trees are dynamic resources that change over time. One could work endlessly trying to capture all changes that occur to trees across a study area during a project of this magnitude. PSE will continue to document updates to the tree dataset captured through ongoing work both prior to and during construction to appropriately measure and mitigate impacts to trees (see the Adaptive Tree Replacement approach described in Section 7).

## 4 Vegetation Inventory Results

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Tree inventory results presented below were derived from querying the tree table (Appendix B) using pivot tables or formulas in Excel. A total of 1,842 trees or large shrubs were mapped in the North Bellevue Project Segment. The most common species inventoried include Douglas-fir, red alder, western red cedar, Leyland cypress, and apple.

Approximately 8 percent of the North Bellevue dataset were surveyed by APS or DEA only and do not contain accompanying, complete attribute data otherwise collected by Watershed during vegetation inventory work. However, when possible tree significance was determined using survey-collected DBH data. When this occurred, tree condition was presumed to be better than dead or dying.

There were 681 trees mapped that meet the City of Bellevue’s significant tree definition, representing approximately 37 percent of the dataset. Significant trees are any tree with a stem diameter of eight inches or greater and with a condition of *excellent*, *good*, *fair*, or *poor* (see Table 1). Over half of the significant trees are evergreen species (Table 2).

Table 2. Total number of significant trees in the North Bellevue Segment by tree type with the top five most common significant tree species listed.

<b>Tree Type</b>	<b>Top 5 Species (Common Names)</b>	<b>Number of Significant Trees</b>
Evergreen	Douglas-fir Austrian pine Leyland cypress Western red cedar Scots pine	398
Deciduous	Red alder Japanese flowering cherry Norway maple Plum Sweet cherry	283
	Total:	681

### *Polygons*

A total of 82 polygons containing groupings of small trees (less than six inches DBH) and shrubs were mapped and described in North Bellevue. The number of individual small trees in these polygons ranges from a few weedy individuals (e.g., p16 with two small cherry trees in a blackberry patch) to over 50 plants (e.g., p307 with beaked hazelnut, Scouler's willow and Douglas-fir saplings). The DBH ranges from one half to three inches in diameter; with average heights varying widely, but mostly ranging from 10 to 25 feet. Maintained hedges were inventoried using polygons in the City of Bellevue (e.g., p617) and are generally composed of cherry laurel, arborvitae, or Fraser photinia. Most mapped hedges in North Bellevue were maintained between 5 to 20 feet tall, but height also varied depending on degree of maintenance.

## 5 Vegetation Removal and Management

The Federal Energy Regulatory Commission (FERC) has certified the North American Electric Reliability Corporation (NERC) as the electric reliability organization who establishes legally enforceable mandatory standards for the U.S. bulk power system. PSE is required by NERC standards to maintain safe clearances between vegetation and utility lines. Specifically, NERC FAC-003-4 (Transmission Vegetation Management) sets forth the vegetation management requirements for transmission lines operated above 200 kV.

Under NERC FAC-003-4, PSE must manage vegetation to prevent encroachments into the Minimum Vegetation Clearance Distance of its applicable line(s). Since the Project entails replacing the existing 115 kV lines with lines operating up to 230 kV, the upgraded transmission lines must comply with the NERC standard and PSE's 230 kV vegetation management standard. These standards generally require the removal of trees with an expected mature height of more than 15 feet from the wire zone and managed right-of way (ROW); and removal of trees with an expected mature height of more than 70 feet from the legal ROW. The wire zone is the area underneath transmission conductors extending approximately 10 feet horizontally from the footprint of the conductors. The managed ROW is the area that extends approximately 16 feet horizontally from the outside of the transmission wires in their static position. The legal ROW encompasses the entirety of PSE-owned properties and easements (Figure 2).

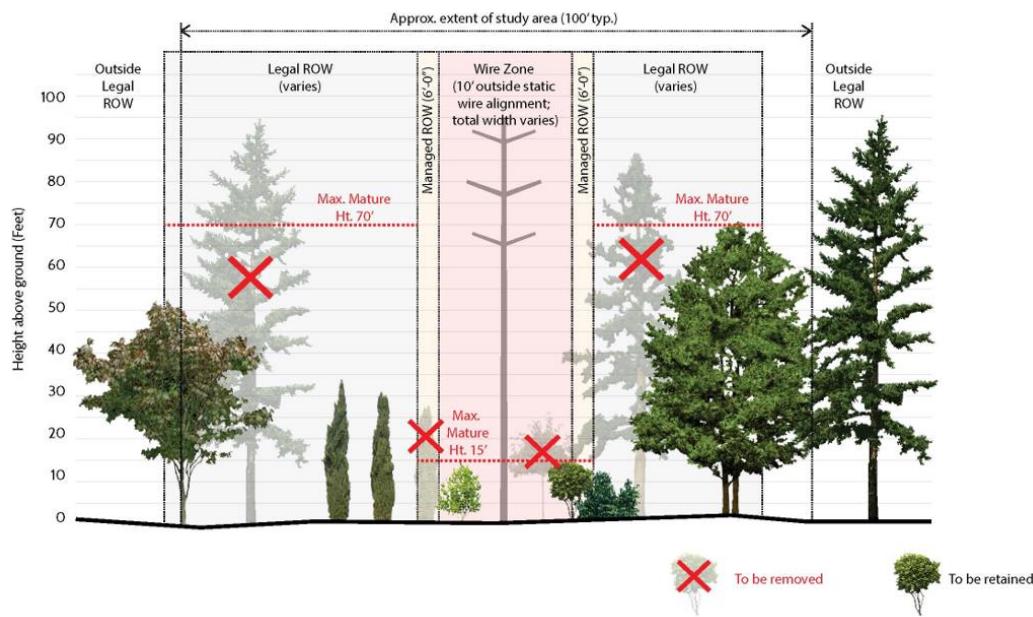


Figure 2. Vegetation impact analysis parameters illustration (cross section view).

A GIS modeling analysis was used to determine the vegetation that would have to be removed to meet the above referenced standards. This analysis, called the Vegetation Impact Analysis

(VIA), utilized vegetation information collected during the original inventory in 2015 with updates incorporated as they were collected (for example, from property owner meetings), maximum projected species height, and proposed transmission line locations and elevations. The methods used to conduct the VIA are described further in Appendix C. Generally, vegetation impacts were calculated according to the following criteria:

- Remove all trees within the proposed wire zone and managed ROW with a maximum potential height that exceeds 15 feet or where 20 feet of vertical clearance is provided beneath the vertical curvature of the lowest wire.
- Remove all trees within the legal ROW and outside of the managed ROW, but within the Maintained legal ROW, with a maximum potential height exceeding 70 feet.

## 5.1 Significant Tree Impacts

According to the VIA, there are approximately 433 significant trees that do not meet the NERC and PSE vegetation management standards in the North Bellevue Segment (Table 3). It is important to note that these trees are already located within an existing and managed transmission line corridor and approximately 74 percent are in fair condition or worse. Most trees to be removed are located on private property, outside of regulated critical areas and associated buffers/setbacks (Table 3).

Table 3. Significant trees proposed for removal categorized by tree location and overlapping critical area type.

	Non-Critical Areas	Critical Areas <sup>1</sup>	Buffers <sup>2</sup>	Setbacks <sup>3</sup>	Total <sup>4</sup>
Private Property	285	16	81	4	386
City right-of-way	11	1	5	1	18
City-owned Property	0	0	2	0	2
PSE-owned Property	20	1	6	0	27
Total	316	18	94	5	433

1. Critical areas include wetlands and geologic hazard areas.
2. Buffers include wetland and stream buffers and a 50-foot top-of-slope buffer for steep slopes and landslide hazard areas.
3. Structure setbacks include a 75-foot toe-of-slope setback for steep slopes. Structure setbacks have not been applied from the edge of wetland and stream buffers.
4. Critical areas, critical area buffers, and critical area setbacks overlap. The hierarchy used to generate this table when one tree was located in more than one critical area, buffer, and/or setback is: critical areas > buffers > setbacks.

## 6 City of Bellevue Tree Regulations

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The City of Bellevue has development standards for new or expanding electrical utility facilities in Land Use Code (LUC), Chapter 20.20 (Development standards), Section 255 (Electrical utility facilities). The purpose of this code section, in part, is to minimize impacts associated with these types of facilities on surrounding areas. However, standards for replacement of impacted vegetation, including trees, are not specifically identified. Tree retention and replacement requirements, as outlined under LUC 20.20.900, apply to land alteration and development activities that are not consistent with the planned electrical utility expansion (*e.g.*, subdivisions and expansion of single-family land uses).

To meet the intent of the LUC and to mitigate for impacts to vegetation associated with the Project in compliance with LUC 20.20.255.G, PSE proposes the tree replacement ratios in Table 4. This tree replacement approach identical to the tree replacement in South Bellevue approved by the City of Bellevue. Using this approach, at least 739 trees will be installed (Table 4) to replace impacted trees. As shown in Table 3, approximately 433 significant trees are planned for removal.

Trees located on private- and City-owned property are subject to PSE's easements that predate the City of Bellevue's incorporation, unlike the trees located within the public street right-of-way. Therefore, trees on private- and City-owned property are only eligible for replacement and not monetary assessment. See Section 7 for more information on mitigation strategies for tree impacts.

Table 4. Tree replacement ratios for the Energize Eastside Project in North Bellevue (not including public right-of-way tree removals).

Tree Size (DBH)	Replacement Ratio	Impacted Live Trees/Shrubs	Replacement Trees
< 6"	As requested by property owner	464	TBD
6" to ≤ 12"	1:1	420 <sup>1</sup>	420
> 12" to < 30"	2:1	158	316
≥ 30"	3:1	1	3
<i>Total Proposed Removal and Replacement =</i>		1,043	739+

1. Trees with “null” values for the DBH attribute (e.g., trees that were surveyed and not inventoried) have been tallied in the 6-≤12-inch DBH category for replacement at 1:1.

Notes: City of Bellevue LUC identifies trees with a DBH of greater than eight inches as significant; however, to ensure that impacts associated with the Energize Eastside Project are mitigated for equally in all impacted jurisdictions, PSE is committed to replacing impacted trees as small as six inches DBH.

The table includes all regulated trees and trees greater than six inches but does not include those trees in City of Bellevue street right-of-way, which will be mitigated using an in-lieu fee approach (see Section 7.3).

## 7 Adaptive Tree Replacement

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PSE has successfully used an Adaptive Tree Replacement approach on similar 115 kV to 230 kV upgrade projects. An Adaptive Tree Replacement approach is appropriate because, due to the range of underlying property interests, PSE cannot guarantee tree replacement in the utility corridor. Although PSE has the rights to operate transmission lines in the corridor, the ability to require property owners to accept mitigation (*i.e.*, additional trees) is not provided for in the easements. Additionally, vegetation replacement is most successful on properties where the owners actually want additional plantings and are willing to commit to their maintenance.

An Adaptive Tree Replacement approach is being proposed which, as explained in detail below, sets out the range of tree replacement and mitigation strategies for the Project. The approach proposes to first maximize tree replacement and mitigation within the easements in the Energize Eastside corridor. If landowners in the corridor decline to have trees planted on their property, PSE will then seek out replanting at alternative properties within the City of Bellevue (across both North and South Bellevue Segments) through the Energy Savings Trees program or on other properties, as explained in detail below.

Planting of replacement trees, regardless of location, will occur within two years of project energization. The Adaptive Tree Replacement approach provides a method to help ensure that the necessary trees will be replaced within the City of Bellevue and that PSE fully mitigates for trees removed during project construction.

### 7.1 Onsite Mitigation

#### 7.1.1 Private Property: Landscape Plans

##### *Pre-Construction*

PSE encourages property owners to incorporate additional trees into their property-specific landscape and tree replacement plans during property owner meetings (see Section 2.5.1); however, PSE cannot require property owners to do so. While some property owners take this as an opportunity to add additional trees to their properties, others decline the offer for replacement trees. Project staff meetings with North Bellevue private property owners are ongoing.

At the property owner meetings, existing tree conditions are confirmed or updated based on the Project's existing tree dataset. Trees that are modeled for removal based on the VIA (Appendix C) are further assessed in the field to determine if removal is required. Typical factors that affect the removal determination are field-confirmed tree sub-species or variety, property-specific topography, and existing physical form and current maintenance activities (e.g., a specific

variety of fruit tree that is regularly maintained would not be expected to reach its maximum potential height and therefore would not need to be removed).

Project staff and property owners discuss how their respective properties can be replanted based upon the current Project design, property owner preferences, and an Energize Eastside-specific plant palette (Appendix E). The plant palette serves as a reference guide of transmission line compatible replacement vegetation options. This information is used to develop a property-specific Landscape and Tree Replacement Plan (see Appendix D example). Project staff then schedules a second meeting with each affected property owner to share and discuss the draft plan for their property. During the second meeting, the plan is reviewed carefully with the property owner and changes, if necessary, are discussed and documented.

#### *Post Construction*

Tree removals will be documented at the time of construction on a property-by-property basis. Documentation will include the tree species, inventory tag number, and DBH at the time of removal.

Tree removals will be cross-referenced to the proposed Landscape and Tree Replacement Plan that was provided to the property owner. Changes to the proposed plan could occur based on a number of factors such as property ownership changes, prior removal of trees by the owner, real world verification of conductor location in relationship to trees, as well as other factors.

The Landscape and Tree Replacement Plan will be updated and replacement vegetation will be installed. The final (as-built) Landscape and Tree Replacement Plan will be provided to the City of Bellevue as documentation of vegetation removal and replacement by property. In addition, upon completion of replanting activities on private property in North Bellevue, PSE will provide a summary report that documents the total number and types of trees that have been removed and planted.

PSE will provide a financial guarantee that covers the estimated cost of tree mitigation (including materials and labor) prior to the issuance of the Clearing and Grading permit and commencement of tree removal activities. Release of said guarantee by the City of Bellevue will occur upon PSE's submittal of the summary planting report. PSE will guarantee plant survival for one year after installation, with plant replacement as the primary remedy for mortality after one year.

#### **7.1.2 Private Property: Secondary Planting Areas**

While the primary focus of the tree replacement efforts will continue to be within the existing transmission line corridor, other locations may be necessary if all of the required replacement trees cannot be accommodated within the corridor. Secondary planting areas will include those

areas outside of the managed ROW, but within PSE's easement boundaries or on other portions of those properties where trees have been removed as part of the project. However, planting in these areas will only be on those properties where the owners have provided permission. In these areas, PSE will give preference to native plantings for tree replacement, subject to agreement by the property owner.

### 7.1.3 PSE-owned Property

In addition to individual properties located along the transmission line corridor, PSE proposes to plant trees at Richards Creek Substation, a company-owned property located along the Energize Eastside corridor as part of mitigation for the North Bellevue Segment critical area impacts (see the *North Bellevue Critical Area Report*; The Watershed Company 2021a). Planting trees at this site reflects the City of Bellevue's preferred approach, which is to plant trees along the corridor. The North Bellevue Segment Richards Creek mitigation area includes 88 native trees, which is in addition to the hundreds of native trees planned for installation on the property as part of the approved South Bellevue mitigation area (Critical Areas Land Use Permit #17-120557-LO).

## 7.2 Offsite Mitigation: Tree Planting Options

PSE anticipates that some trees cannot be replaced onsite due to property owners' preferences. In those cases, replacement trees will need to be planted outside the corridor. One benefit of offsite planting is the option to plant larger trees, which contribute to habitat quality, tree canopy, and area aesthetics.

PSE has and will consider offsite options, as necessary. Offsite options may include city parks, neighborhood groups/Home Owner Associations (HOAs) tracts, and other developments within the City of Bellevue. An emphasis will be placed on finding sites within 0.25 mile of the corridor, which was the defined study area used to assess scenic views and aesthetics in the project Environmental Impact Statement. PSE will identify opportunity replacement areas starting with a GIS-based analysis of:

1. Land use – existing land use, such as parks, trails, schools, campuses; critical area or buffer status; open space areas; existing tree cover
2. Ownership – PSE-owned, public, private ownerships, such as individuals or HOAs

Maps or figures that depict potentially viable planting opportunities will be generated based on the GIS analysis. PSE will assess the viability of the identified sites and will work with the property owners to determine if they would be interested in planting trees on their property. Upon completion of this analysis and property owner communications, the potential planting locations will be proposed to the City of Bellevue prior to the issuance of the required clear and grade permit.

## 7.3 Programmatic Mitigation Strategies

### *Energy Saving Trees*

To help increase tree numbers in the City of Bellevue, PSE has been participating in the Energy Saving Trees program, which provides trees to those residents that want to add trees to their property in a manner that can help offset energy usage. While in most cases these trees are not along the project corridor, they are in the City of Bellevue and help buffer potential tree loss due to factors such as mortality and property owner changes (*i.e.*, a new property owner removes existing trees due to landscaping preferences). PSE began participating in the Energy Saving Trees program in 2018 to help offset anticipated tree removal associated with the South Bellevue Segment of Energize Eastside. Continued use of this program offers a viable approach to replacing trees in the City of Bellevue outside of the corridor, as it provides trees to property owners who want additional trees. As stated previously, emphasis will be made to provide trees to property owners within 0.25 mile of the corridor; however, if that is not successful, the program will be expanded City-wide. During a spring event, PSE and the National Arbor Days Foundation provided 551 trees to 300 Bellevue residents as part of the tree restoration associated with the South Bellevue Segment.

### *In-Lieu Fee*

PSE proposes to compensate for removal of trees in City right-of-way with a fee, based on the value of trees to be removed. PSE understands that the fee will be used by the City for replanting in the City right-of-way or on other City-owned parcels. An independent arborist will complete a tree appraisal for the North Bellevue Segment city asset trees using the methods outlined in the Council of Tree and Landscape Appraisers, 10<sup>th</sup> Edition of the *Guide for Plant Appraisal* (CTLA 2017). PSE shall prepare a final tree removal plan depicting trees to be removed in the right-of-way including their size and species. This plan shall be submitted to the City of Bellevue for approval prior to the issuance of required clear and grade permit.

## References

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- Allen, E. A., Morrison, D. J., & Wallis, G. W. 1996. Common Tree Diseases of British Columbia. Victoria, British Columbia, Canada: Natural Resources Canada, Canadian Forest Service.
- Council of Tree & Landscape Appraisers (CTLA). 2017. Guide for Plant Appraisal, 10th Edition. Chicago: International Society of Arboriculture.
- Dunster, J. A., Smiley, E. T., Matheny, N., & Lilly, S. 2013. Tree Risk Assessment. Champaign, IL: International Society of Arboriculture.
- Gooding, R. F., Ingram, J. B., Urban, J. R., Bloch, L. B., Steigerwaldt, W. M., Harris, R. W., & Allen, E. N. 2000. Guide for Plant Appraisal (9th ed.). (P. Currid, Ed.) Champaign, IL: International Society of Arboriculture.
- International Society of Arboriculture. (n.d.). International Dictionary Online. Retrieved January 2016, from International Society of Arboriculture: <http://www.isa-arbor.com/education/onlineresources/dictionary.aspx>
- Matheny, N. P., & Clark, J. R. 1994. A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas. Pleasanton: HortScience, Inc.
- Oregon State University. (n.d.). Landscape Plants: Images, Identification, and Information. (P. Breen, Editor) Retrieved 2015-2016, from Oregon State University Horticulture Department: <http://oregonstate.edu/dept/laplants/>
- The Watershed Company. May 2016. City of Bellevue Tree Inventory Report: Puget Sound Energy – Energize Eastside Project. Prepared for PSE.
- The Watershed Company 2021a. North Bellevue Critical Areas Report: PSE Energize Eastside Project. Prepared for City of Bellevue.
- The Watershed Company. 2021b. Delineation Report Update for the North Bellevue Segment: PSE Energize Eastside Project Documentation. Prepared for PSE.
- United States Department of Agriculture. (2016, January 15). Natural Resources Conservation Service. Retrieved from PLANTS Database: <http://plants.usda.gov/java/>
- University of Washington. (n.d.). WTU Image Collection: Plants of Washington. Retrieved 2015-2016, from Burke Museum of Natural History and Culture: <http://biology.burke.washington.edu/herbarium/imagecollection.php>

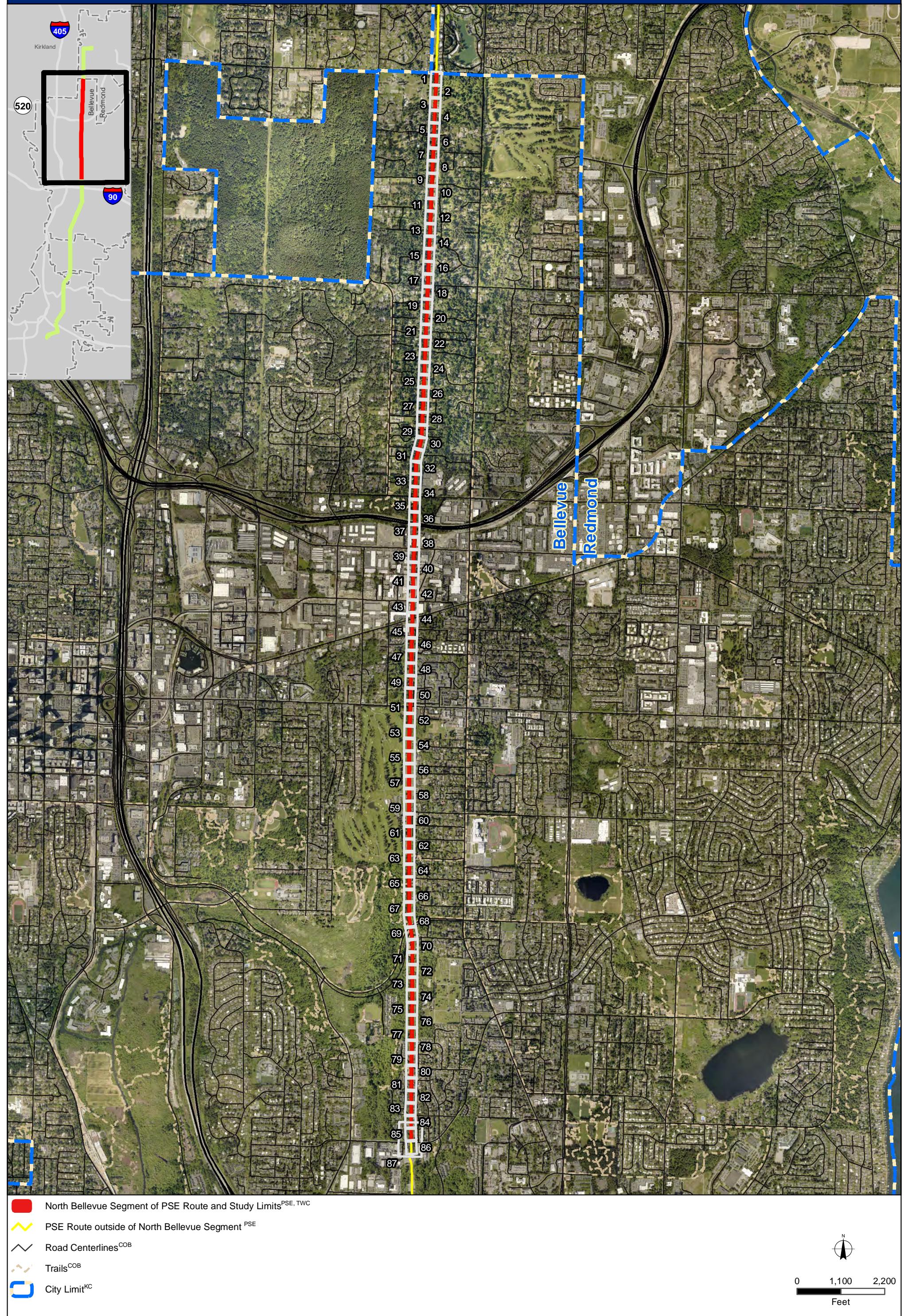
## Appendix A

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# OUTREACH MAPS AND PUBLIC TREE REMOVAL MAPS



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



# PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

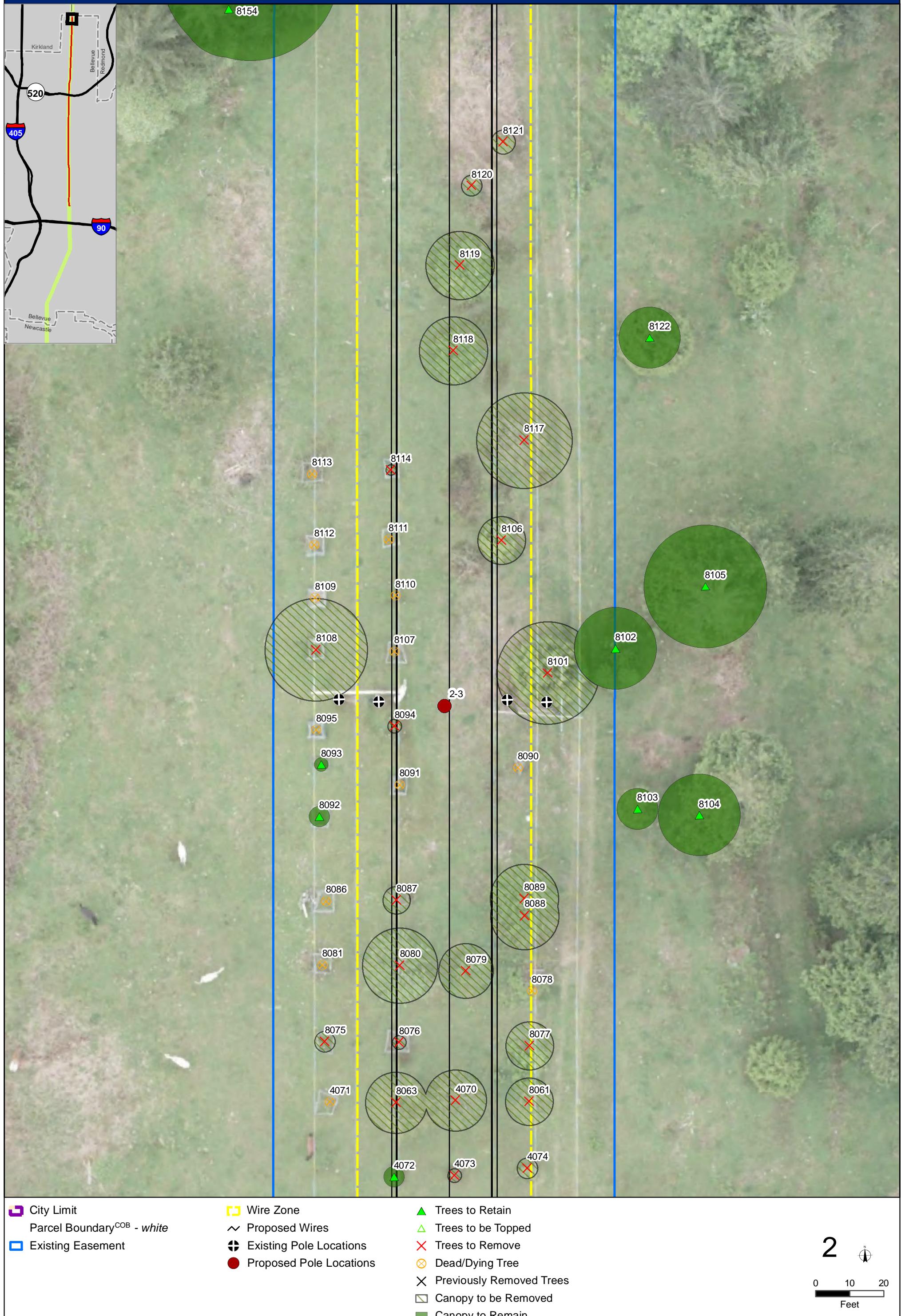
Canopy to be Removed

Canopy to Remain

1

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

3

0 10 20  
Feet

# PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



# PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



# PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

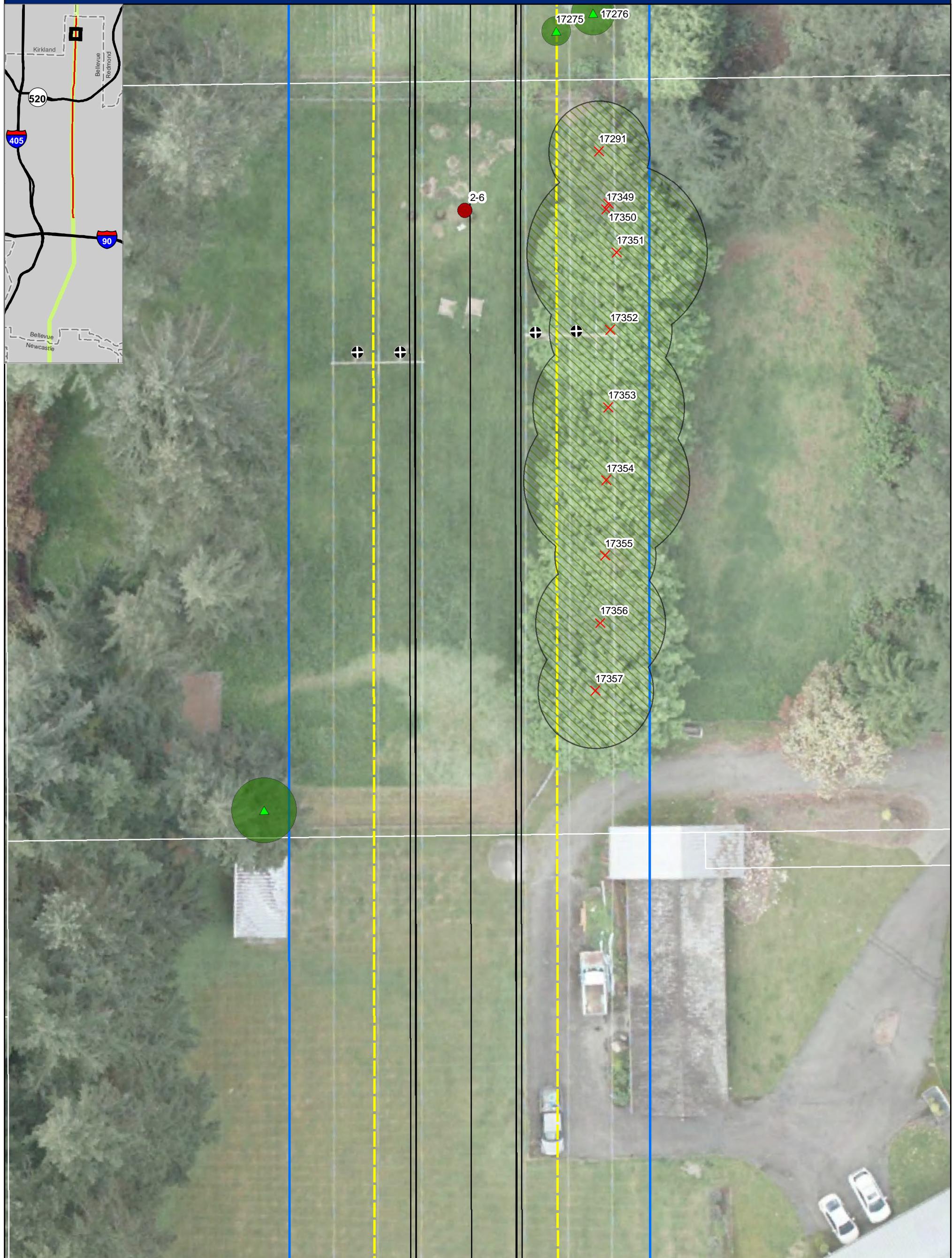
6

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

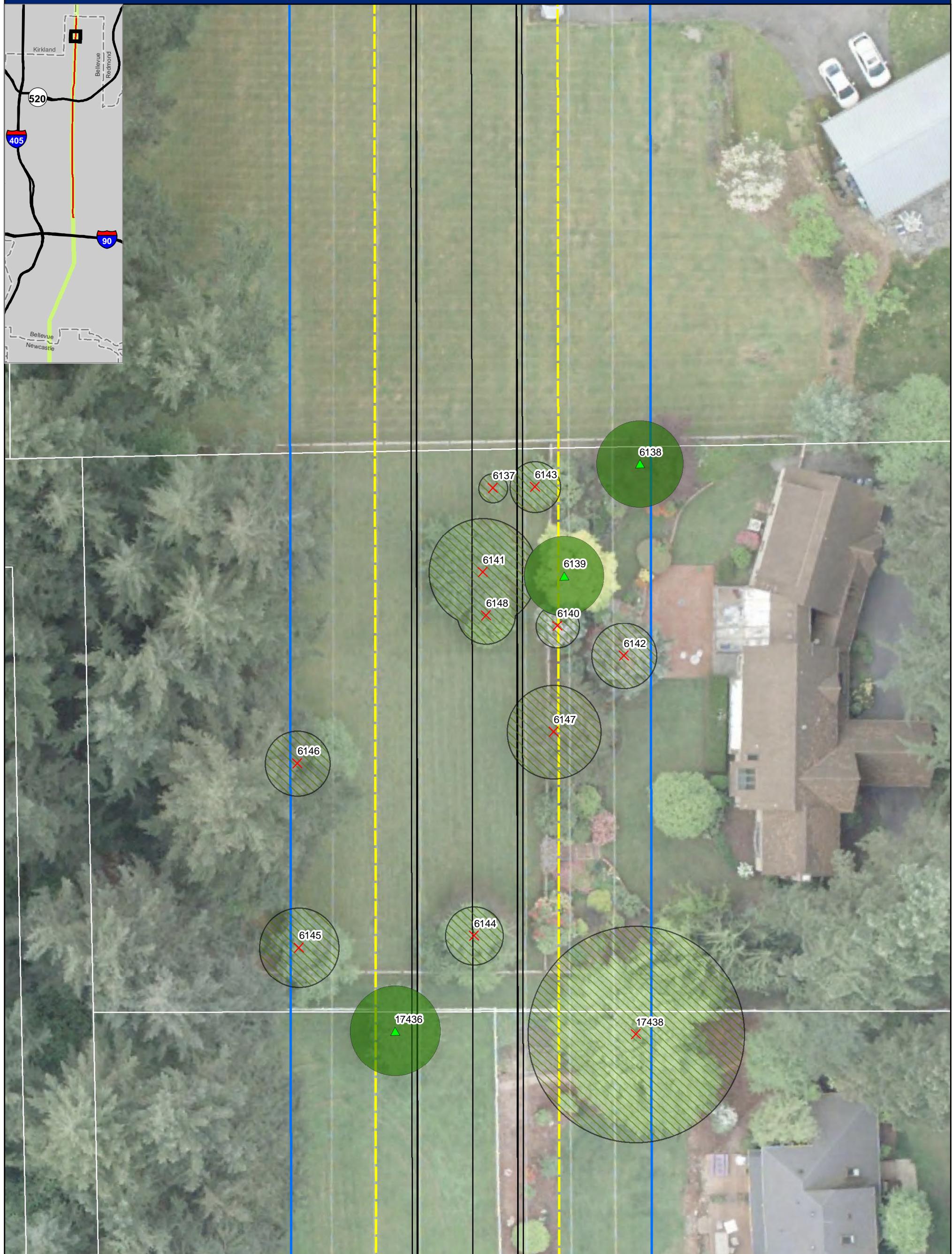
Canopy to be Removed

Canopy to Remain

8

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

9

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



■ City Limit

■ Parcel Boundary<sup>COB - white</sup>

□ Existing Easement

□ Wire Zone

~ Proposed Wires

+-----+ Existing Pole Locations

● Proposed Pole Locations

▲ Trees to Retain

△ Trees to be Topped

X Trees to Remove

○ Dead/Dying Tree

X Previously Removed Trees

□ Canopy to be Removed

■ Canopy to Remain

10

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

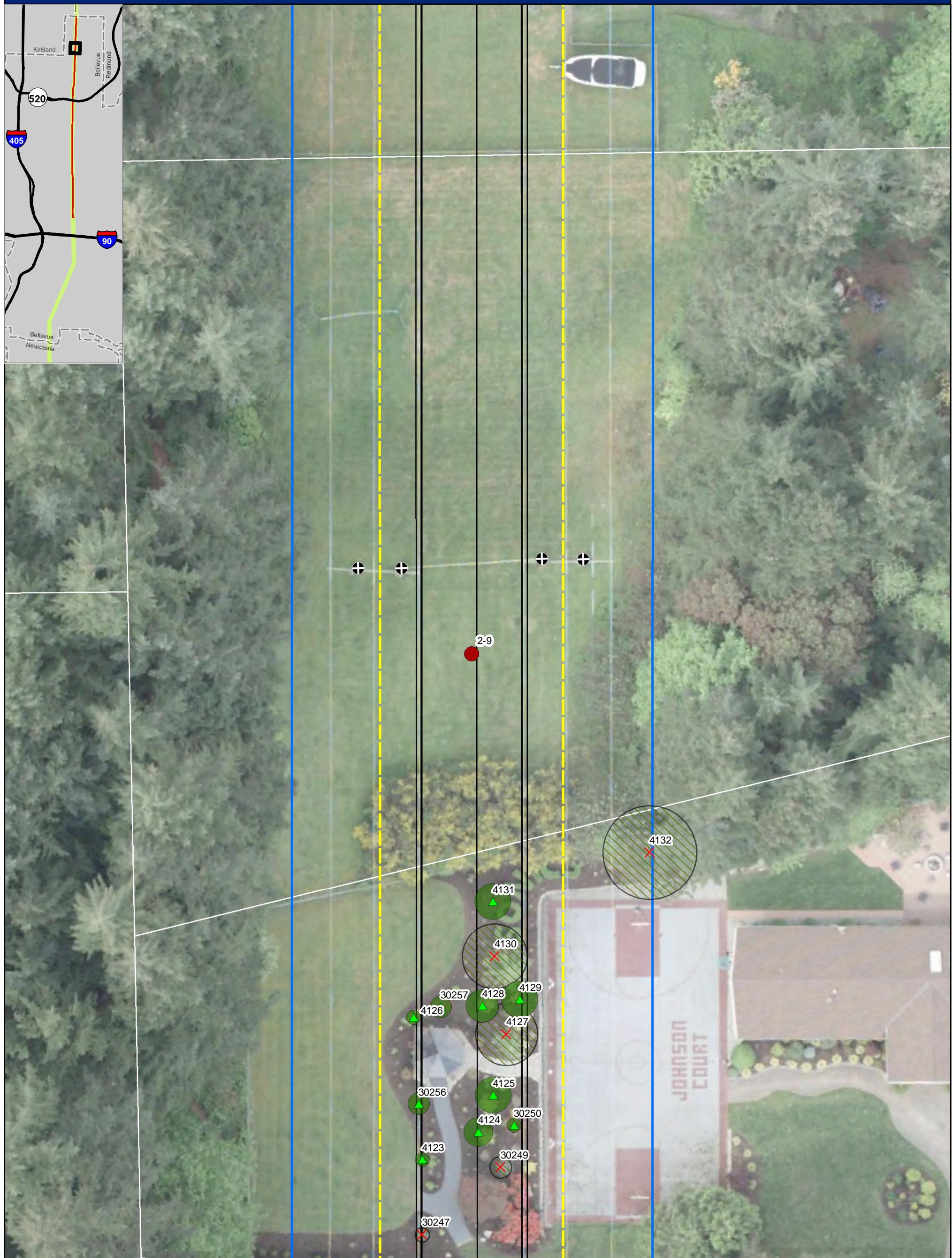
12

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB</sup> - white

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

14

0 10 20  
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and Aerial imagery from PSE, 2011.

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PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>  
Existing Easement

Wire Zone  
Proposed Wires  
Existing Pole Locations  
Proposed Pole Locations

Trees to Retain  
Trees to be Topped  
Trees to Remove  
Dead/Dying Tree  
Previously Removed Trees  
Canopy to be Removed  
Canopy to Remain

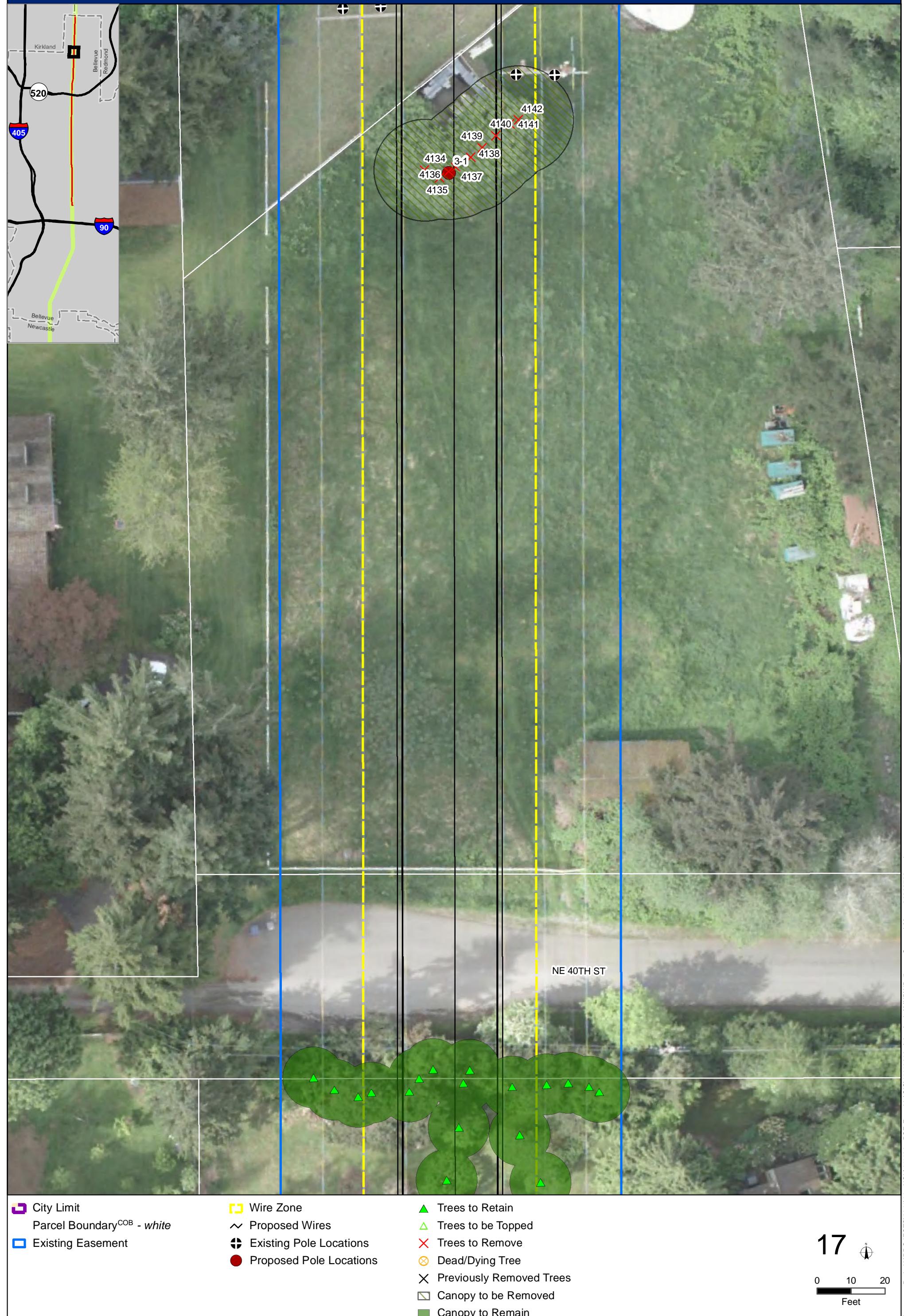
15

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



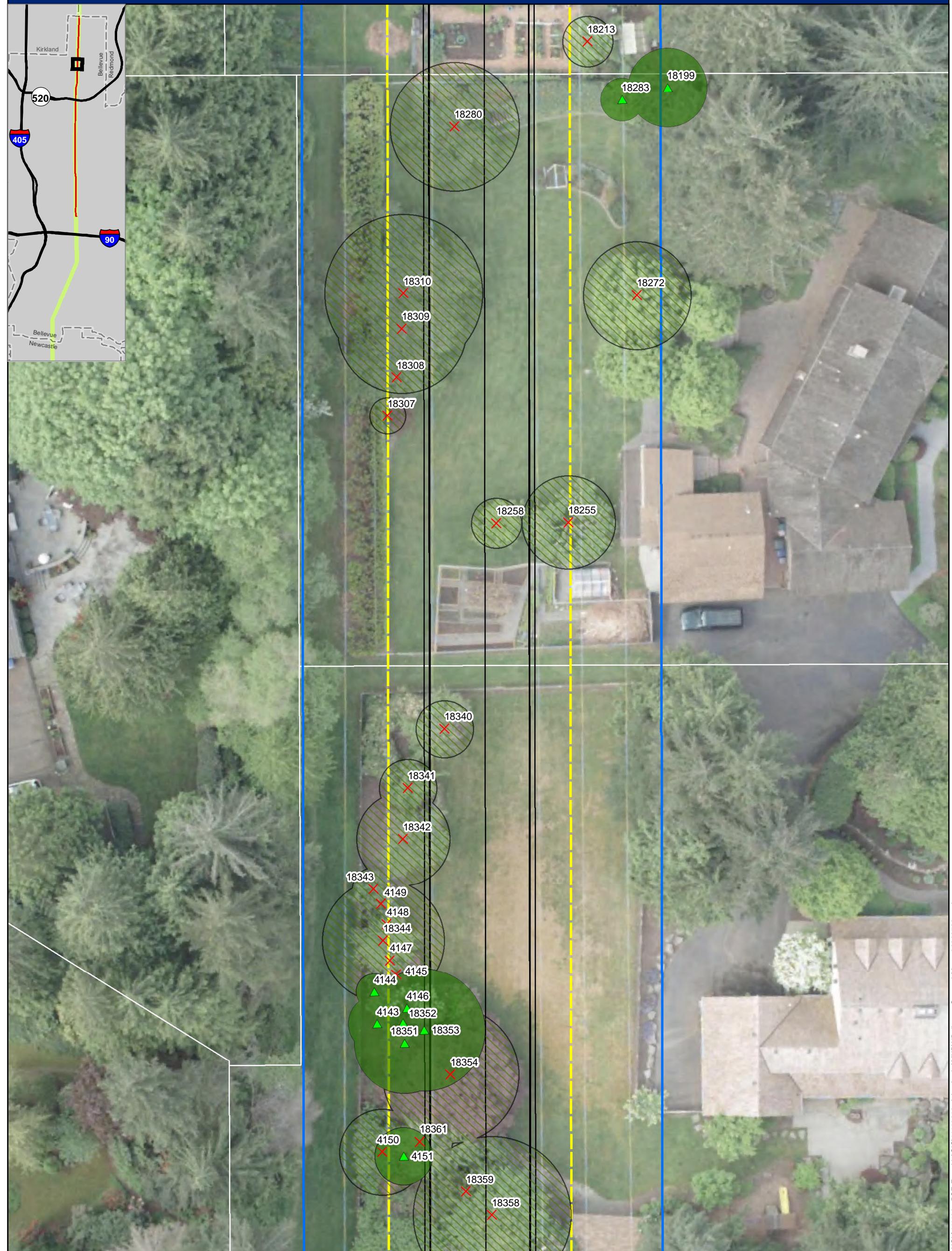
PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

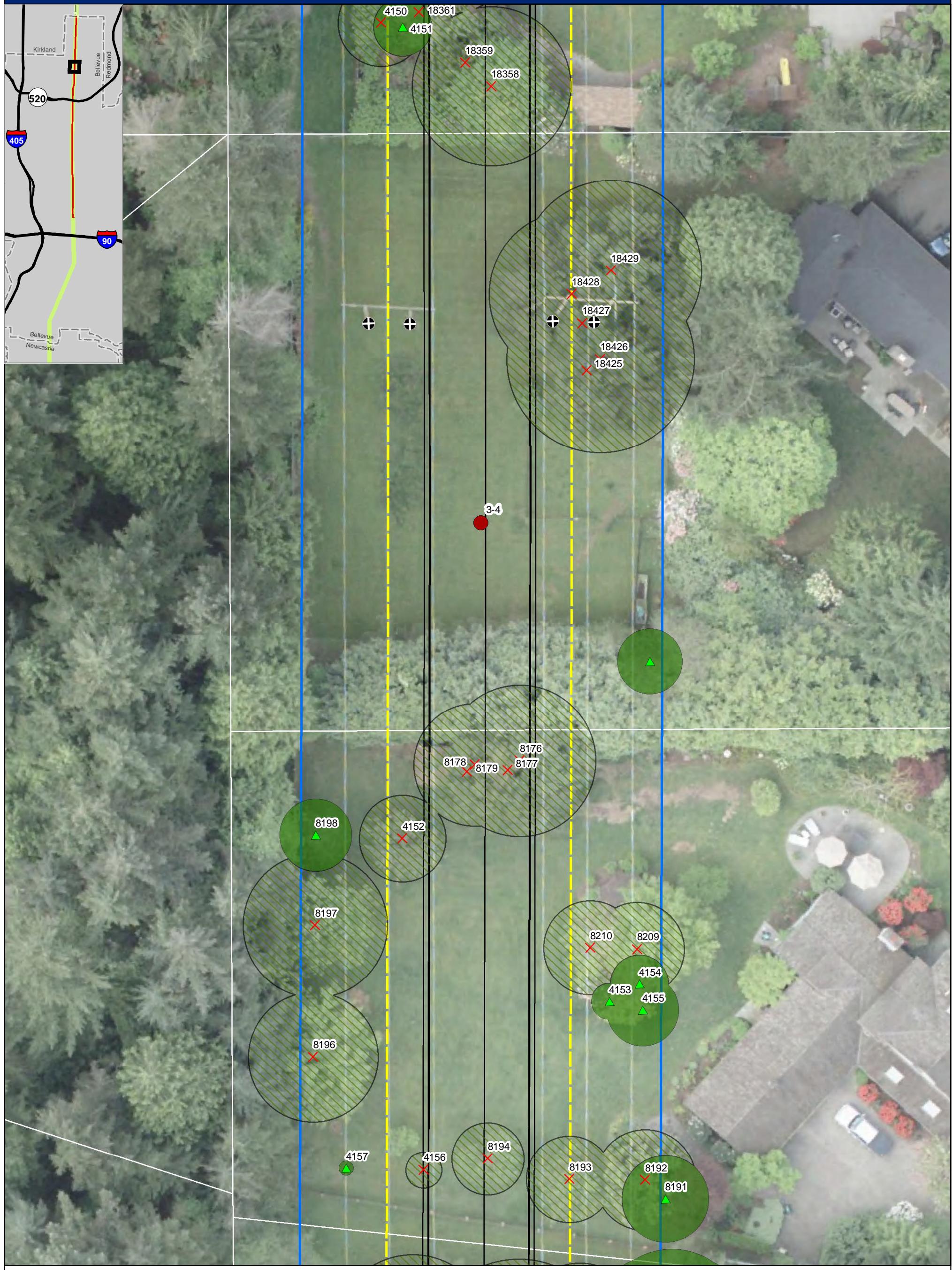
Canopy to be Removed

Canopy to Remain

21

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



22

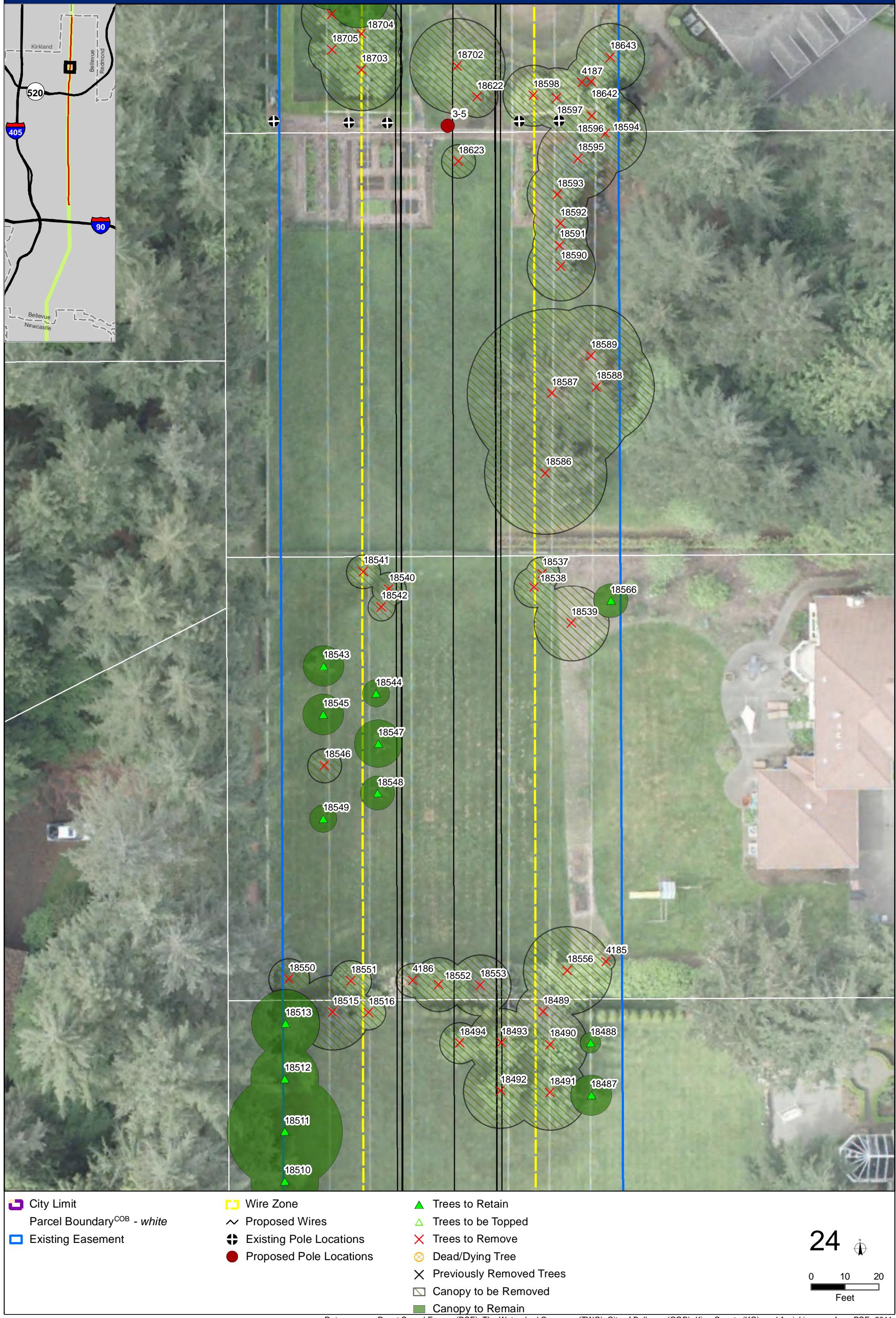


PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



23

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



# PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



■ City Limit

■ Wire Zone

▲ Trees to Retain

Parcel Boundary<sup>COB - white</sup>

~ Proposed Wires

△ Trees to be Topped

● Existing Pole Locations

✗ Trees to Remove

● Proposed Pole Locations

○ Dead/Dying Tree

✖ Previously Removed Trees

▨ Canopy to be Removed

■ Canopy to Remain

25

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

26

0 10 20  
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and Aerial imagery from PSE, 2011.

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB</sup> - white

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

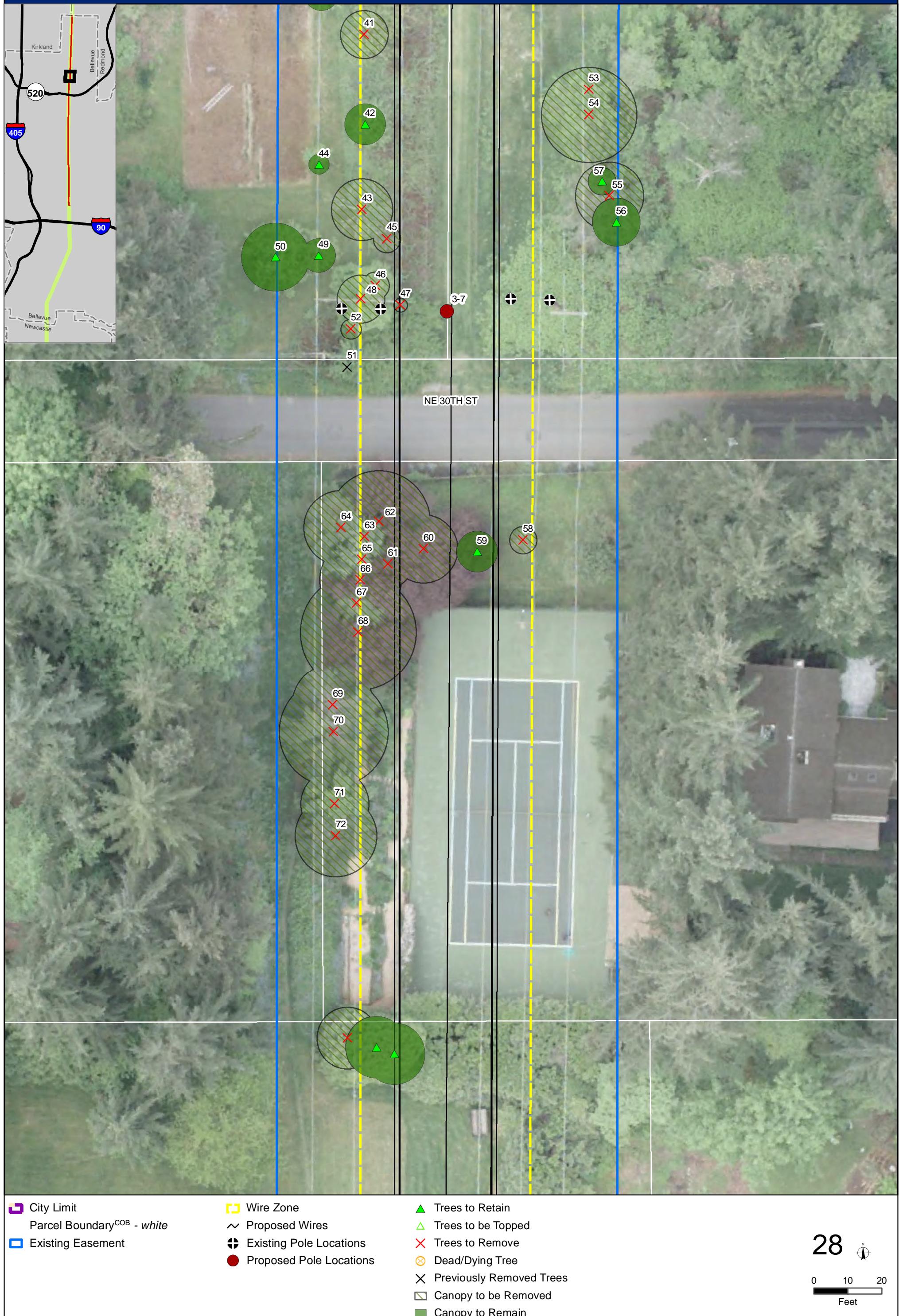
Canopy to be Removed

Canopy to Remain

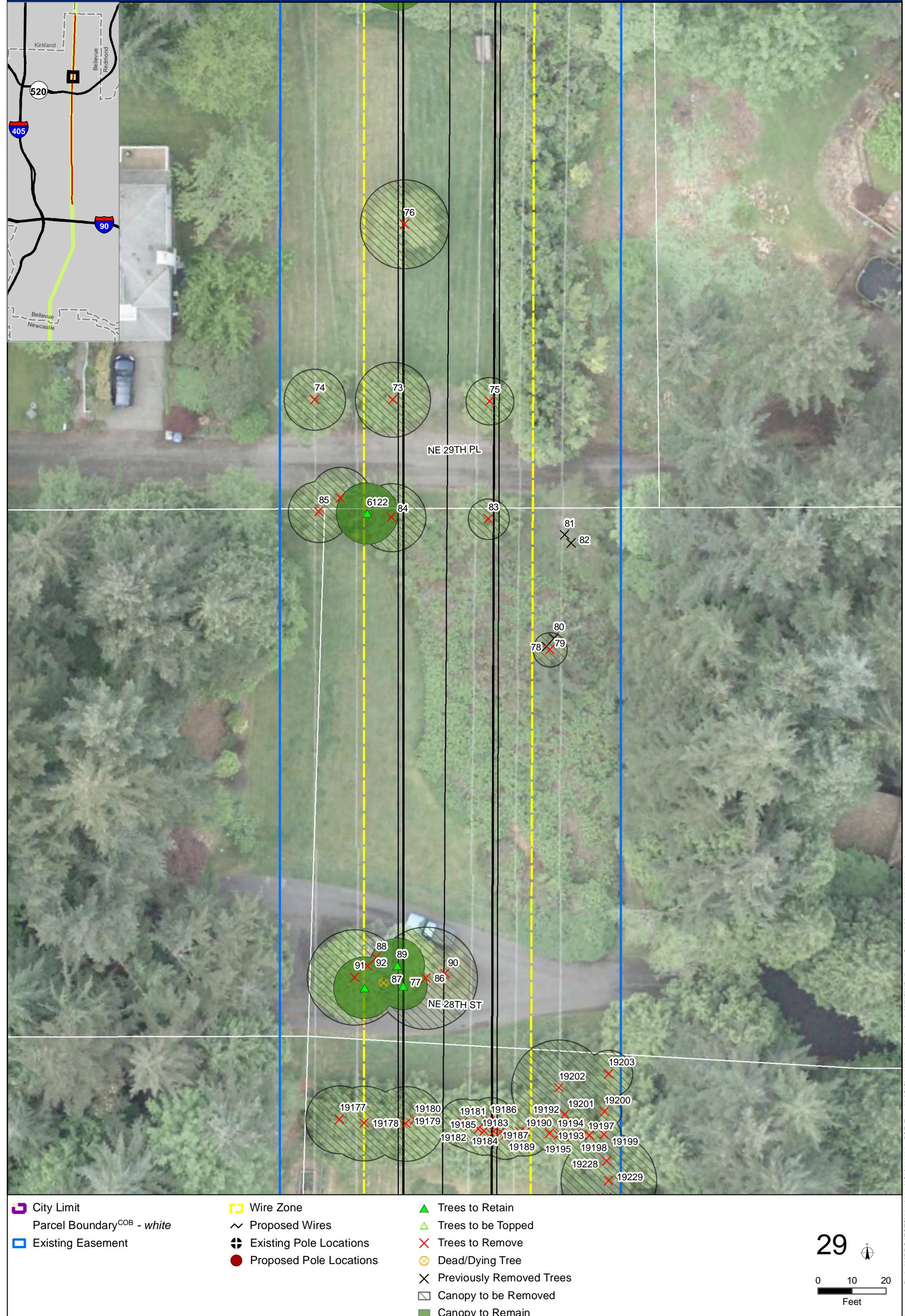
27

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

31

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

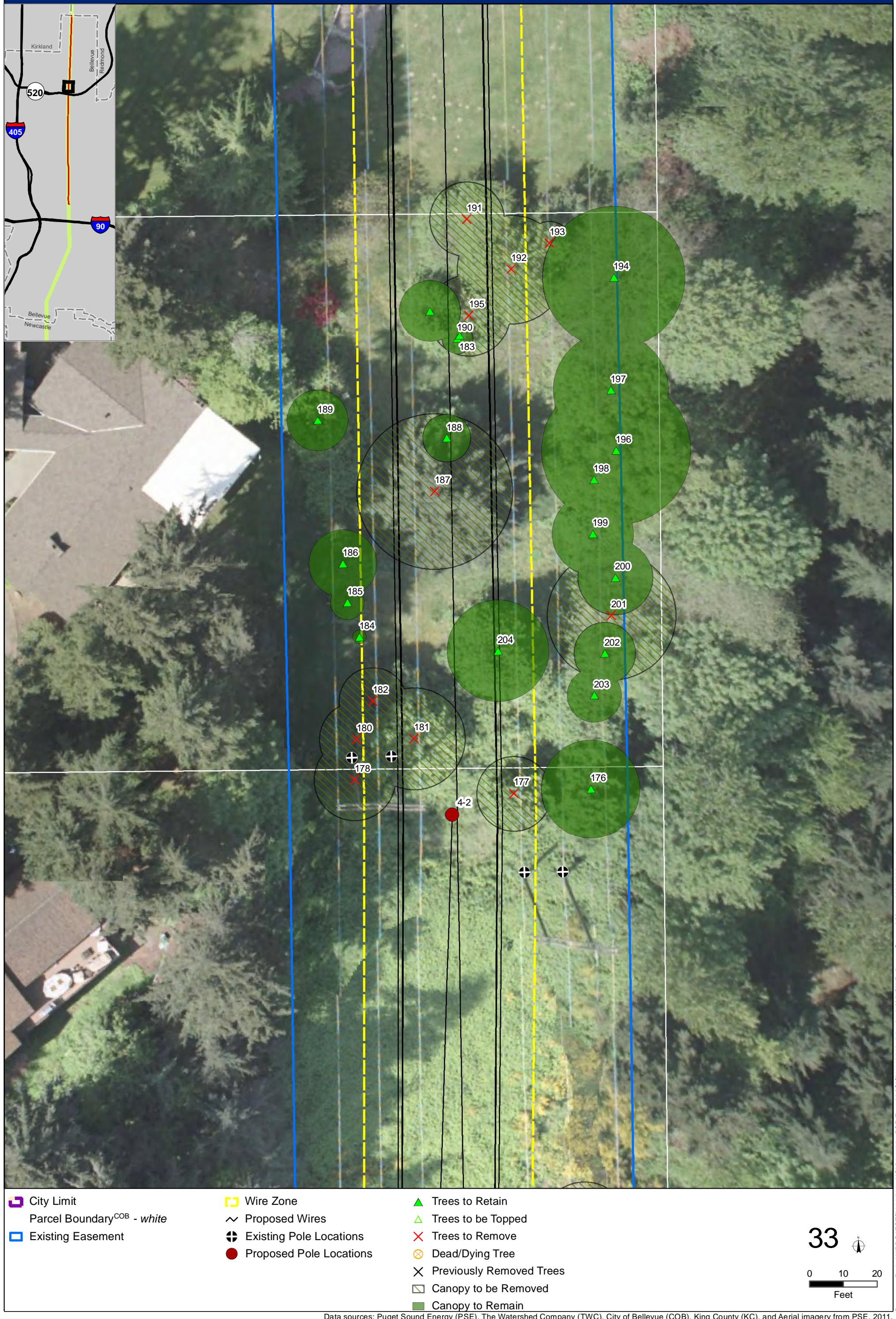
Canopy to be Removed

Canopy to Remain

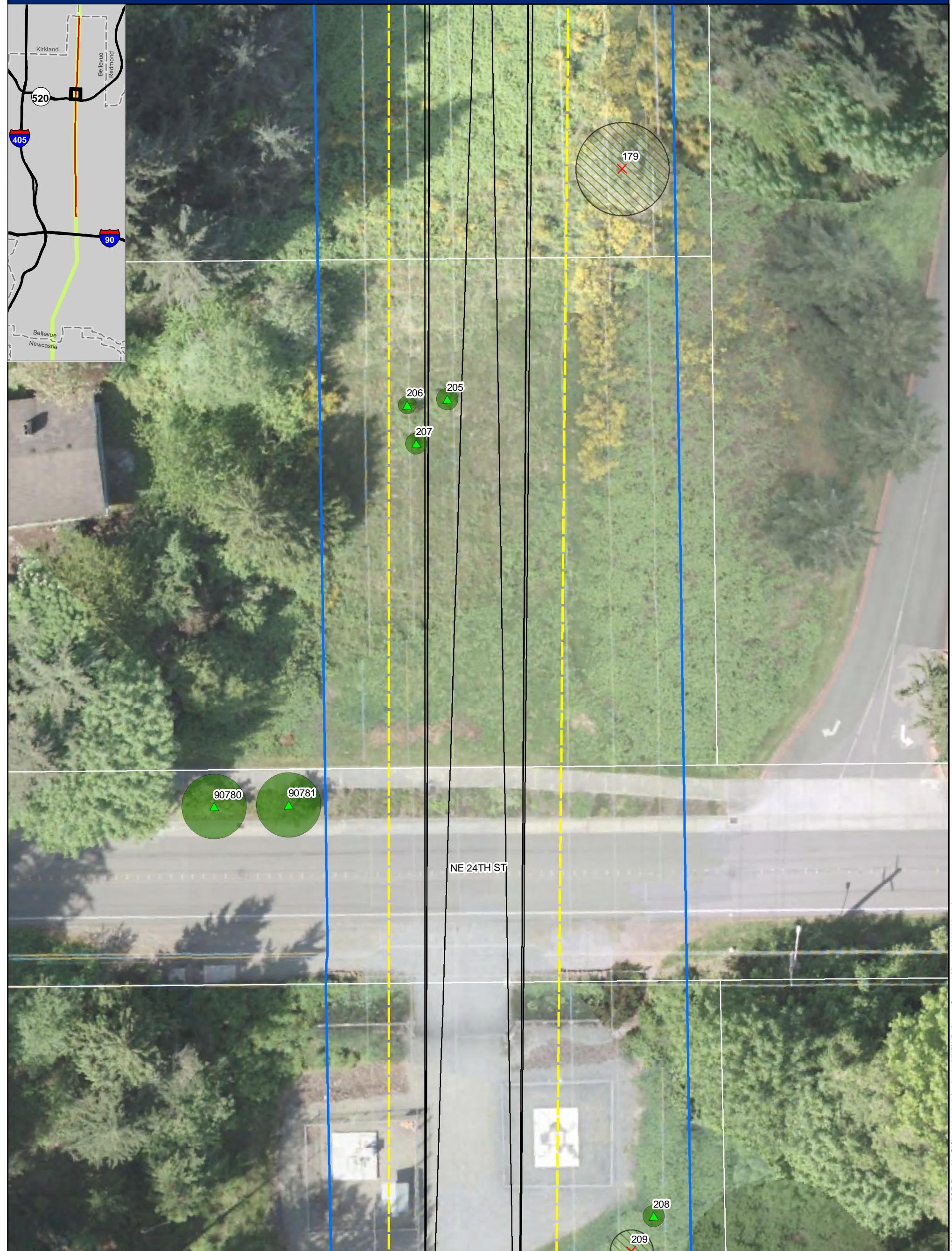
32

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>  
Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

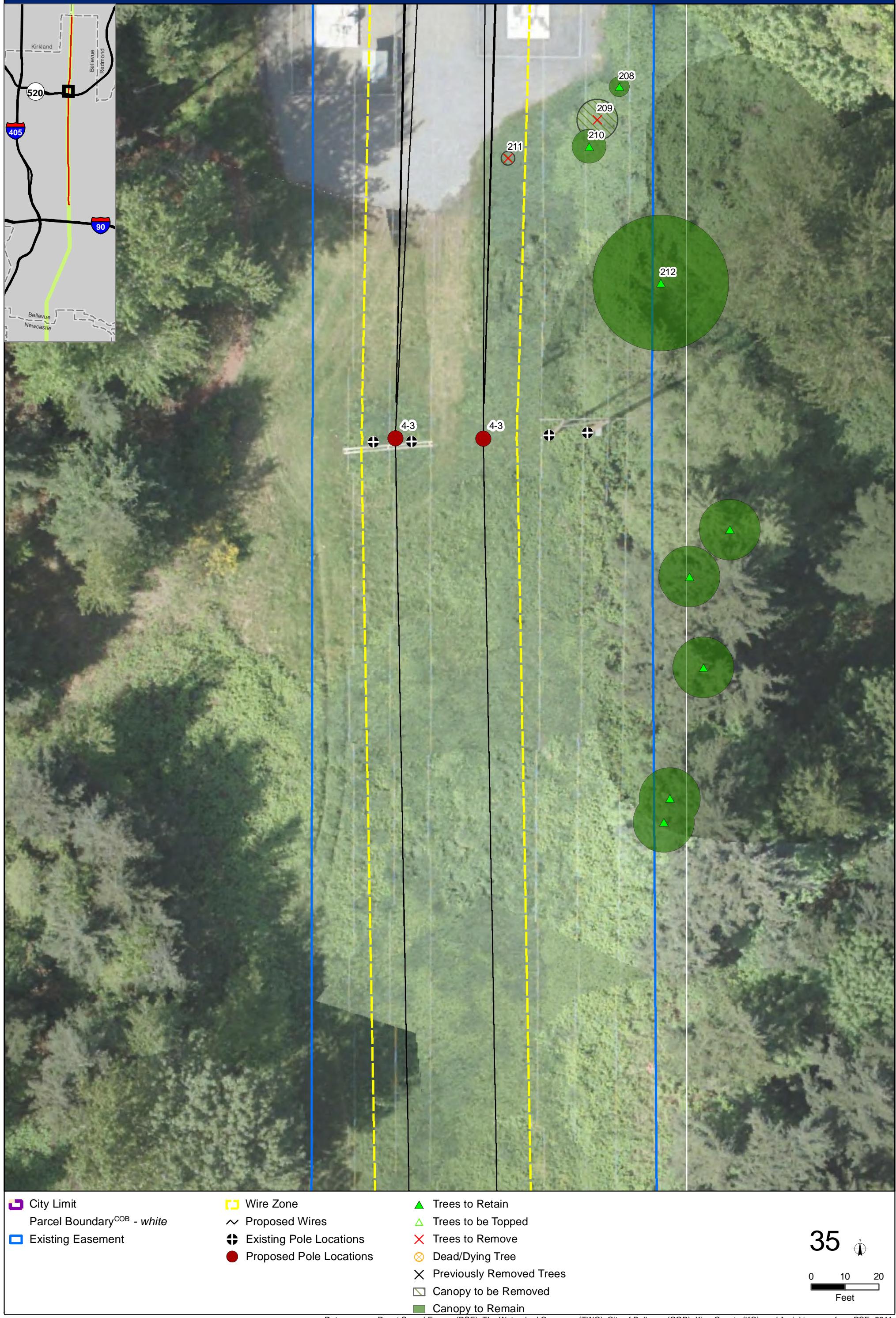
Canopy to be Removed

Canopy to Remain

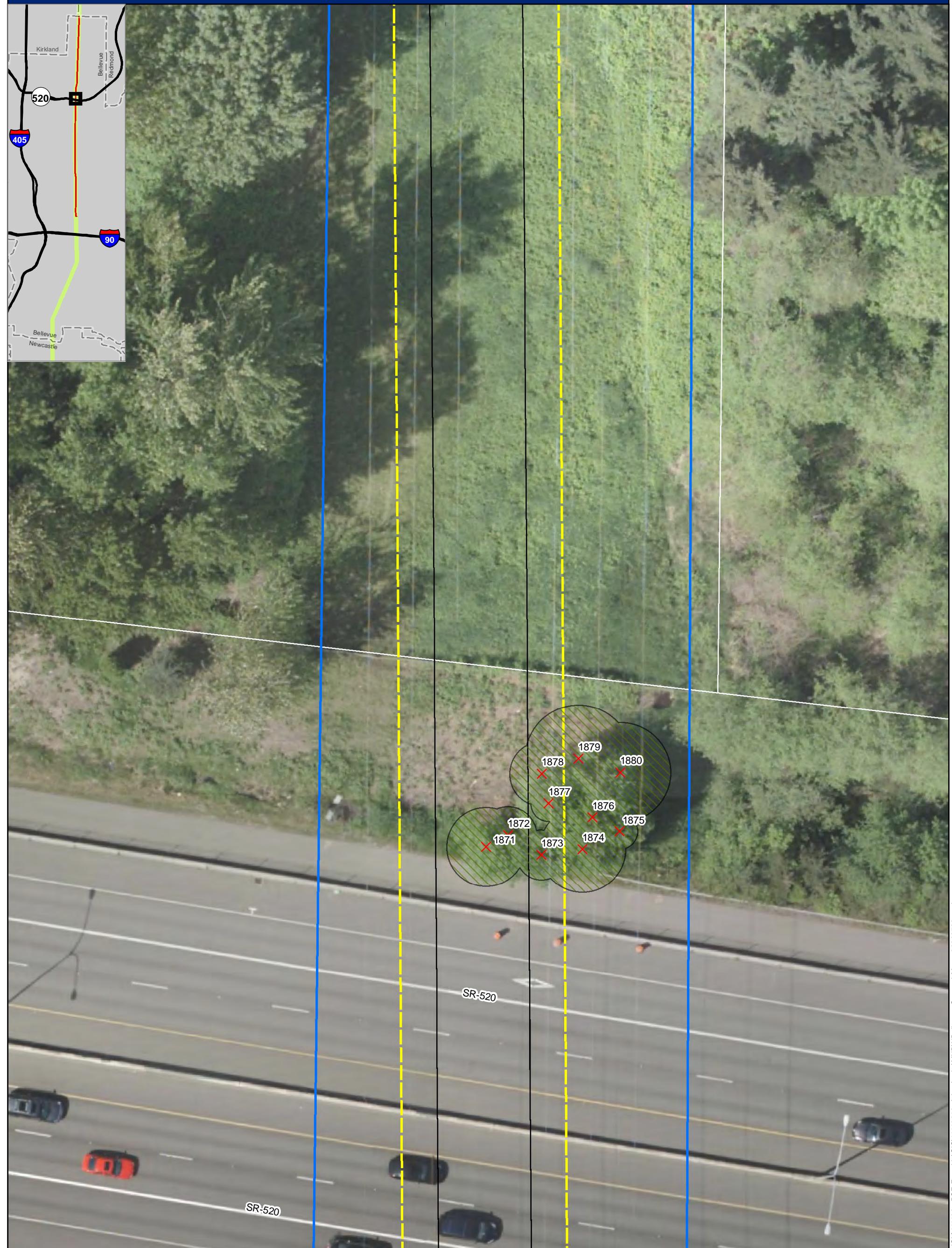
34

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



■ City Limit

Parcel Boundary<sup>COB - white</sup>

□ Existing Easement

□ Wire Zone

~~ Proposed Wires

✖ Existing Pole Locations

● Proposed Pole Locations

▲ Trees to Retain

△ Trees to be Topped

✗ Trees to Remove

○ Dead/Dying Tree

✗ Previously Removed Trees

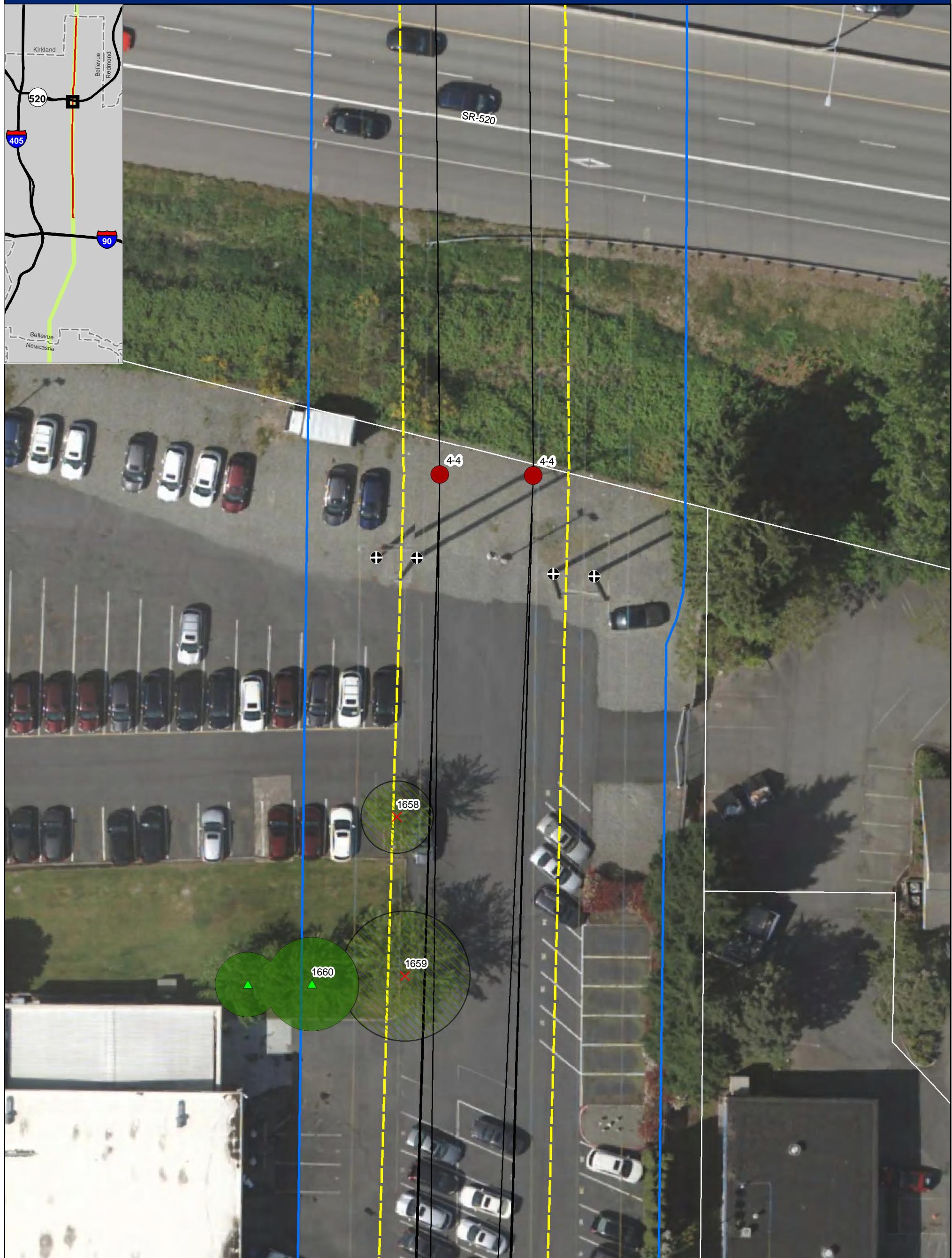
◻ Canopy to be Removed

■ Canopy to Remain

36

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB</sup> - white  
Existing Easement

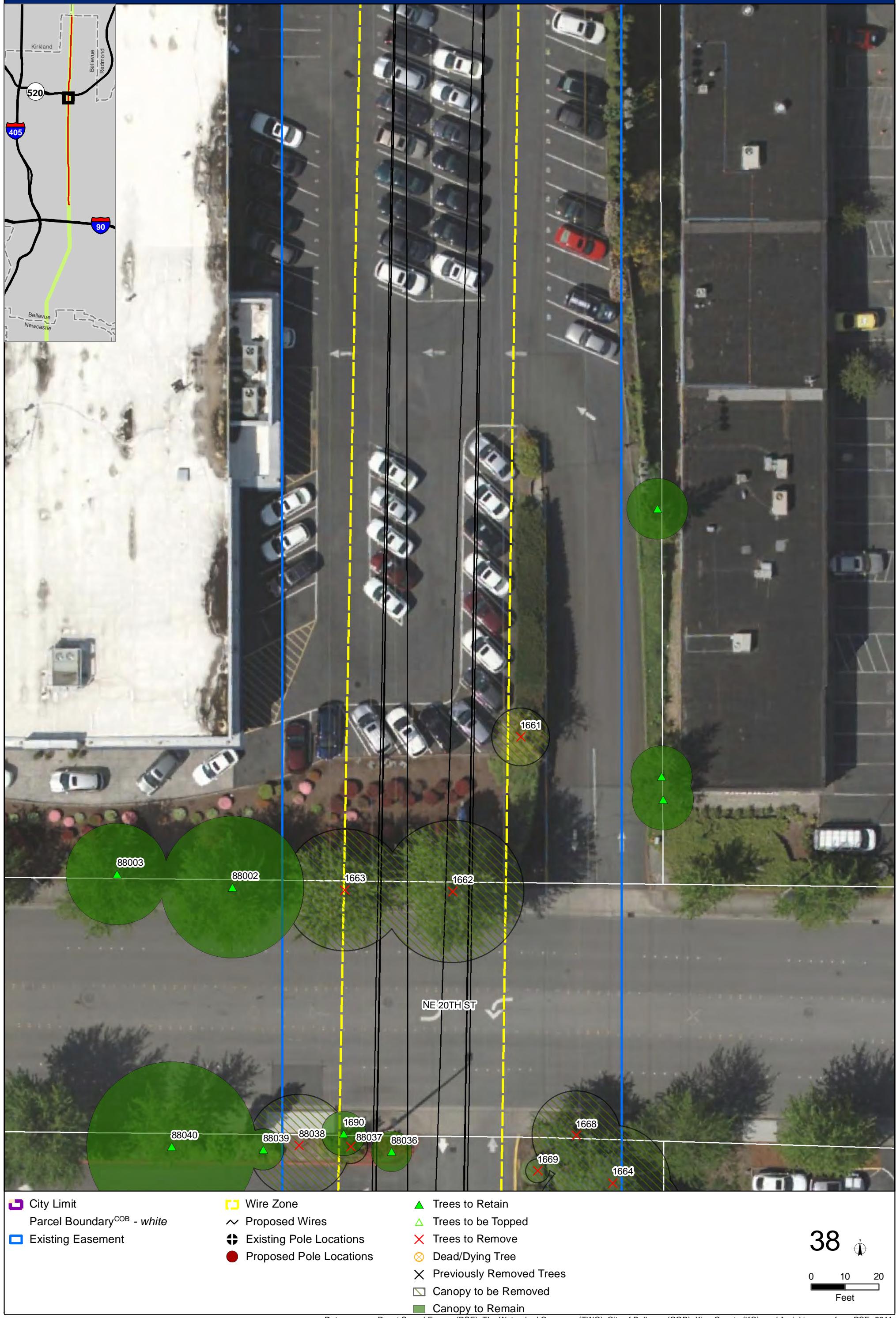
Wire Zone  
Proposed Wires  
Existing Pole Locations  
Proposed Pole Locations

Trees to Retain  
Trees to be Topped  
Trees to Remove  
Dead/Dying Tree  
Previously Removed Trees  
Canopy to be Removed  
Canopy to Remain

37

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

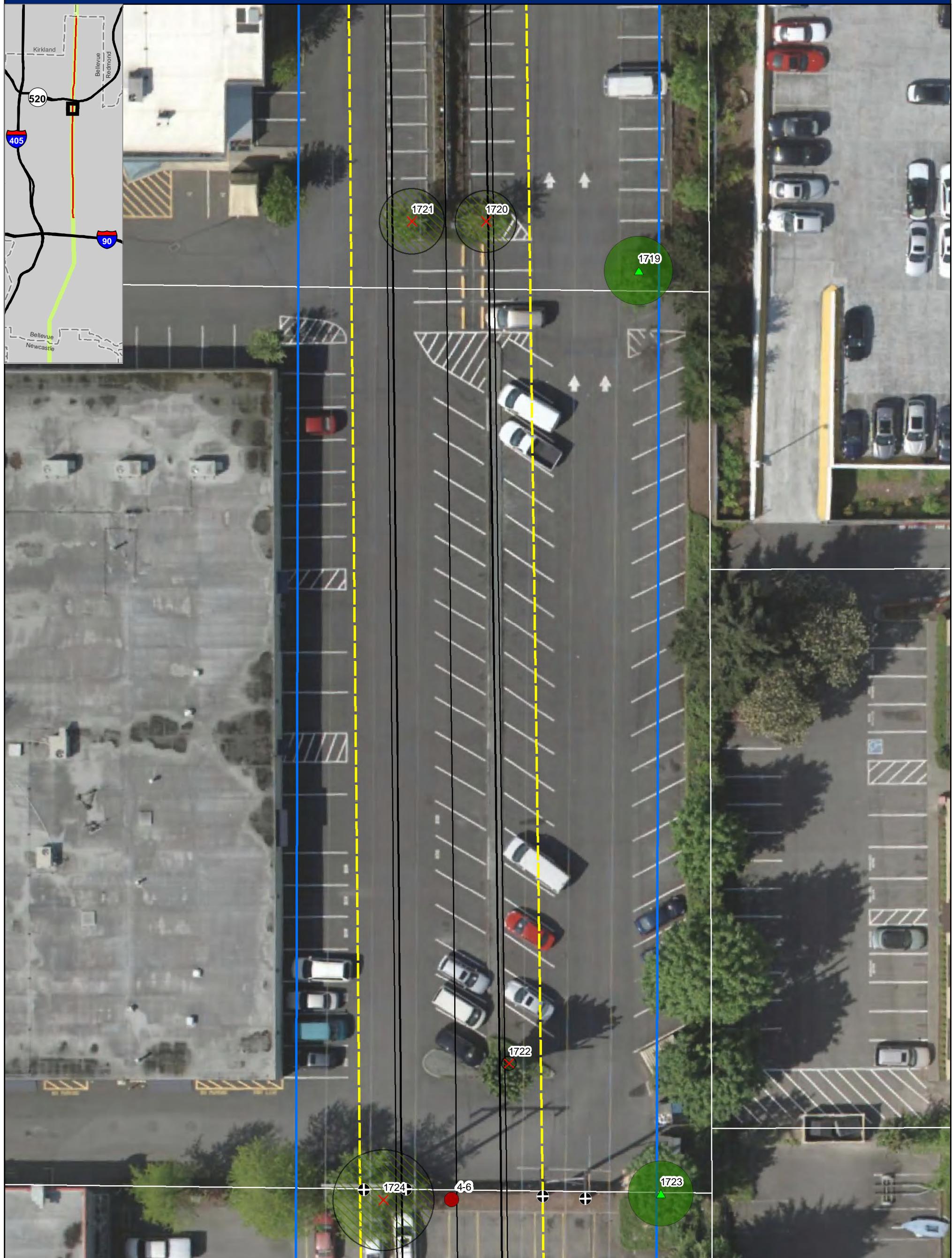
Canopy to Remain

39

0 10 20  
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and Aerial imagery from PSE, 2011.

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



■ City Limit

Parcel Boundary<sup>COB</sup> - white

□ Existing Easement

□ Wire Zone

~ Proposed Wires

✖ Existing Pole Locations

● Proposed Pole Locations

▲ Trees to Retain

△ Trees to be Topped

✖ Trees to Remove

○ Dead/Dying Tree

✗ Previously Removed Trees

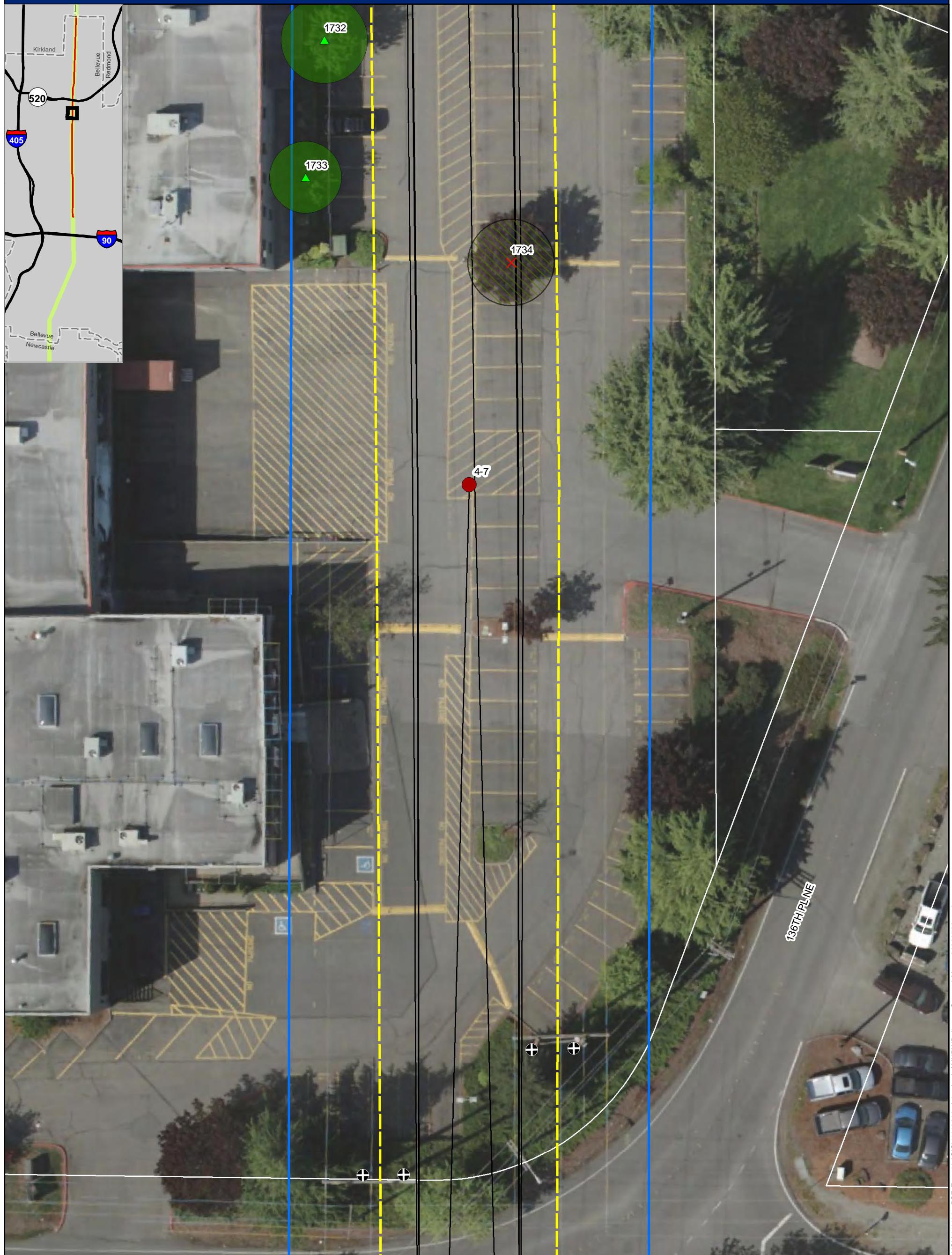
◻ Canopy to be Removed

■ Canopy to Remain

41

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

42

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>  
Existing Easement

Wire Zone  
Proposed Wires  
Existing Pole Locations  
Proposed Pole Locations

Trees to Retain  
Trees to be Topped  
Trees to Remove  
Dead/Dying Tree  
Previously Removed Trees  
Canopy to be Removed  
Canopy to Remain

43

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



■ City Limit

Parcel Boundary<sup>COB</sup> - white

□ Existing Easement

□ Wire Zone

~~ Proposed Wires

⊕ Existing Pole Locations

● Proposed Pole Locations

▲ Trees to Retain

△ Trees to be Topped

✗ Trees to Remove

○ Dead/Dying Tree

✗ Previously Removed Trees

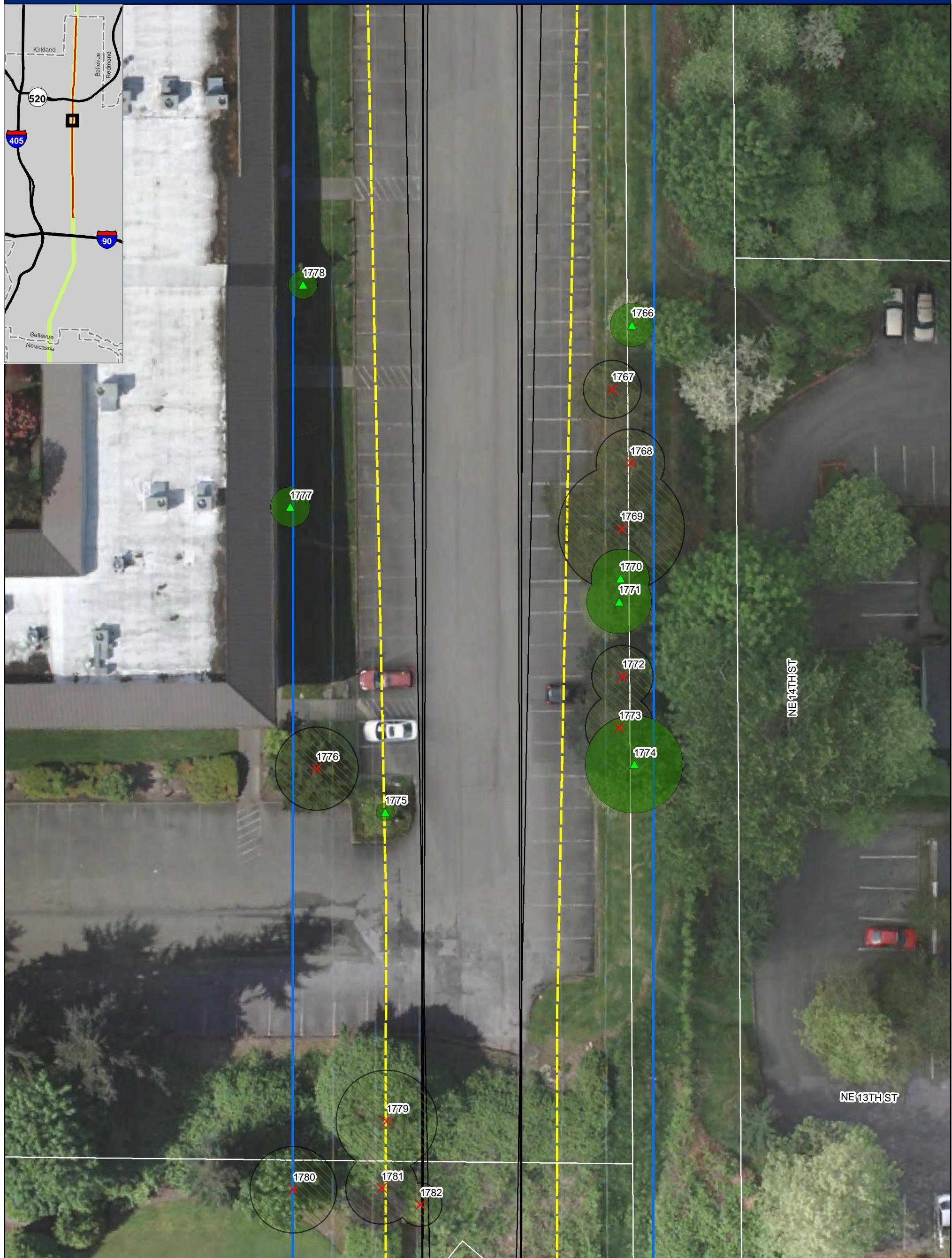
◻ Canopy to be Removed

■ Canopy to Remain

44

0 10 20  
Feet

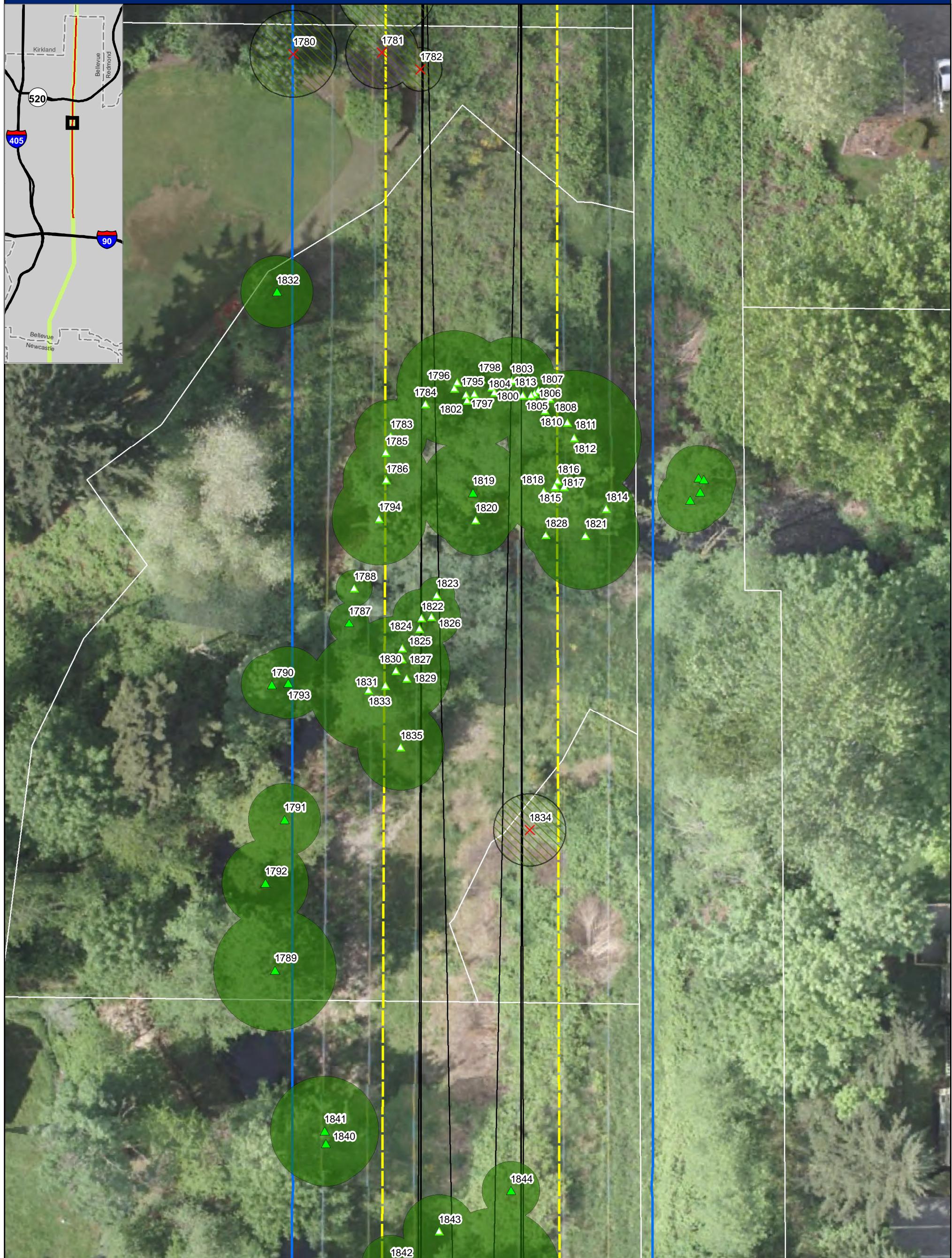
PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



45

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

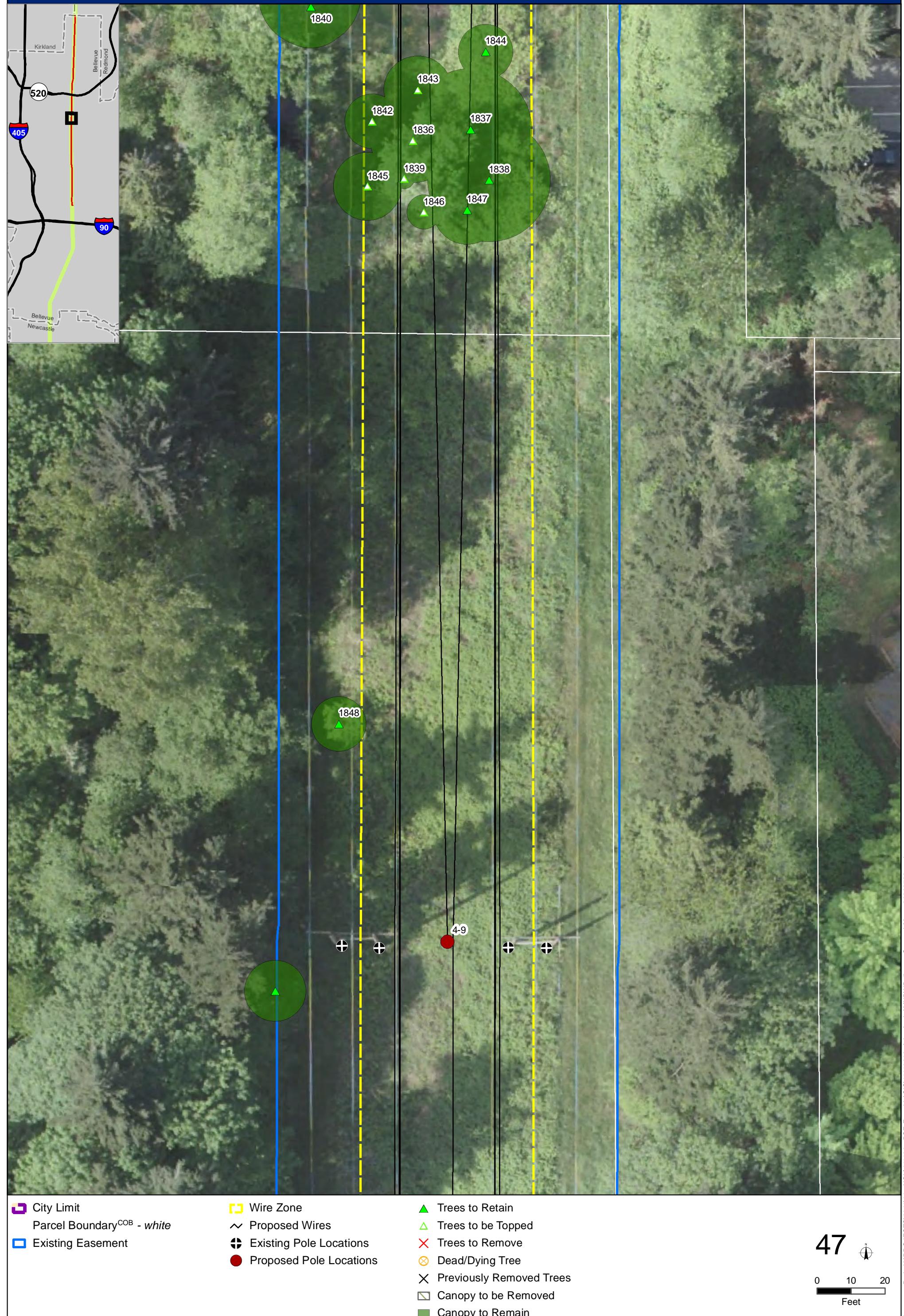
Canopy to be Removed

Canopy to Remain

46

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



48

0 10 20  
Feet

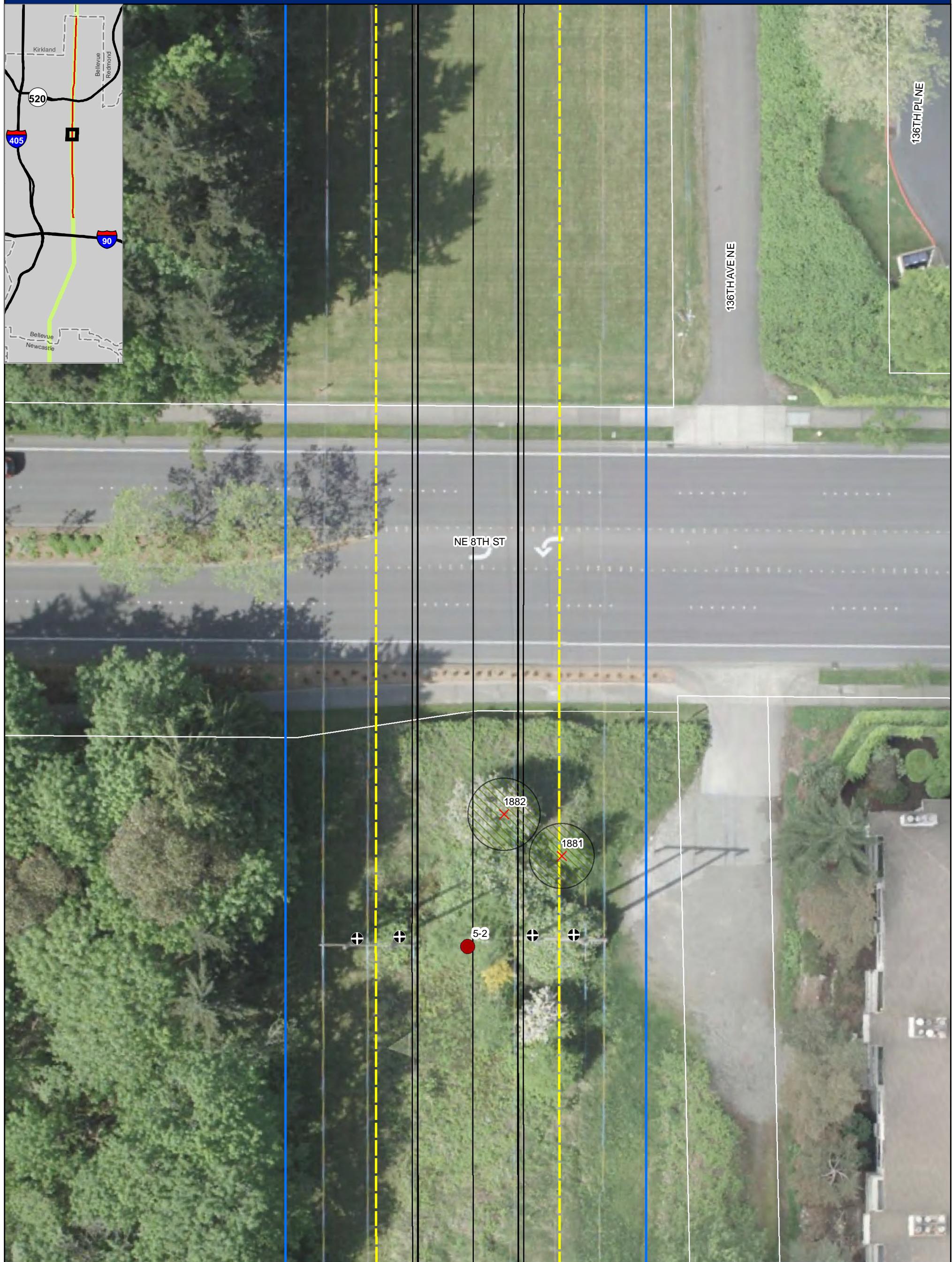
PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



■ City Limit

Parcel Boundary<sup>COB - white</sup>

□ Existing Easement

□ Wire Zone

~~ Proposed Wires

✖ Existing Pole Locations

● Proposed Pole Locations

▲ Trees to Retain

△ Trees to be Topped

✗ Trees to Remove

○ Dead/Dying Tree

✗ Previously Removed Trees

◻ Canopy to be Removed

■ Canopy to Remain

51

0 10 20  
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and Aerial imagery from PSE, 2011.

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

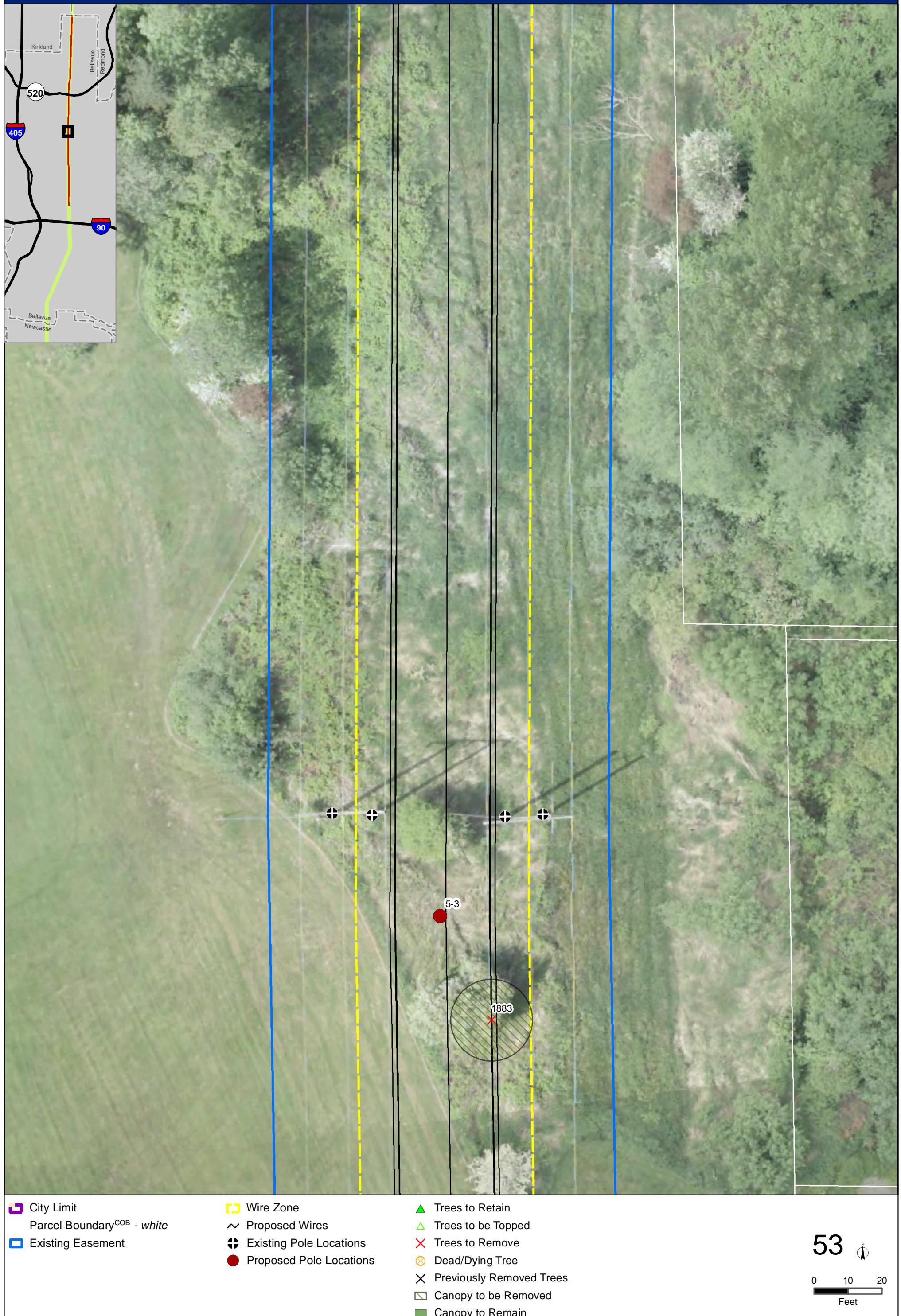
Canopy to be Removed

Canopy to Remain

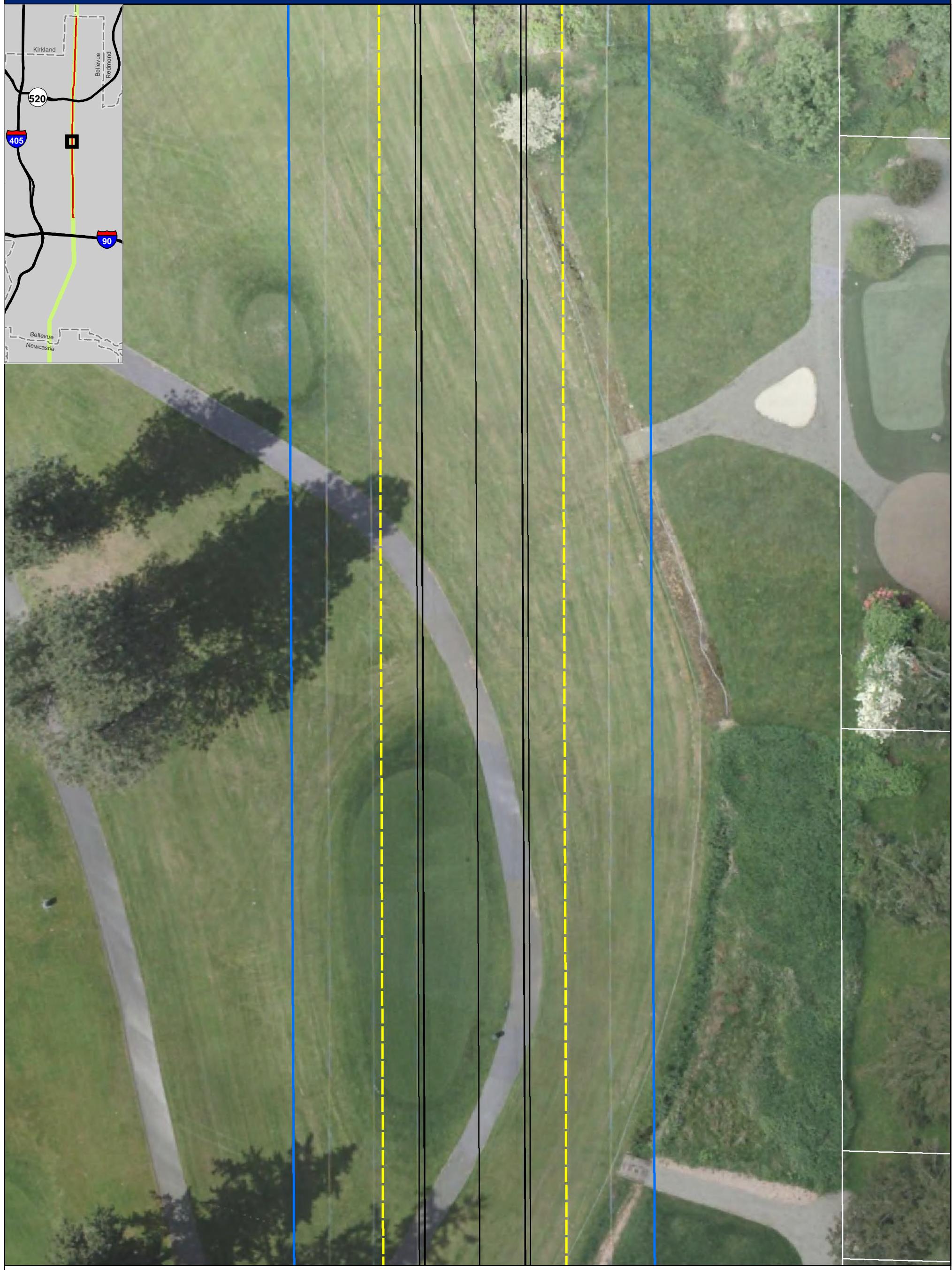
52

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>  
Existing Easement

Wire Zone  
Proposed Wires  
Existing Pole Locations  
Proposed Pole Locations

Trees to Retain  
Trees to be Topped  
Trees to Remove  
Dead/Dying Tree  
Previously Removed Trees  
Canopy to be Removed  
Canopy to Remain

54

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

55

0 10 20  
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and Aerial imagery from PSE, 2011.

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

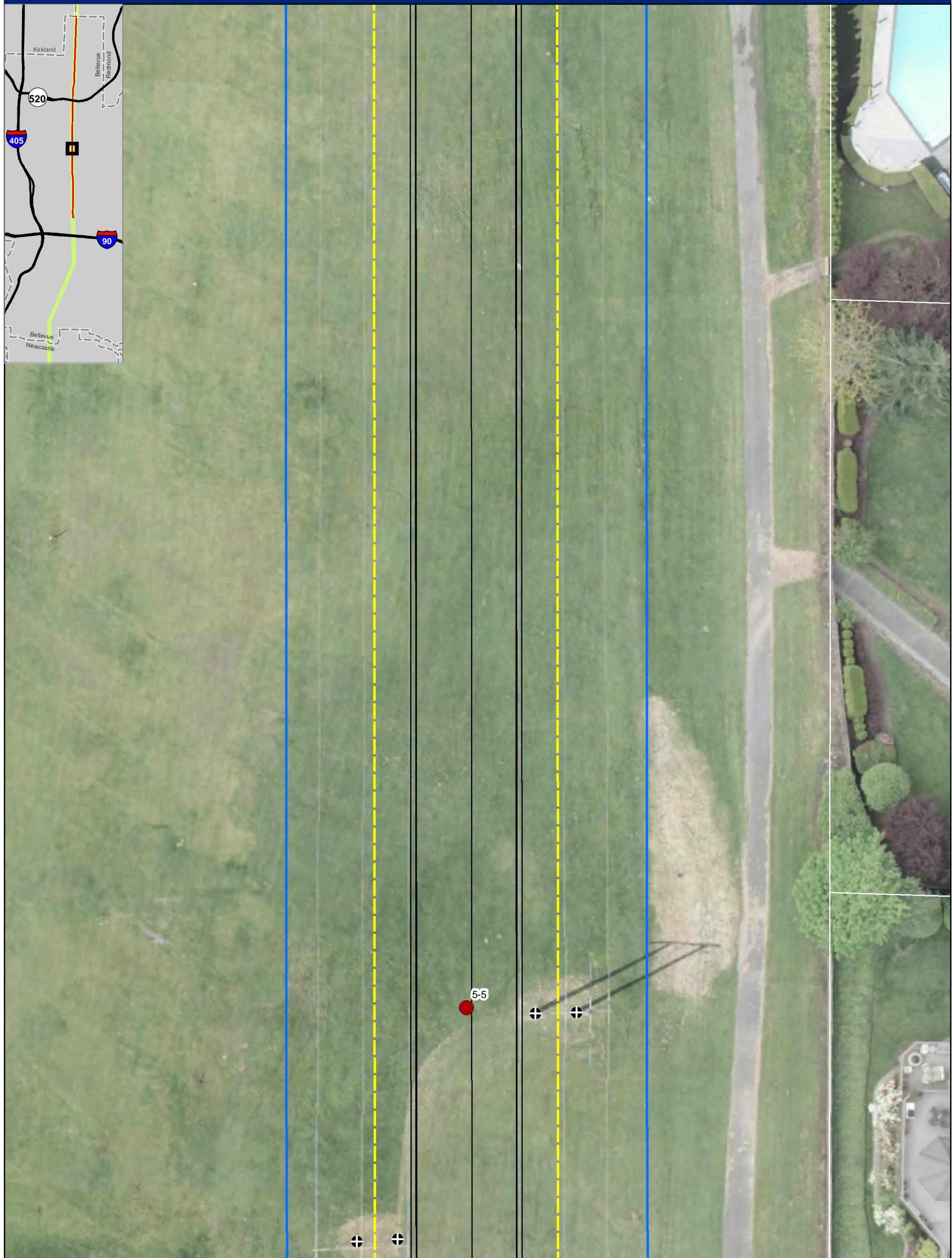
Canopy to be Removed

Canopy to Remain

56

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

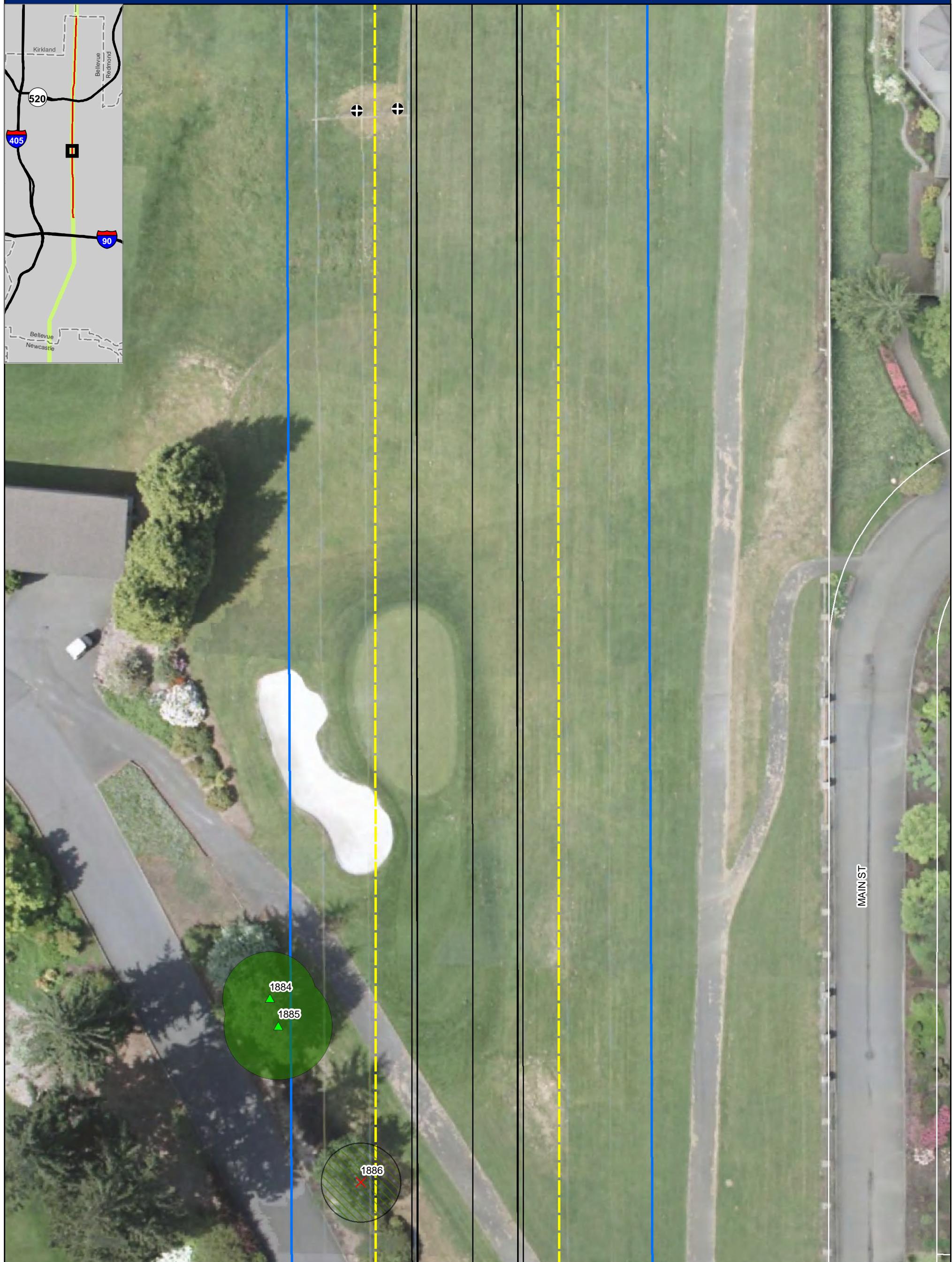
Canopy to be Removed

Canopy to Remain

57

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>  
Existing Easement

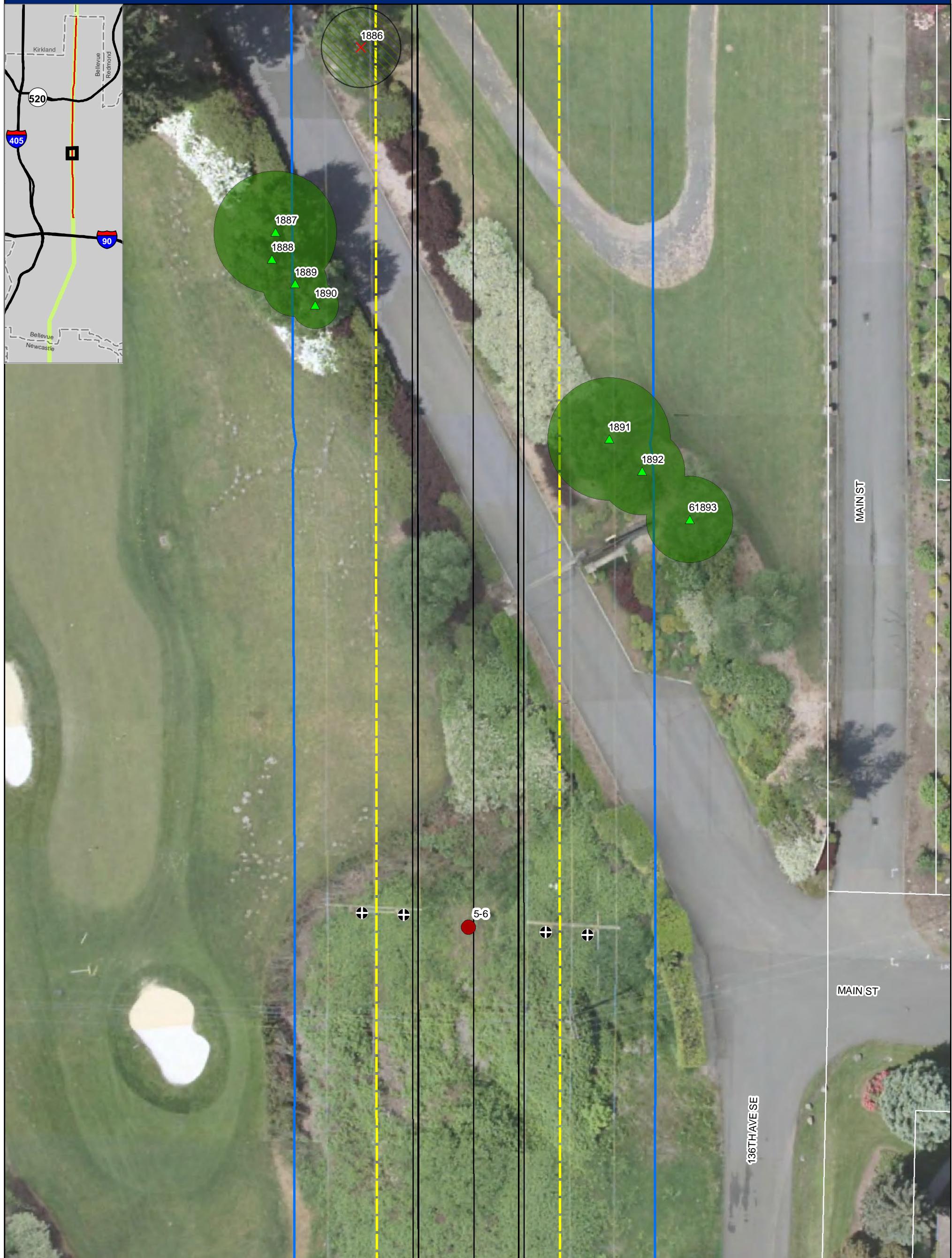
Wire Zone  
Proposed Wires  
Existing Pole Locations  
Proposed Pole Locations

Trees to Retain  
Trees to be Topped  
Trees to Remove  
Dead/Dying Tree  
Previously Removed Trees  
Canopy to be Removed  
Canopy to Remain

58

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>  
Existing Easement

Wire Zone  
Proposed Wires  
Existing Pole Locations  
Proposed Pole Locations

Trees to Retain  
Trees to be Topped  
Trees to Remove  
Dead/Dying Tree  
Previously Removed Trees  
Canopy to be Removed  
Canopy to Remain

59

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

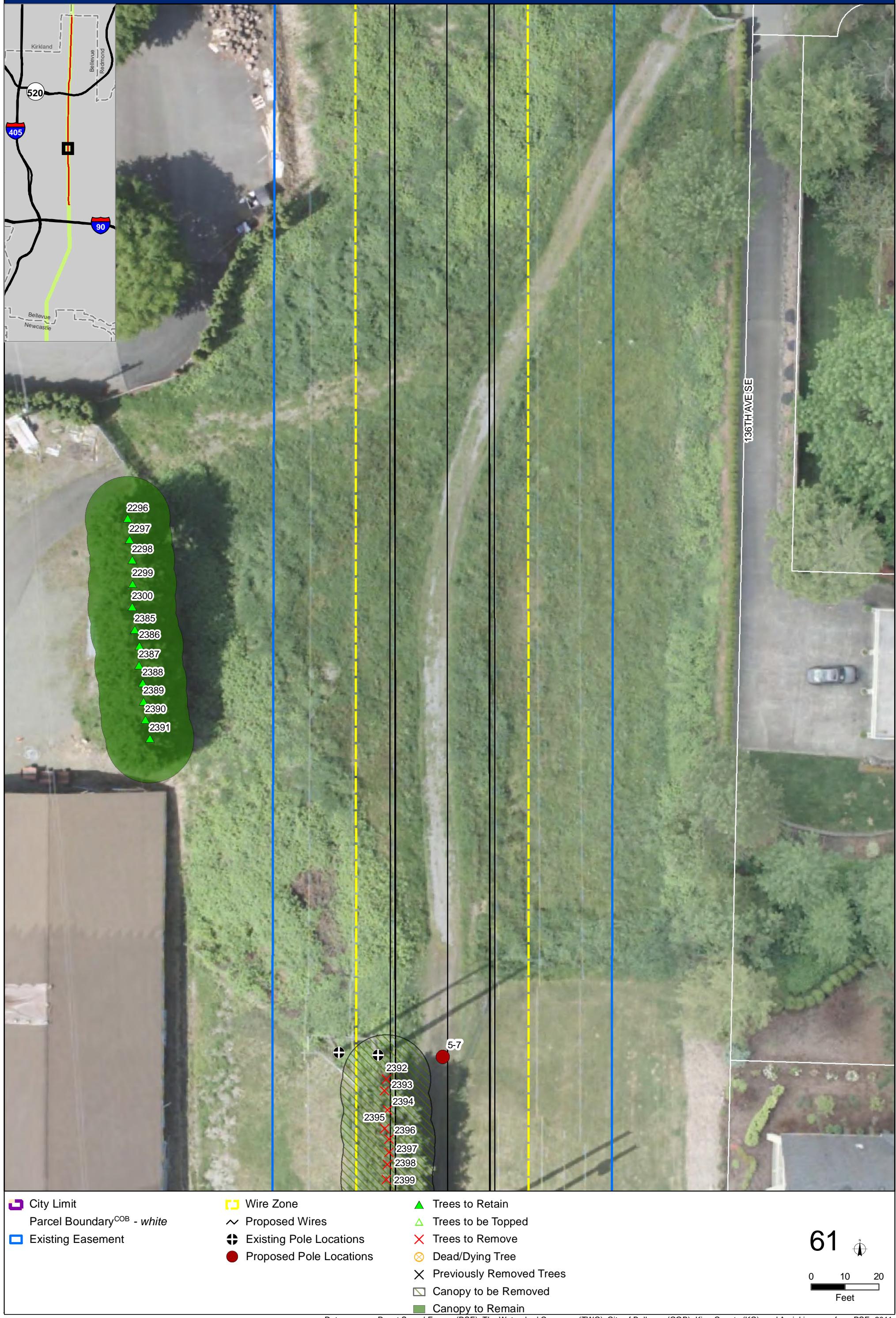
Canopy to be Removed

Canopy to Remain

60

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



■ City Limit

Parcel Boundary<sup>COB - white</sup>

□ Existing Easement

□ Wire Zone

~ Proposed Wires

⊕ Existing Pole Locations

● Proposed Pole Locations

▲ Trees to Retain

△ Trees to be Topped

✗ Trees to Remove

○ Dead/Dying Tree

✗ Previously Removed Trees

◻ Canopy to be Removed

■ Canopy to Remain

62

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB</sup> - white

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

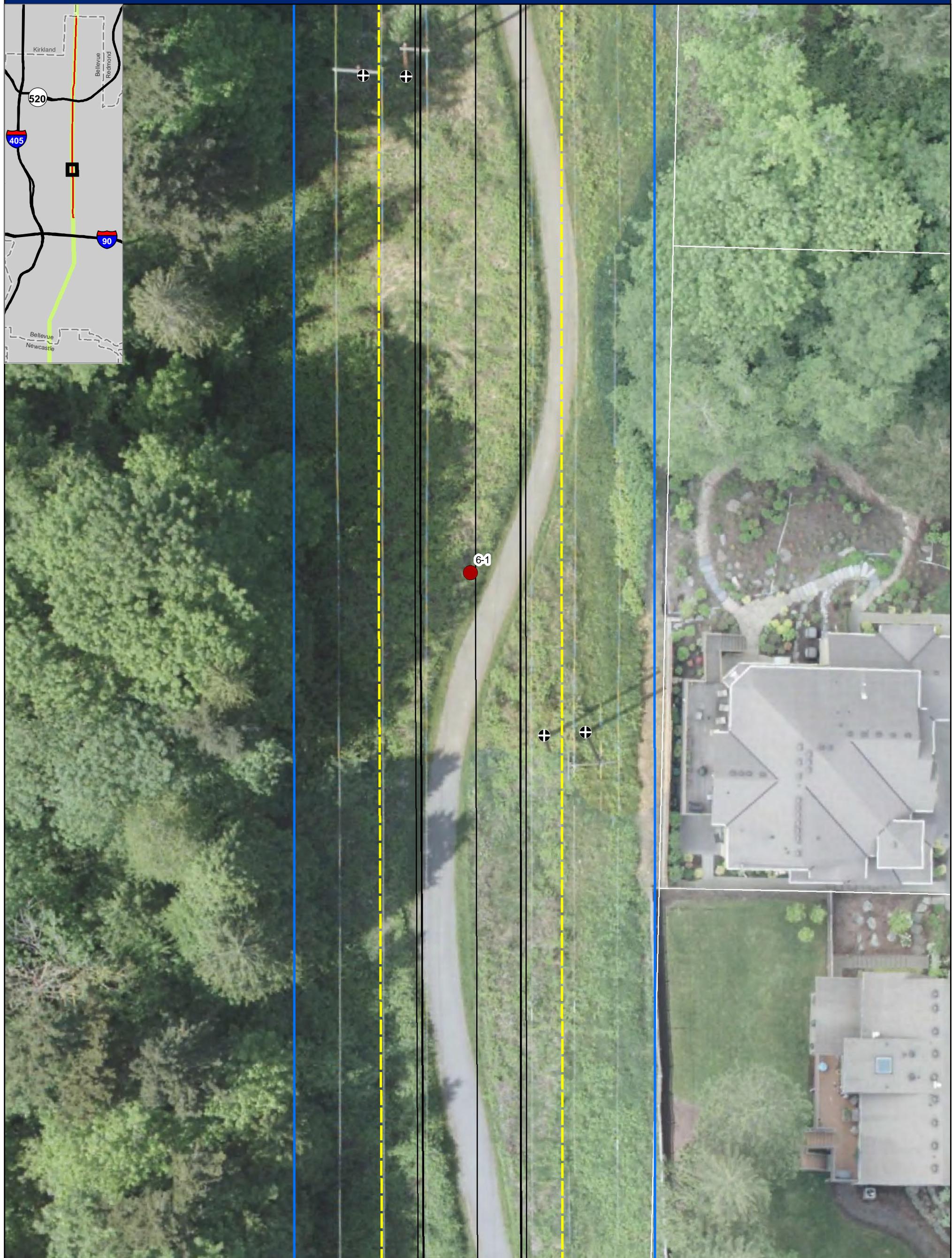
64

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

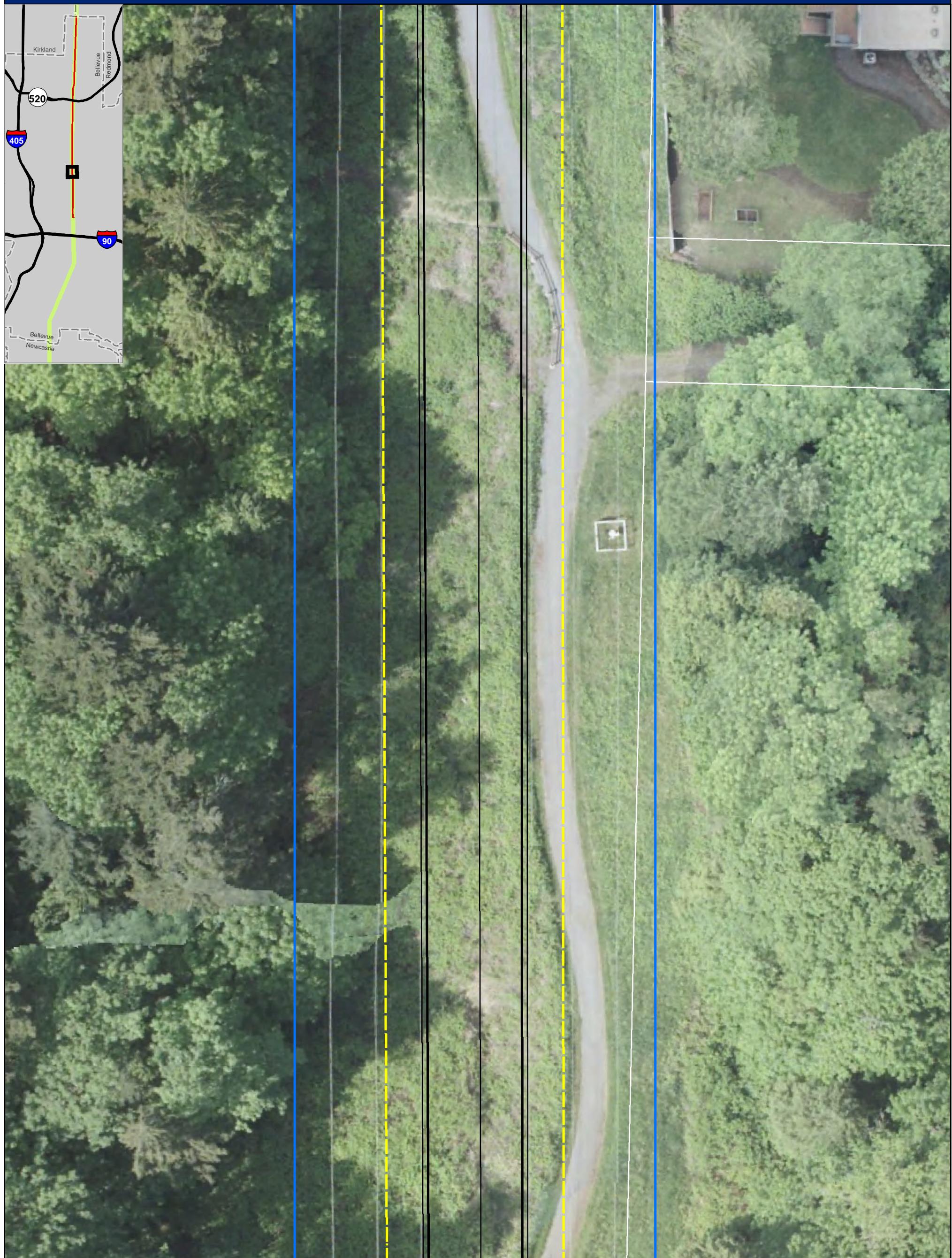
Canopy to be Removed

Canopy to Remain

66

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

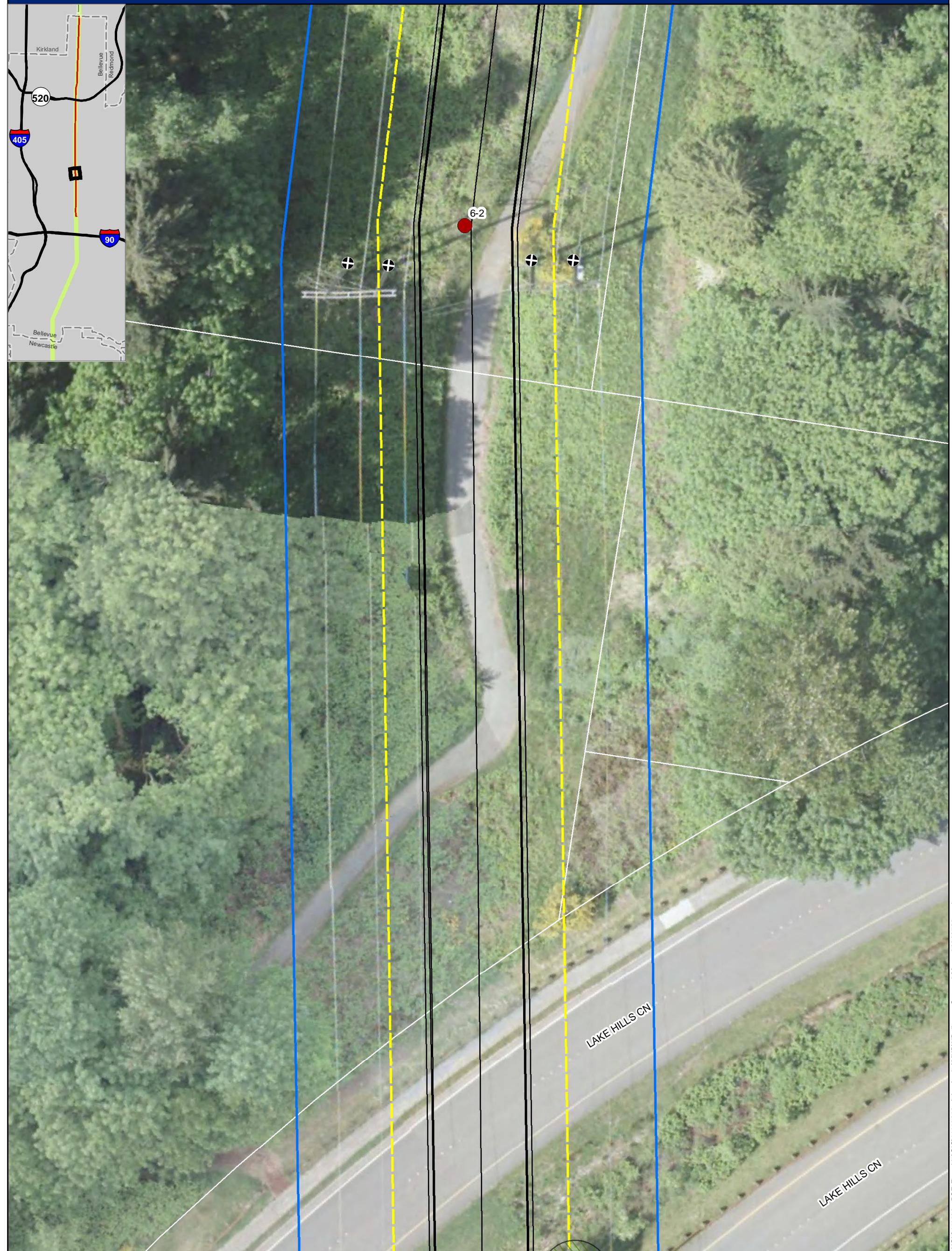
Canopy to Remain

67

0 10 20  
Feet

Data sources: Puget Sound Energy (PSE), The Watershed Company (TWC), City of Bellevue (COB), King County (KC), and Aerial imagery from PSE, 2011.

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



■ City Limit

Parcel Boundary<sup>COB - white</sup>

□ Existing Easement

□ Wire Zone

~ Proposed Wires

✖ Existing Pole Locations

● Proposed Pole Locations

▲ Trees to Retain

△ Trees to be Topped

✗ Trees to Remove

○ Dead/Dying Tree

✗ Previously Removed Trees

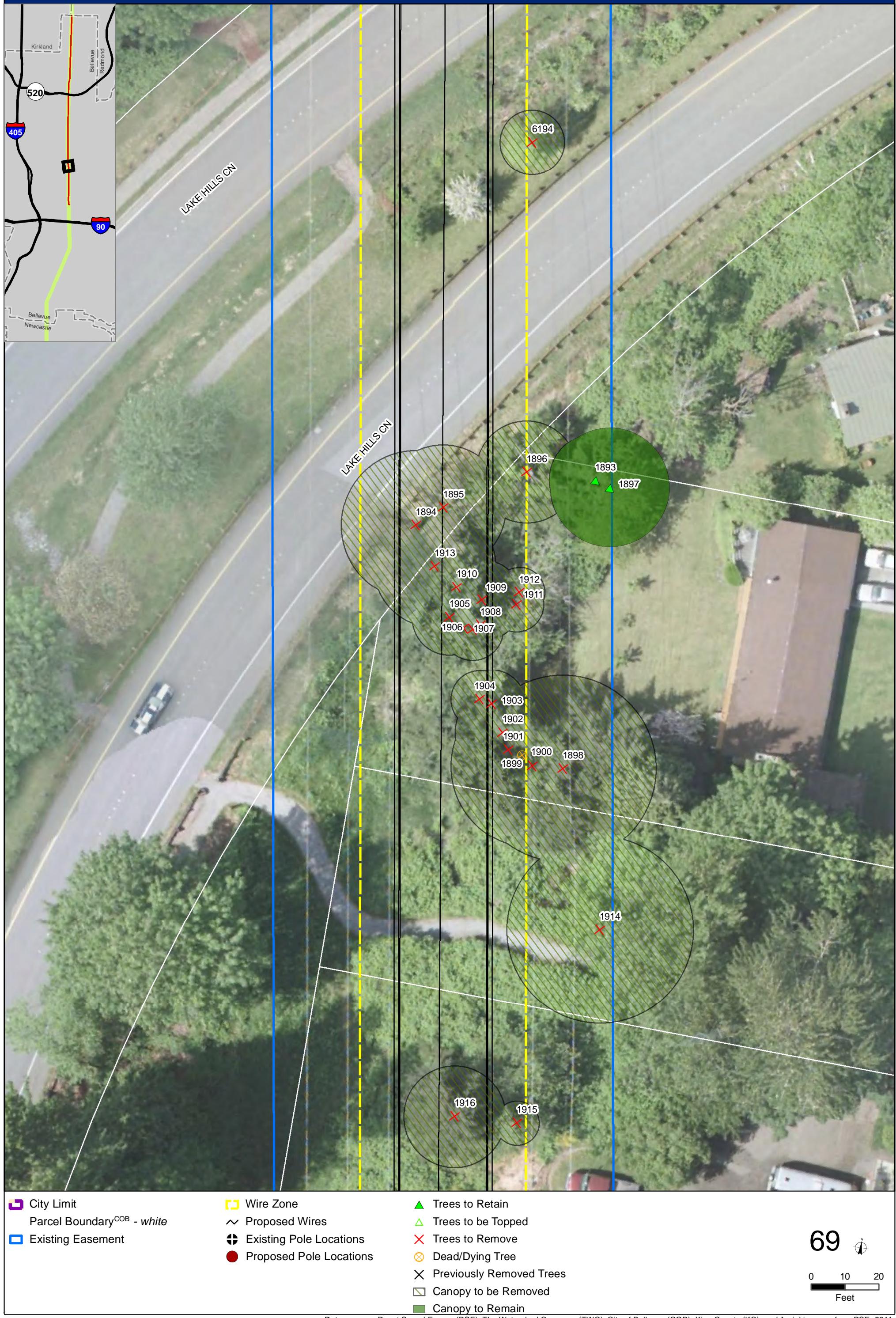
◻ Canopy to be Removed

■ Canopy to Remain

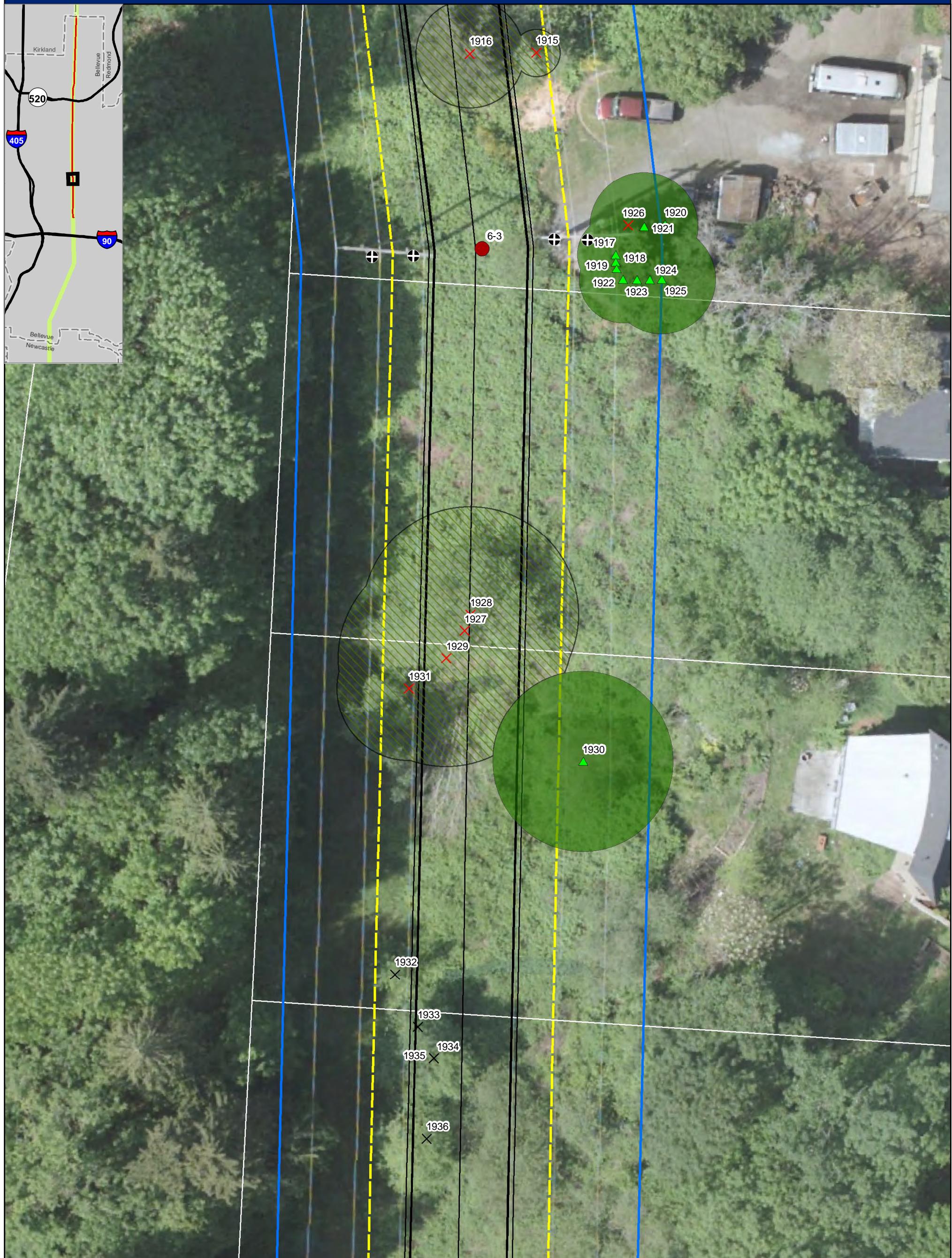
68

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary<sup>COB - white</sup>  
Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

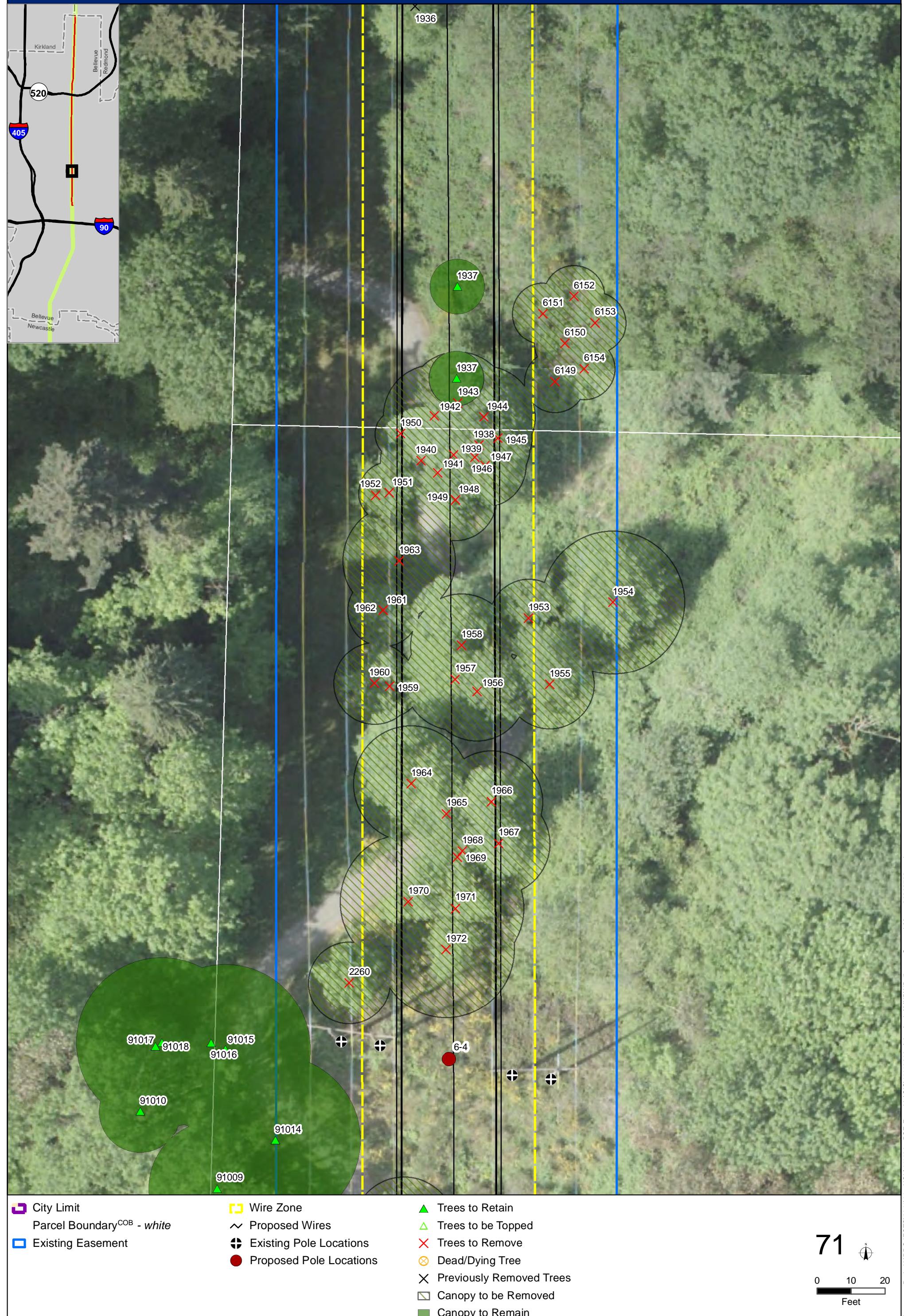
70

0 10 20  
Feet

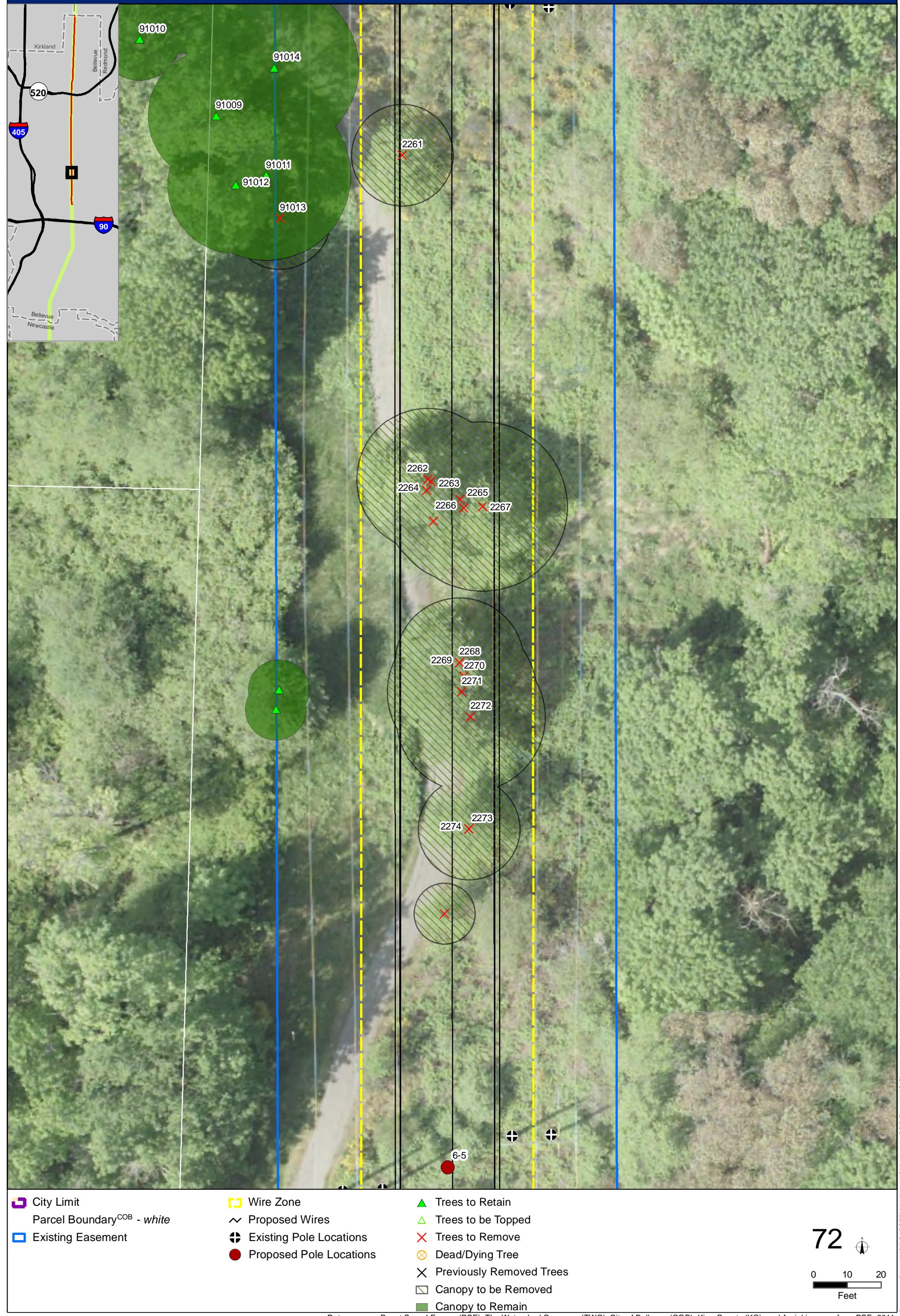
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PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



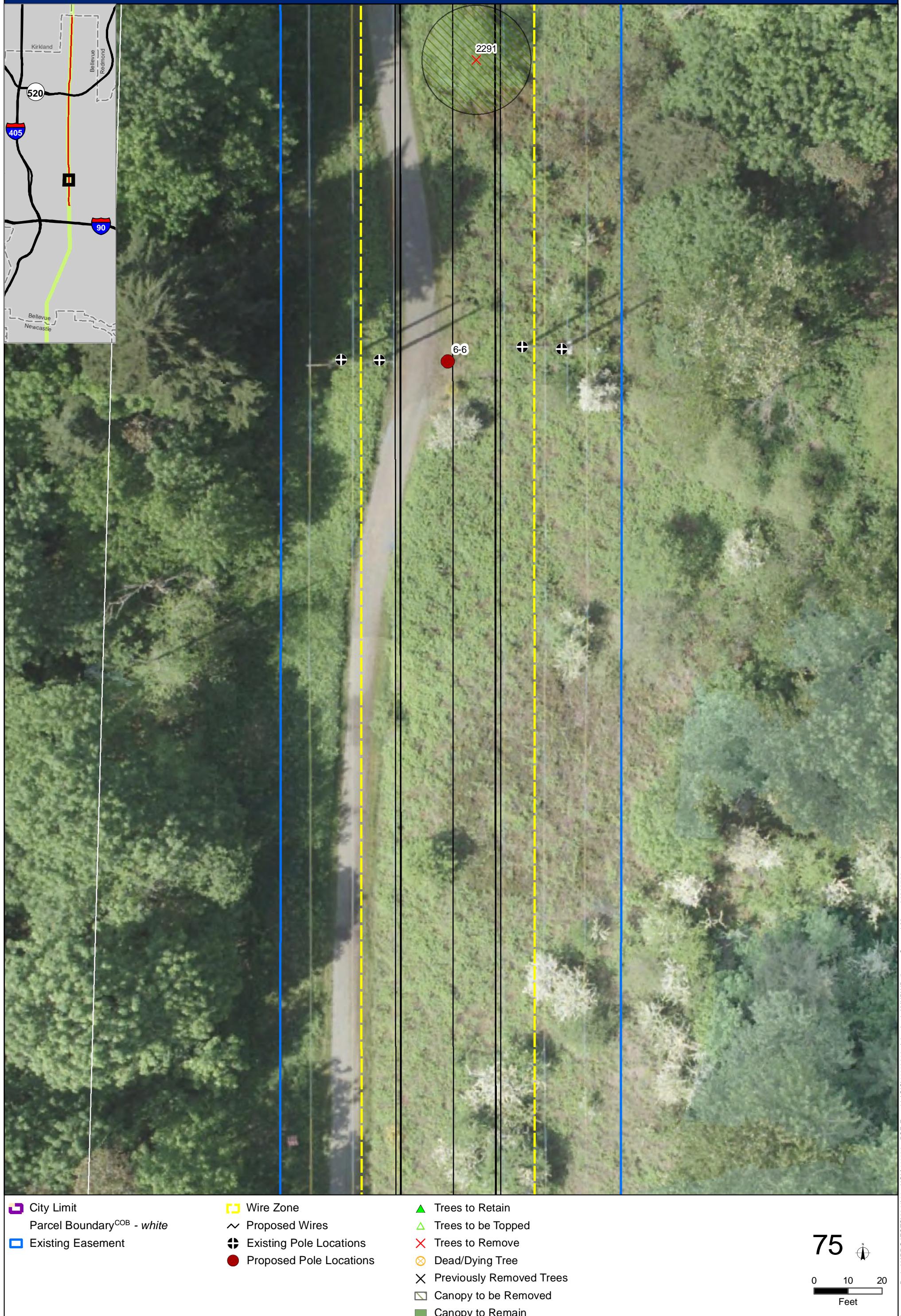
PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



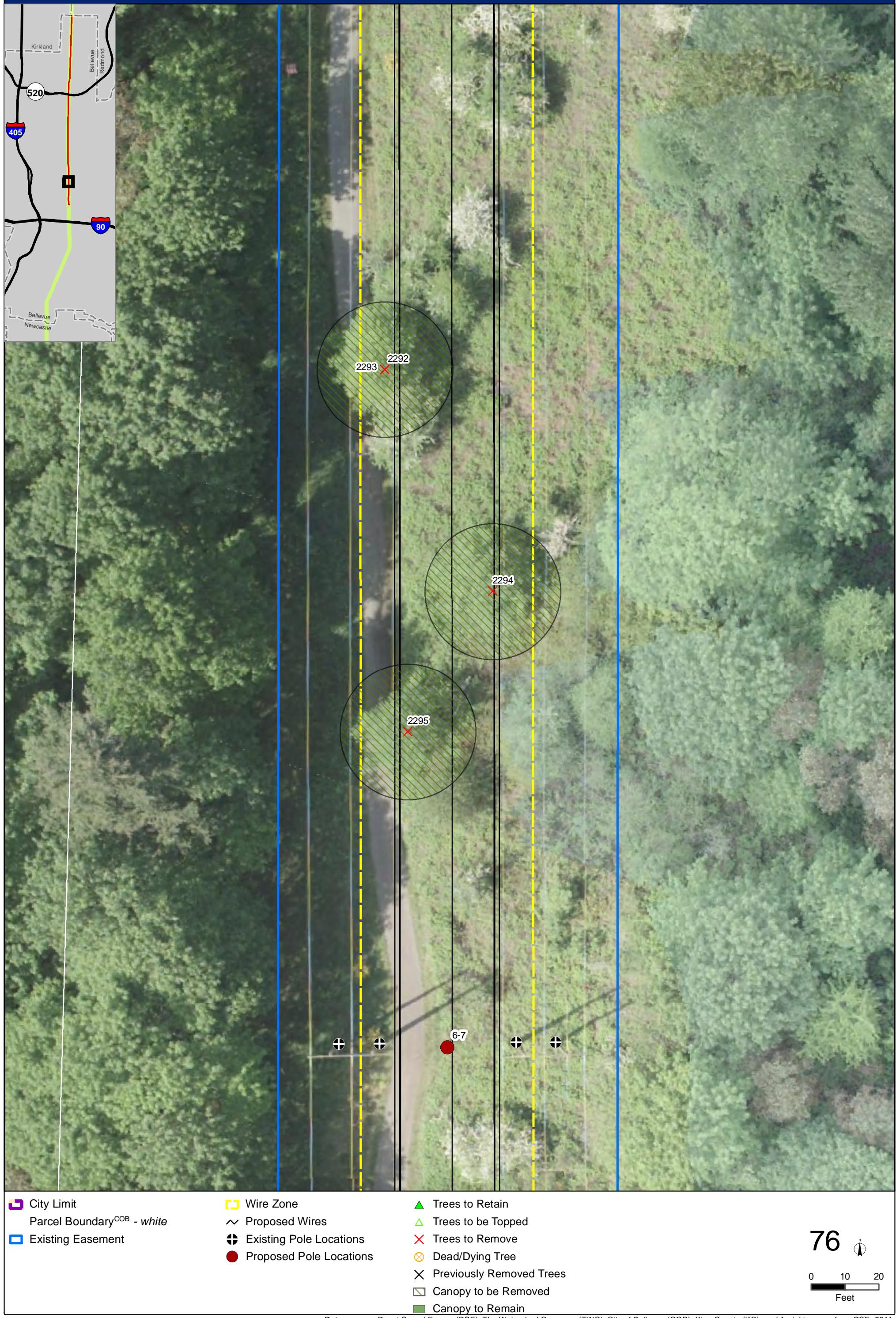
74

0 10 20  
Feet

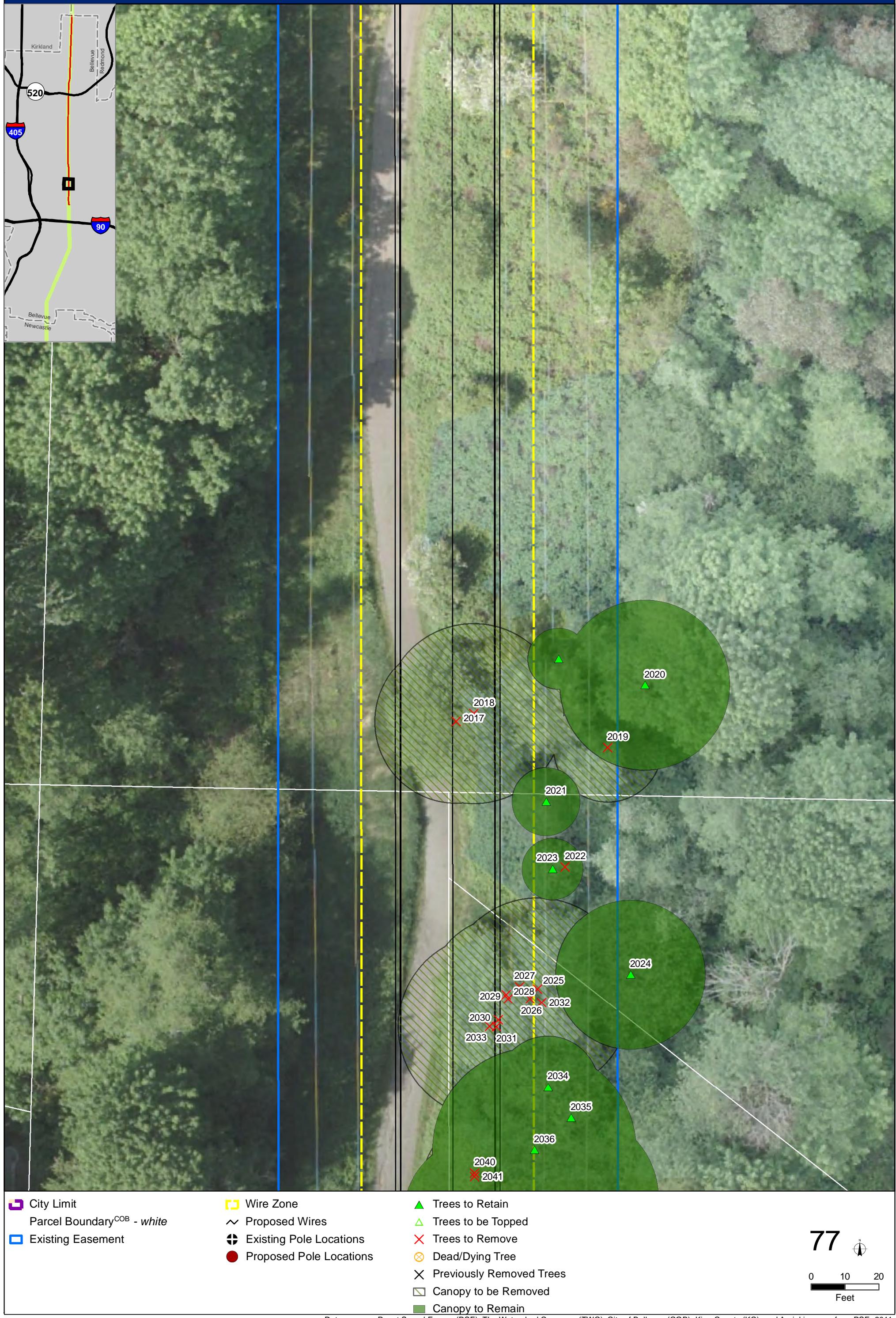
PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



78

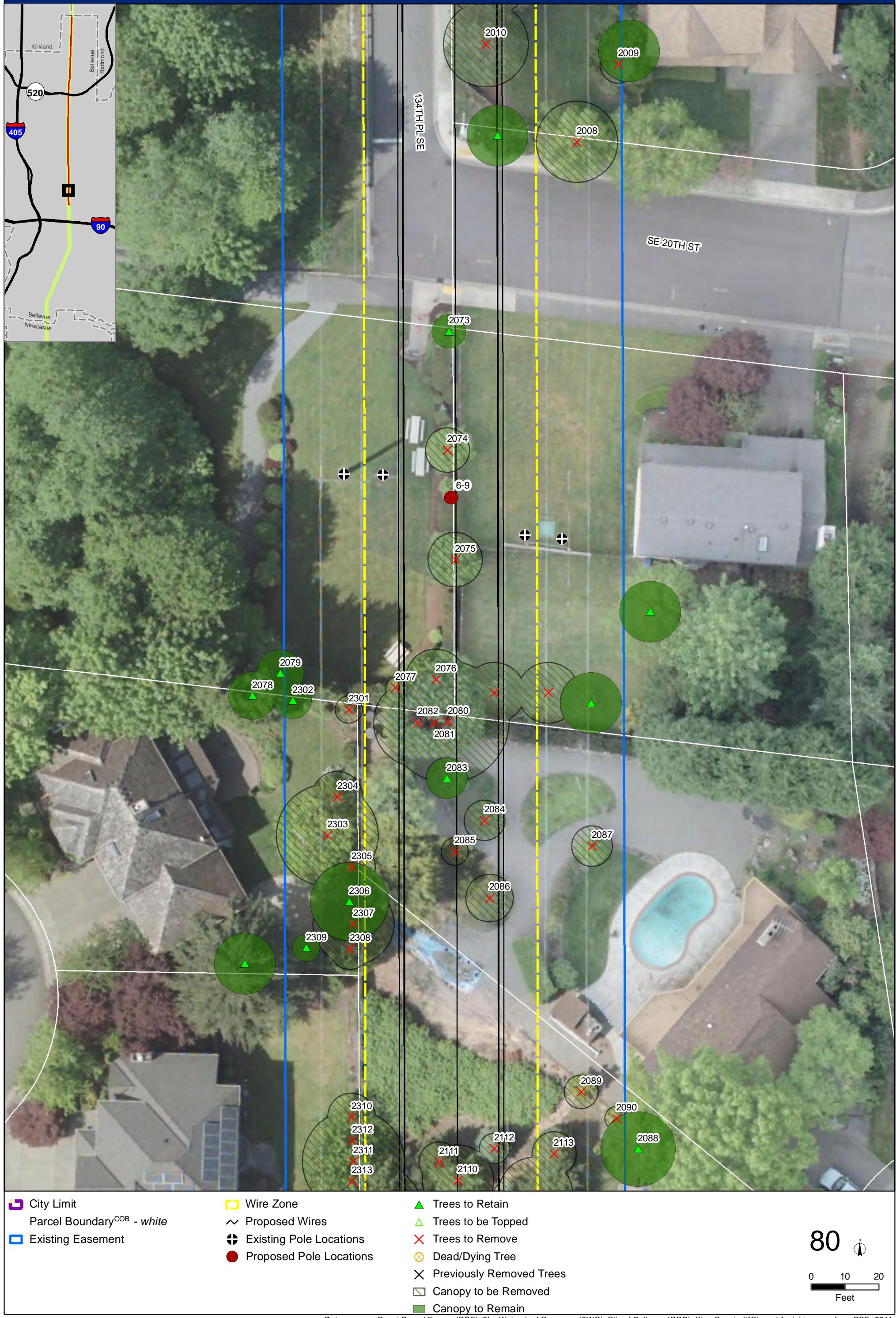
0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



79

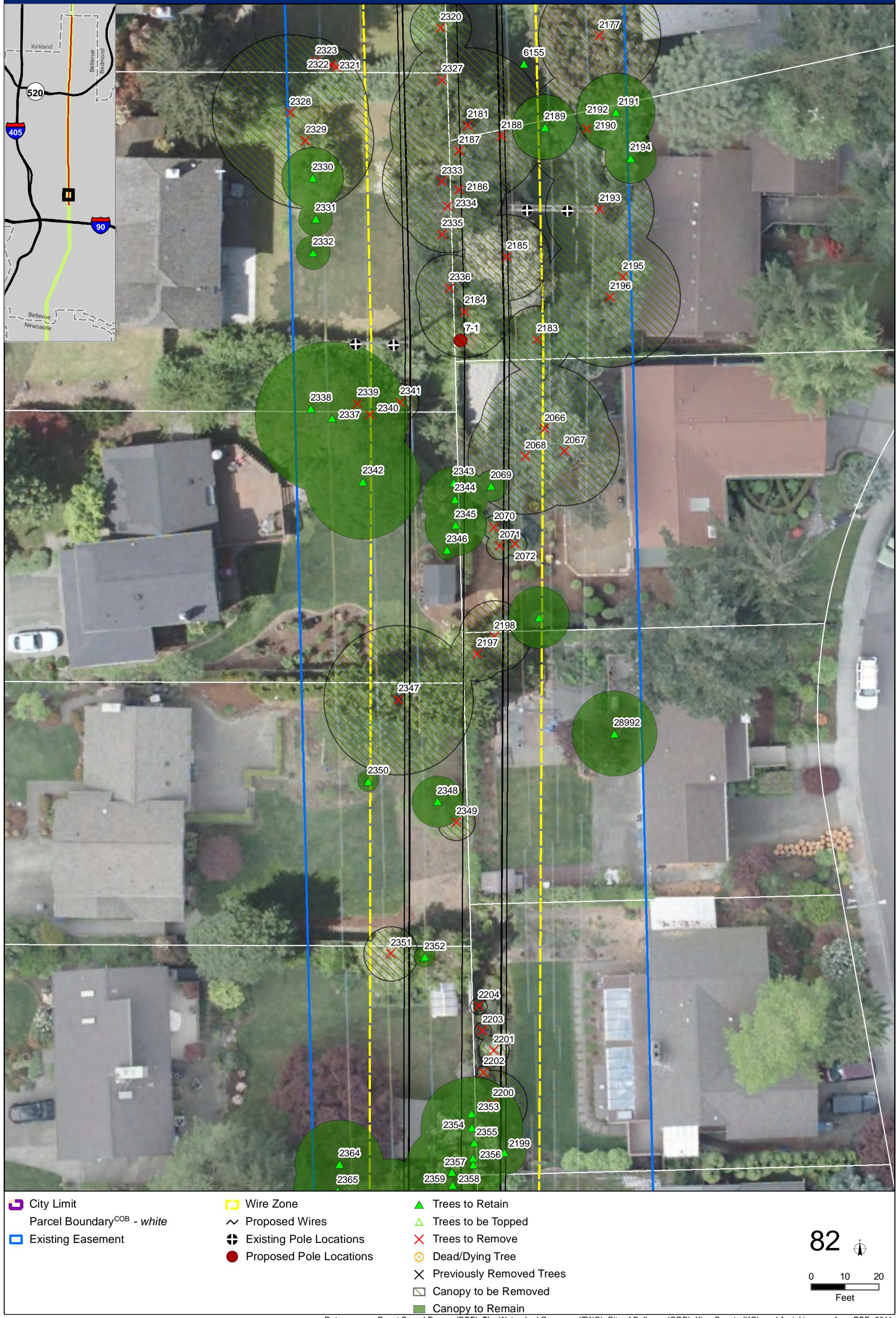
PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

Canopy to be Removed

Canopy to Remain

83

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit

Parcel Boundary<sup>COB - white</sup>

Existing Easement

Wire Zone

Proposed Wires

Existing Pole Locations

Proposed Pole Locations

Trees to Retain

Trees to be Topped

Trees to Remove

Dead/Dying Tree

Previously Removed Trees

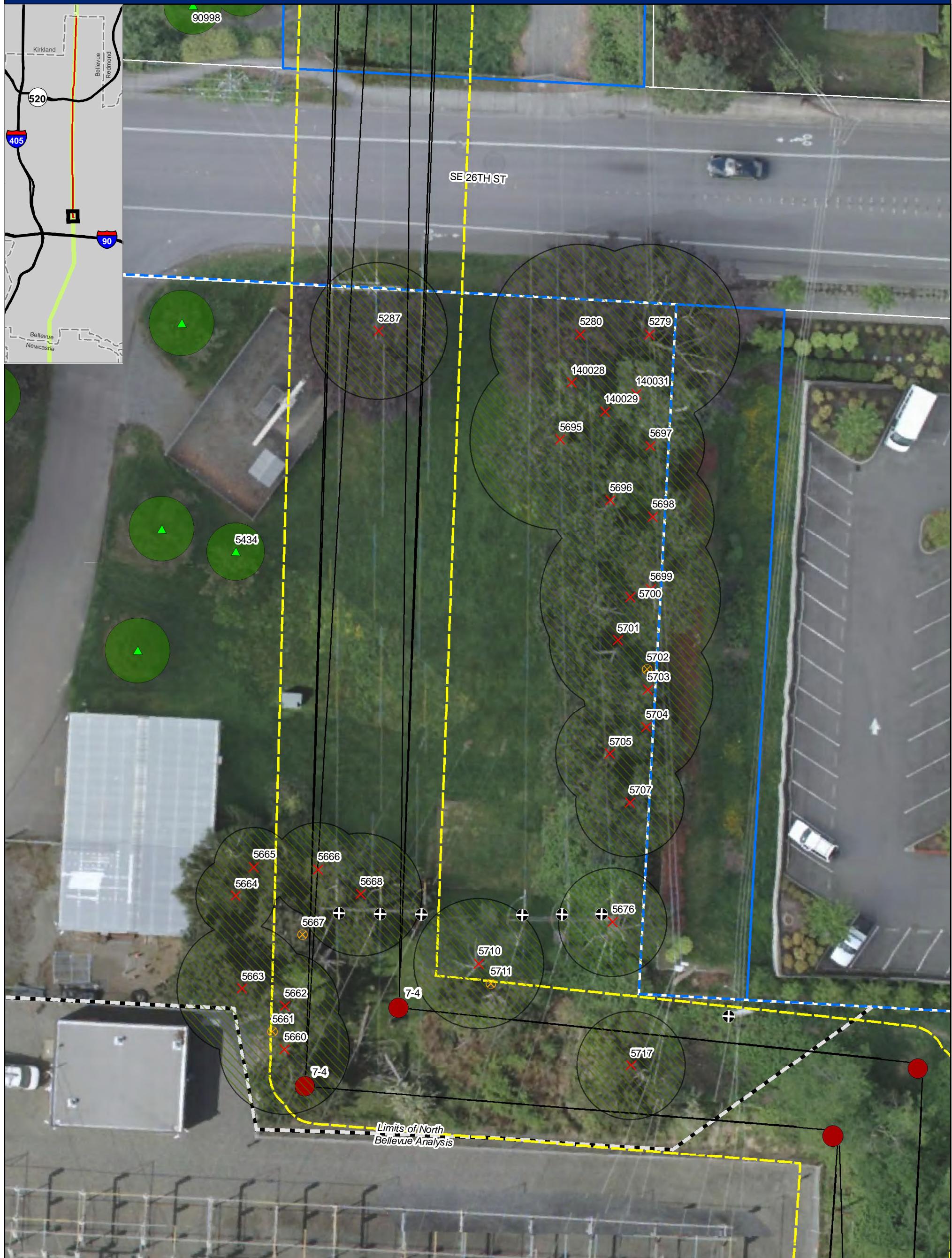
Canopy to be Removed

Canopy to Remain

85

0 10 20  
Feet

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



City Limit  
Parcel Boundary COB - white  
Existing Easement  
PSE Owned Parcels

Wire Zone  
Proposed Wires  
Existing Pole Locations  
Proposed Pole Locations

Trees to Retain  
Trees to be Topped  
Trees to Remove  
Dead/Dying Tree  
Previously Removed Trees  
Canopy to be Removed  
Canopy to Remain

86

0 10 20  
Feet

Document Path: H:\PROJECTS\2011111 - NOV111031 - PSE EastsideGIS\1111031\_ArborAssistMXD\Bellevue\_OutreachMaps\_20200722.mxd

PSE EE230 - NORTH BELLEVUE OUTREACH MAP: TREE REMOVAL AND RETENTION



# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



Significant Trees to be Removed<sup>TWC</sup>

- City Owned
- Public ROW

Parcel Ownership<sup>KC, COB</sup>

- City Owned Parcel
- COB Park
- Private

PSE Owned Parcels and Existing Easement<sup>PSE</sup>

City Limit<sup>COB</sup>

Wire Zone<sup>TWC</sup>

Proposed Wires<sup>PSE</sup>

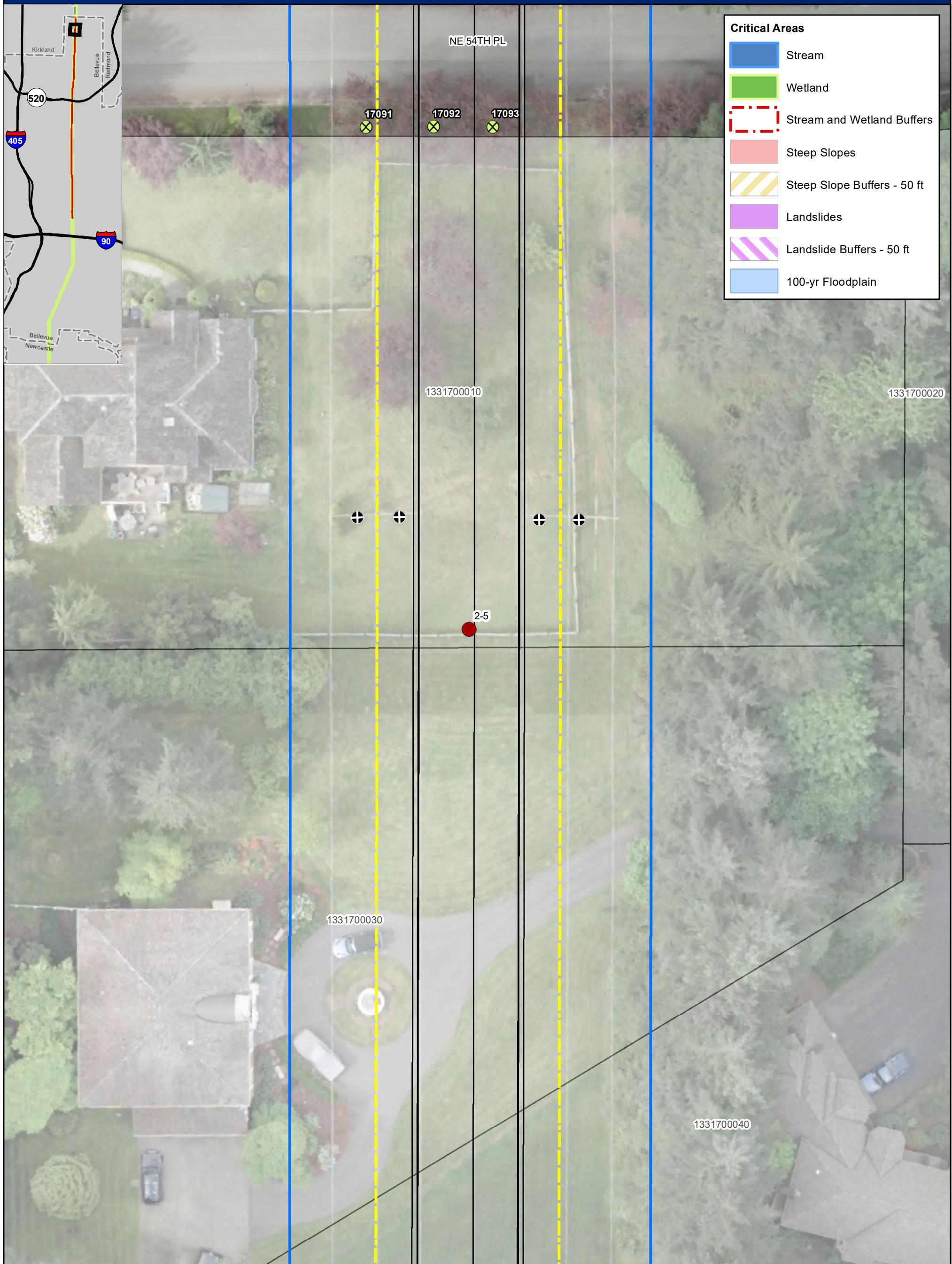
Existing Pole Locations<sup>PSE</sup>

Proposed Pole Locations<sup>PSE</sup>

1

0 10 20  
Feet

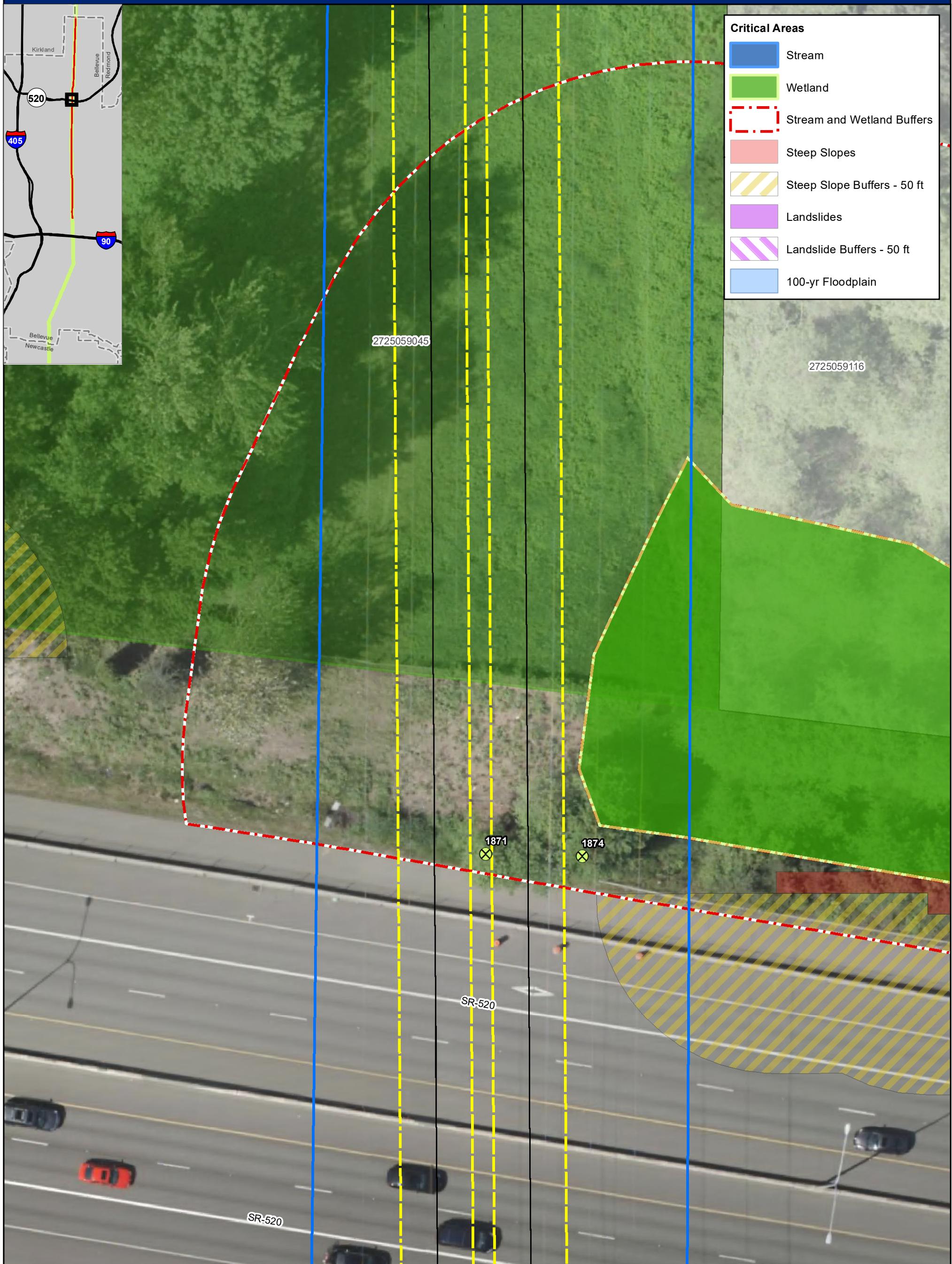
# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



2

0 10 20  
Feet

# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



Significant Trees to be Removed<sup>TWC</sup>

- City Owned
- Public ROW

Parcel Ownership<sup>KC, COB</sup>

- City Owned Parcel
- COB Park
- Private

PSE Owned Parcels and Existing Easement<sup>PSE</sup>

City Limit<sup>COB</sup>

Wire Zone<sup>TWC</sup>

Proposed Wires<sup>PSE</sup>

Existing Pole Locations<sup>PSE</sup>

Proposed Pole Locations<sup>PSE</sup>

3

0 10 20  
Feet

## PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



Significant Trees to be Removed<sup>TWC</sup>

- City Owned
- Public ROW

Parcel Ownership<sup>KC, COB</sup>

- City Owned Parcel
- COB Park
- Private

PSE Owned Parcels and Existing Easement<sup>PSE</sup>

- City Limit<sup>COB</sup>

Wire Zone<sup>TWC</sup>

Proposed Wires<sup>PSE</sup>

Existing Pole Locations<sup>PSE</sup>

Proposed Pole Locations<sup>PSE</sup>

4

0 10 20  
Feet

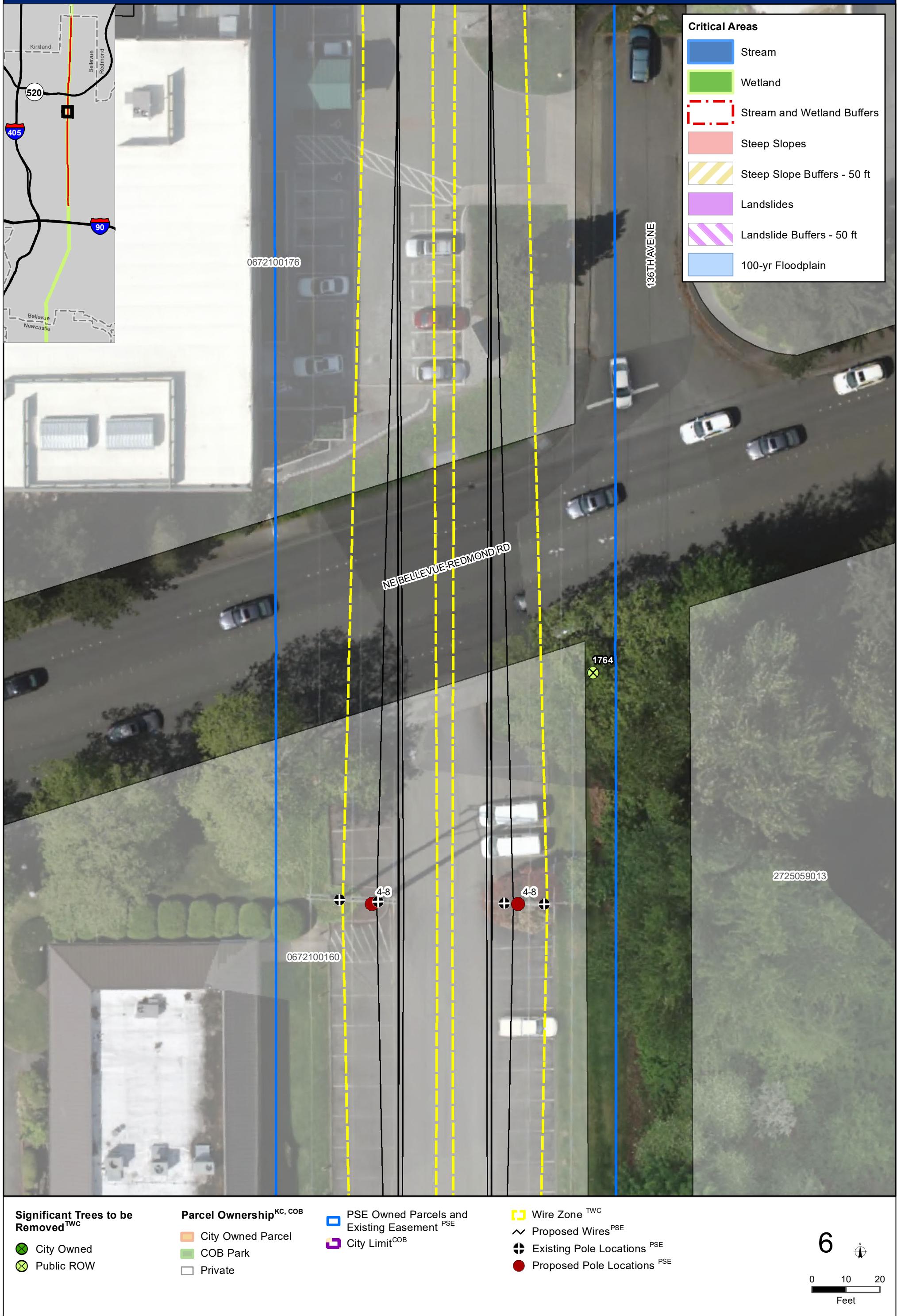
# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



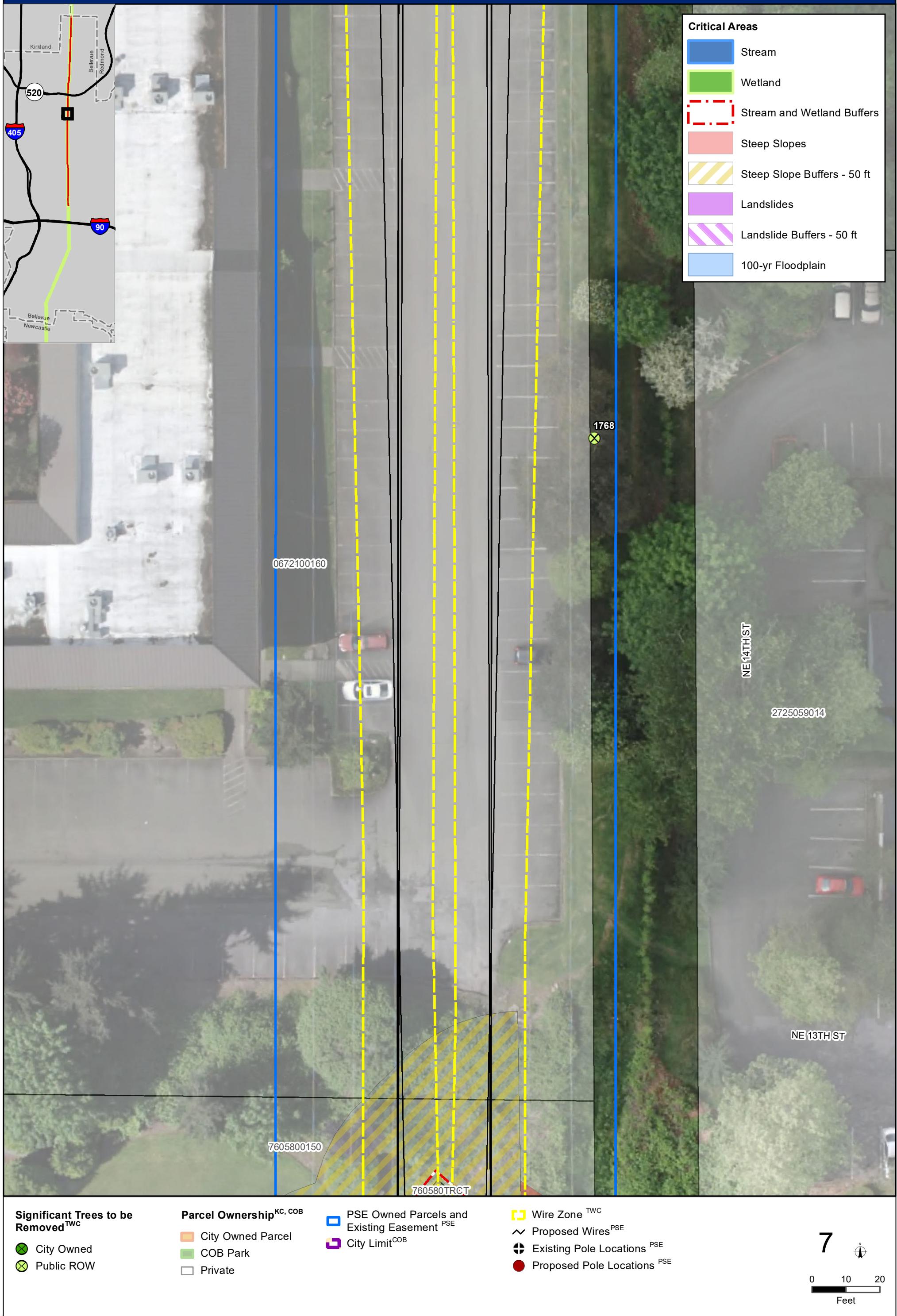
5

0 10 20  
Feet

# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



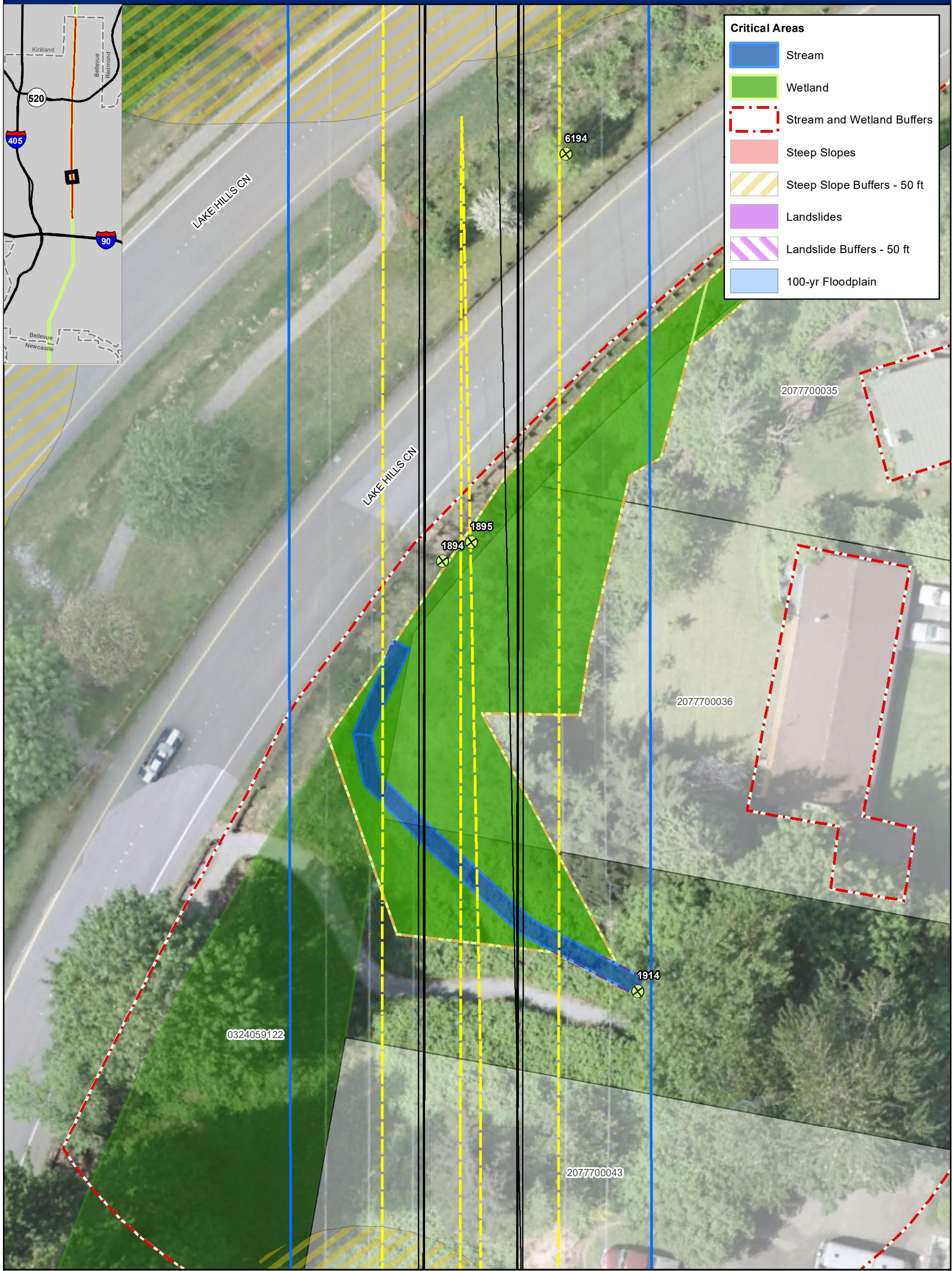
# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



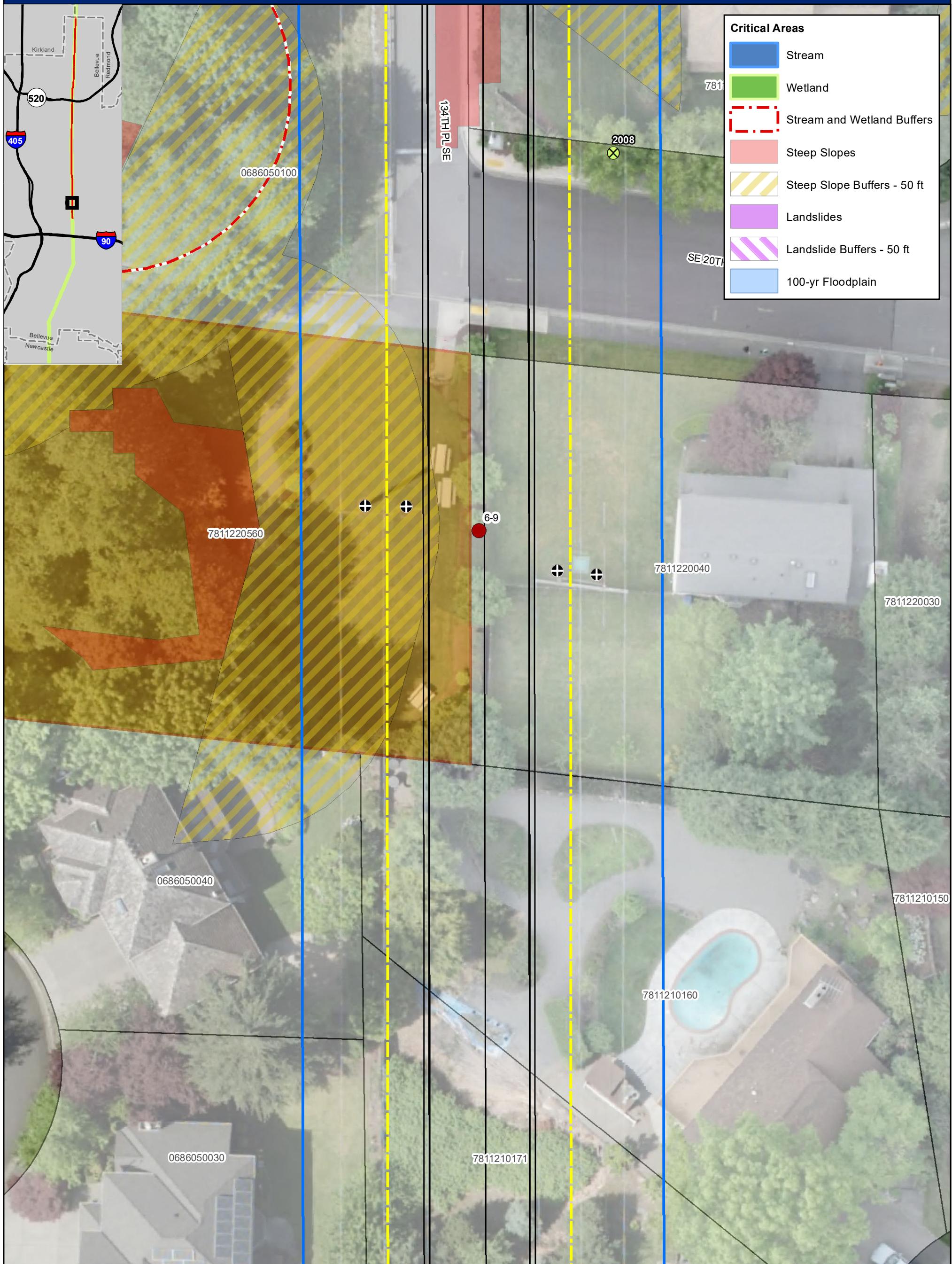
# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



Significant Trees to be Removed<sup>TWC</sup>

- City Owned
- Public ROW

Parcel Ownership<sup>KC, COB</sup>

- City Owned Parcel
- COB Park
- Private

PSE Owned Parcels and Existing Easement<sup>PSE</sup>

- City Limit<sup>COB</sup>

Wire Zone<sup>TWC</sup>

~ Proposed Wires<sup>PSE</sup>

⊕ Existing Pole Locations<sup>PSE</sup>

● Proposed Pole Locations<sup>PSE</sup>

11

0 10 20  
Feet

# PSE EE230 - NORTH BELLEVUE: PUBLIC TREE REMOVAL MAPS



12

0 10 20  
Feet

## Appendix B

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# TREE TABLE











































## Appendix C

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# VEGETATION IMPACT ASSESSMENT METHODS



## Vegetation Impact Analysis Methods

This document is intended to describe the Vegetation Impact Analysis (VIA) methods used to determine PSE Energize Eastside Project (Project) impacts to trees and large shrubs in the North Bellevue Segment. This Appendix is meant to complement and expand upon the methods described in the body of the *Vegetation Inventory & Management Plan Report for the North Bellevue Segment*.

The contents of this document include:

<b>Assumptions.....</b>	<b>II</b>
<b>Tree Inventory.....</b>	<b>III</b>
Tree Point Mapping .....	III
Data Set Compilation.....	III
Evaluation of Tree Significance.....	IV
Data Set Refinement.....	IV
<b>Vegetation Impact Analysis .....</b>	<b>IV</b>
Removal Criteria (Two-dimensional Parameters) .....	V
Removal Criterion (Three-dimensional Parameter).....	V
Special Removal Criteria .....	V
Process Overview .....	VI
Quality Assurance Review of Analysis Steps and Results.....	VI
<b>Limitations .....</b>	<b>VI</b>

Vegetation within a utility corridor that has transmission line(s) with an operational voltage of more than 200 kV must be managed in a way that meets federal requirements. The fines, penalties, and impacts for having a power outage related to vegetation growing into a 230 kV transmission line can be substantial. To comply with the North American Electric Reliability Corporation (NERC) standard, PSE allows vegetation with a mature height of no greater than 15 feet within the *wire* zone of its existing transmission corridors. Within the *managed* right-of-way (ROW) zone, PSE conducts selective vegetation removal and maintenance on a case-by-case basis based on the proximity of vegetation to its built infrastructure, as determined in the field by PSE vegetation maintenance crews. The area outside of the managed ROW, but still within the *legal* ROW is also subject to selective clearing of trees that pose a risk of damaging the line. “Wire zone,” “managed ROW,” and “legal ROW” are defined under the Assumption section and depicted in Figures 1-3.

The existing corridor does not contain 230 kV transmission lines from which to facilitate a case-by-case field assessment of whether trees should be retained or removed. Current 115 kV vegetation management standards are less restrictive than the NERC standards for 200 kV and above. To identify and quantify the number of trees that could be impacted by vegetation management in order to meet NERC standards, PSE requested a digital analysis by The Watershed Company (Watershed) based on design drawings provided by PSE’s design engineers. The following process and methodology was developed to accomplish this task.

The Vegetation Impact Assessment (VIA) used geospatial analysis of corridor-wide tree inventory data along with the transmission line design to assess the number of trees that are likely to require removal due to Project impacts. The steps of the analysis are provided below.

### *Assumptions*

The wire zone is the area measured approximately 10 feet away from the outermost conductor(s) in a static position, whereas the managed ROW zone is the area that extends approximately 16 feet from the outside of the transmission wires in their static position (Figures 1-3). The legal ROW encompasses the entirety of PSE-owned properties and easements; however, because some areas within the legal ROW are far enough from utility infrastructure so as to avoid vegetation conflicts, the vegetation present is not actively managed. Based on guidance from PSE, for this analysis, the legal ROW definition was limited to only the areas where PSE intends to exercise long-term vegetation management.

In alignment with PSE’s vegetation management practices, a vegetation height limitation of 15 feet was applied to the wire zone. For evaluation purposes, the same vegetation height limitation of 15 feet was also applied to the managed ROW zone. Within the legal ROW, trees

with a maximum mature height of 70 feet or greater were presumed for removal. Final tree removal determinations will be made by a Project arborist in the field during construction, but will for the most part follow the tree removal plan developed based on the project design. Factors that may impact tree removal changes during construction include changes to the dataset since collection (e.g., trees that have been planted or removed by property owners or trees that have fallen or been removed as part of ongoing management of the corridor) and inclusion of trees growing on parcels that were not accessible during original field work activities, for example.

### *Tree Inventory*

The Watershed Company ISA Certified Arborists® conducted a field-based vegetation inventory to comprehensively identify, describe, and mark all vegetation greater than 15 feet tall, or that had the potential to reach a mature height of 15 feet or taller, as described in the accompanying report.

### **Tree Point Mapping**

Tree locations used in this analysis were obtained and compiled from survey, GPS, and digitization using high-resolution imagery. Surveyed locations were collected by two survey firms, APS Survey & Mapping (APS) and David Evans Associates (DEA). This information was provided to Watershed as tables containing surveyor-assigned point number, latitude and longitude coordinates, and surveyors' field notes. Surveyors captured the physical tree tag numbers, which were placed in the field by Watershed arborists during the tree inventory. Where possible, the surveyors also collected tree type information and approximate diameter at breast height (DBH).

### **Data Set Compilation**

Surveyed tree locations were mapped as geospatial points using the coordinate data and then merged with the geospatial data associated with each point. Once compiled, the full set of tree points was spatially joined to parcel geometry obtained through City of Bellevue, as APS and DEA only surveyed the corridor easement areas, not entire parcels. Mapped tree points were then joined to the arborist's master tree inventory table that contained detailed information for each tree, including DBH, species, observed height, maximum expected mature height (EMH), canopy radius, condition/health, and arborist's field notes. Maximum EMH values were assigned by species according to best available resources for mature vegetation growth, to identify non-compatible species. The resultant dataset provides the location and detailed attribute information for all inventoried trees within the study area.

## Evaluation of Tree Significance

Significant trees were classified according to the jurisdictional definition. The City of Bellevue defines significant trees as (LUC 20.50.046):

*A healthy evergreen or deciduous tree, eight inches in diameter or greater, measured four feet above existing grade. The Director of the Development Services Department may authorize the exclusion of any tree which for reasons of health, age or site development is not desirable to retain.*

After the tree inventory dataset was compiled, a value of significance was added to the tree inventory data using a select query expression, based on the attributes assigned by the arborists. Where no arborist evaluation was conducted, such as where a parcel was not accessible to arborist crews, significance could not be determined (see “Limitations” section at the end of this document). Due to this gap, the overall number of significant trees may be underrepresented in each dataset.

## Data Set Refinement

Prior to conducting the VIA, the tree inventory data set was refined to include only those trees that occurred within the study area, as defined by PSE. Table 1 provides a summary of the study area and dataset for the North Bellevue Segment.

Table 1. Study area and data set summary in the North Bellevue Segment.

Study Area Name	Approximate Study Area (Acres)	Total Tree Points
North Bellevue	36.7	1,842
Project Total	200.9	6,277

1. Trees north of pole 7/5 on the PSE Lakeside Substation property were reclassified resulting in a net loss of 50 trees in South Bellevue. See the ‘Limitations’ section for more information regarding these 50 trees.

## Vegetation Impact Analysis

The impact analysis was conducted by overlaying tree inventory information with proposed development and vegetation maintenance areas associated with the Project in order to identify where existing vegetation is incompatible with the Project.

The analysis used a two-step methodology for the purpose of developing a worst-case scenario for tree/vegetation removal. First, vegetation removal was calculated based on a set of two-dimensional parameters relating to (1) the proximity of a tree to proposed vegetation maintenance areas (*i.e.*, wire zone, managed ROW, and legal ROW) and (2) attributes of tree data yielded from the arborist assessment at the time of inventory. Second, the vegetation removal result was refined based on a three-dimensional parameter related to the relationship

between EMH, topographic elevation, and proposed design height of the overhead transmission lines. The removal criteria applied are listed below:

### **Removal Criteria (Two-dimensional Parameters)**

- Dead and dying trees.
- Conflict between maximum EMH of vegetation and horizontal proximity to new transmission lines, specifically:
  - Expected mature height exceeding 70 feet within the legal ROW and outside of the managed ROW.
  - Expected mature height exceeding 15 feet within the wire zone or managed ROW.
- Conflict between tree location and proposed impacts due to:
  - Transmission pole installation, including the footprint, clearance area, or construction work area of a new pole
  - Temporary construction access, including within proposed access route alignments

### **Removal Criterion (Three-dimensional Parameter)**

- Less than 20 feet of vertical clearance between the proposed transmission line elevation and the expected mature height of vegetation.

The analysis parameters are illustrated in Figures 1, 2, and 3 that are included at the end of this document.

Geometry for proposed transmission line poles and proposed long-term vegetation management zones was obtained from multiple sources in AutoCAD format, then translated into ArcGIS polygon data to facilitate overlay with geospatial point data. Geometry for the proposed transmission infrastructure was provided by PSE. Geometries for poles and wires were buffered accordingly. Approximate construction work areas were defined by PSE and categorized by pole type, which was then translated by Watershed into polygon data. Proposed temporary access route alignments were provided by HDR via PSE, in ArcGIS polyline format, then buffered to a width of 20 feet.

### **Special Removal Criteria**

Based on the construction plans communicated by PSE, vegetation management in the buffer of Kelsey Creek were modeled differently than described above. Trees within the buffer of Kelsey Creek were deliberately selected for retention to minimize associated tree-removal impacts to Kelsey Creek. The height of Kelsey Creek buffer trees will be managed as necessary for safe operation of the transmission lines, but will not be removed.

## **Process Overview**

Two-dimensional parameters were applied by placing the tree points on a georeferenced base map and overlaying the proposed vegetation management zones and development areas. Next, using a series of spatial queries, tree points were classified as occurring within or outside of the designated development or long-term vegetation management areas for each corridor alignment. Then, within each zone, select-by attribute queries were used to identify records that met the criteria for removal.

Next, further vegetation removal was determined based on the three-dimensional criterion to provide a minimum of 20 feet of vertical clearance between the maximum expected mature vegetation height and proposed transmission line heights. This 3-D analysis considered both the vertical sag of the proposed transmission lines and the topographic landscape surface which varies along the length of the transmission corridor. The analysis allowed for preservation of more trees in ravines and other areas where the terrain slopes away from the lines, which allows for sufficient clearance below the wires to accommodate trees at greater heights. For 230 kV overhead lines for this Project, the vertical clearance required below the wire curvature is 20 feet.

## **Quality Assurance Review of Analysis Steps and Results**

Internal review of VIA steps and results occurred throughout the process described above. Ecologists, arborists, GIS analysts, and planners worked collaboratively to ensure appropriate trees and tree attributes were incorporated into the analysis and mapping efforts.

Project elements and site plans were provided by, and reviewed with, PSE project staff. The mapped locations of project elements were based upon discussions with PSE regarding Best Management Practices (BMPs) and standard PSE programs and policies.

Components of the VIA were generated or authored by reputable sources and were cross-checked internally for consistency.

## ***Limitations***

During the field inventory stage, several properties along the Project corridor were wholly or partially inaccessible to arborist and/or survey field crews. Tree locations on these properties may not have been captured completely and/or detailed inventory data may not have been collected.

Some surveyed trees were not attributed with a physical tree tag number. To rectify unnumbered point data, surveyed points were analyzed against the mapped parcel data and the arborist's master tree inventory table, which recorded parcel numbers. Using the surveyors'

notes, high-resolution aerial imagery, and arborists' notes and recollection, unnumbered points were matched with physical tree tag numbers to the extent feasible.

Further, some errors, such as typographical or duplicate values, were present in the field notes. These errors were rectified based on the best judgement of the analyst through review of the data, documentation, and imagery. Considering these limitations, it is possible that some tree tag numbers may be incorrectly assigned, which may affect the vegetation impact summary calculations and mapped results.

Where the surveyors' point location could not be matched with the arborists' detailed tree inventory data, assumptions were made in order to conduct the VIA. Tables 2 and 3 below describe the data set composition by source and provide a summary of issues affecting the data set, along with the assumptions that were applied for affected records. For trees that were not inventoried by Watershed, an assumed maximum tree height and radius were applied to tree points to quantify impacts. Values that were determined in coordination with Project arborists and PSE staff during early vegetation impact assessment studies in the South Bellevue Segment study area have also been applied to the North Bellevue Segment study area. An assumed maximum potential tree height of 25 feet was established because it represented a "worst case" result (i.e., greater than 15 feet) and was consistent with common inventoried vegetation heights across residential parcels, where many of the tree points with unassigned values were located.

Detailed tree attribute information, including EMH, significance, and condition, was not available – or only partially available – for 150 trees in the North Bellevue Segment dataset. These records are included in impacts quantities presented in the *Vegetation Inventory & Management Plan Report for the North Bellevue Segment* but could not be further categorized by criteria or attribute.

A total of 50 trees in the North Bellevue Segment tree dataset were also included in the South Bellevue tree dataset. All trees are located on the Lakeside Substation property. This redundancy is a function of the mid-parcel cut-off between the North Bellevue and South Bellevue Project Segments. Because there was no design data to assess the North Bellevue trees against during the South Bellevue analysis, they were generally not classified for removal in the South Bellevue dataset. A comparison of the North and South Bellevue VIA results for these 50 trees is summarized below:

- 27 are retained in South Bellevue and removed in North Bellevue
- 1 is removed in South Bellevue and retained in North Bellevue (based on an incorrect previously assigned condition of dead/dying that has been resolved)

- 4 are removed in South Bellevue (based on dead/dying condition) and are also removed in North Bellevue
- 18 are retained in South Bellevue and retained in North Bellevue

In addition, this analysis relies on a series of data products produced using different scales and methods; therefore, mapped features may not align with the exact planned real-world layout of proposed corridor facilities. Ground-truthing of these results may reveal inaccuracies. For example, data products from King County and City of Bellevue are not survey accurate and are presented at different map scales. Georeferenced aerial photos provided by PSE represent a snapshot in time that is not consistent across other data; changes in vegetation or development may have occurred since the date the aerial photos were taken. Furthermore, as some features and design geometries were translated from AutoCAD into ArcGIS, some geometric refinements were necessary to address gaps and other issues, which could affect the accuracy of the analysis results.

Table 2. Summary of source data for tree point locations in the North Bellevue Segment.

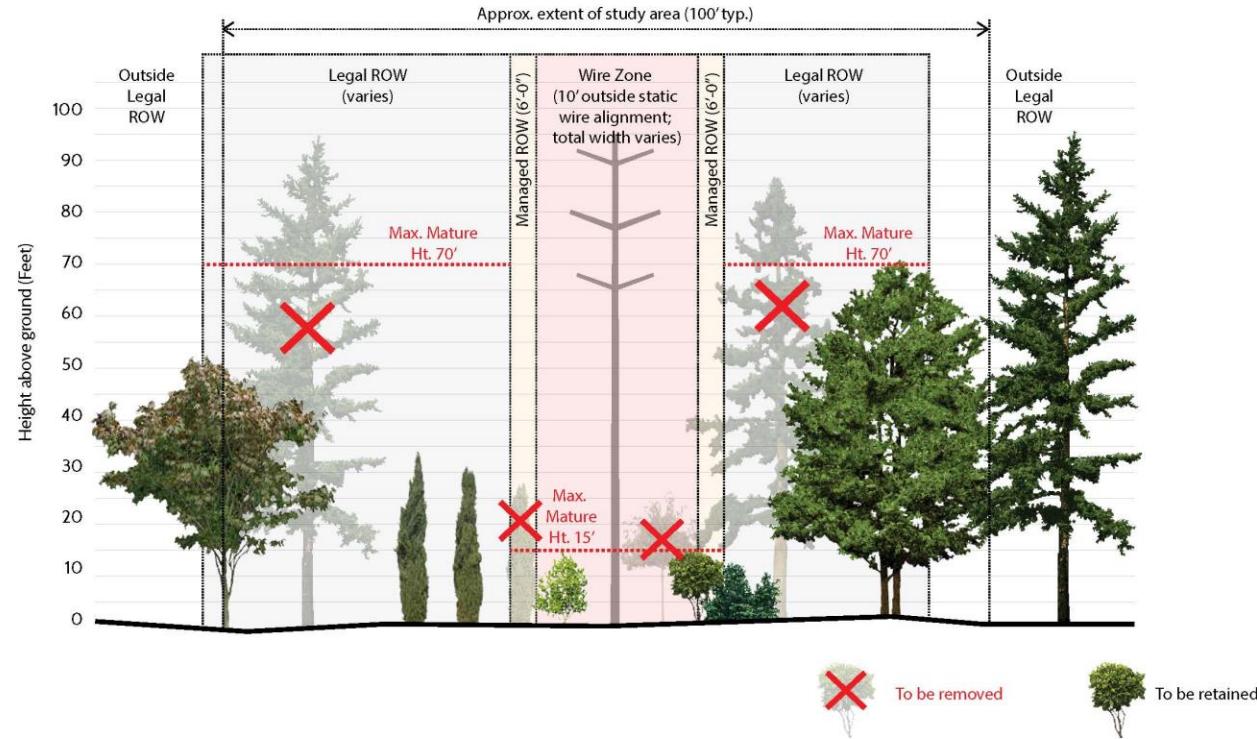
Source	Total Number of Records
Surveyed tree locations (APS)	1,428
Surveyed tree locations (DEA)	129
GPS points (Watershed)	186
Digitized tree locations (Watershed)	99
Total Tree Point Locations Gathered	1,842

Table 3. Number of records affected by point issues and assumptions in the North Bellevue Segment.

Issue Description	Number of Tree Points Affected	Effect on Vegetation Impact Analysis and Assumption Applied
<b>Inaccessible parcel:</b> Tree is located on a parcel where access was granted to the surveyor, but was not extended to Watershed field crews. Data point lacks detailed attribute information, including species, DBH, and expected mature height.	88	Included in data set. Assumed values were applied for canopy radius (9 feet) and expected mature height (25 feet) were applied.
<b>Surveyed, but not inventoried by arborists:</b> Tree was located by survey field crews, but not inventoried by Watershed arborists due to scope, accessibility, or terrain; and species composition of forested area does not support an assumed expected mature height of 25 feet.	62	Included in data set. Genus assumed based on field comments populated by the surveyors. Where genus could be assumed from survey notes (ex. "MAPLE"), an expected mature height was assigned based on the assumed genus. Where genus could not be assumed from survey notes (ex. "DECIDUOUS CLUSTER"), an assumed height of 25 feet was applied. Assumed value of 9 feet for canopy radius.

Figure 1. CROSS SECTION VIEW

Vegetation Impact Analysis - Analysis Parameter Illustration  
Page 1 of 3



**VEGETATION IMPACT ANALYSIS PARAMETERS (CROSS SECTION VIEW):**

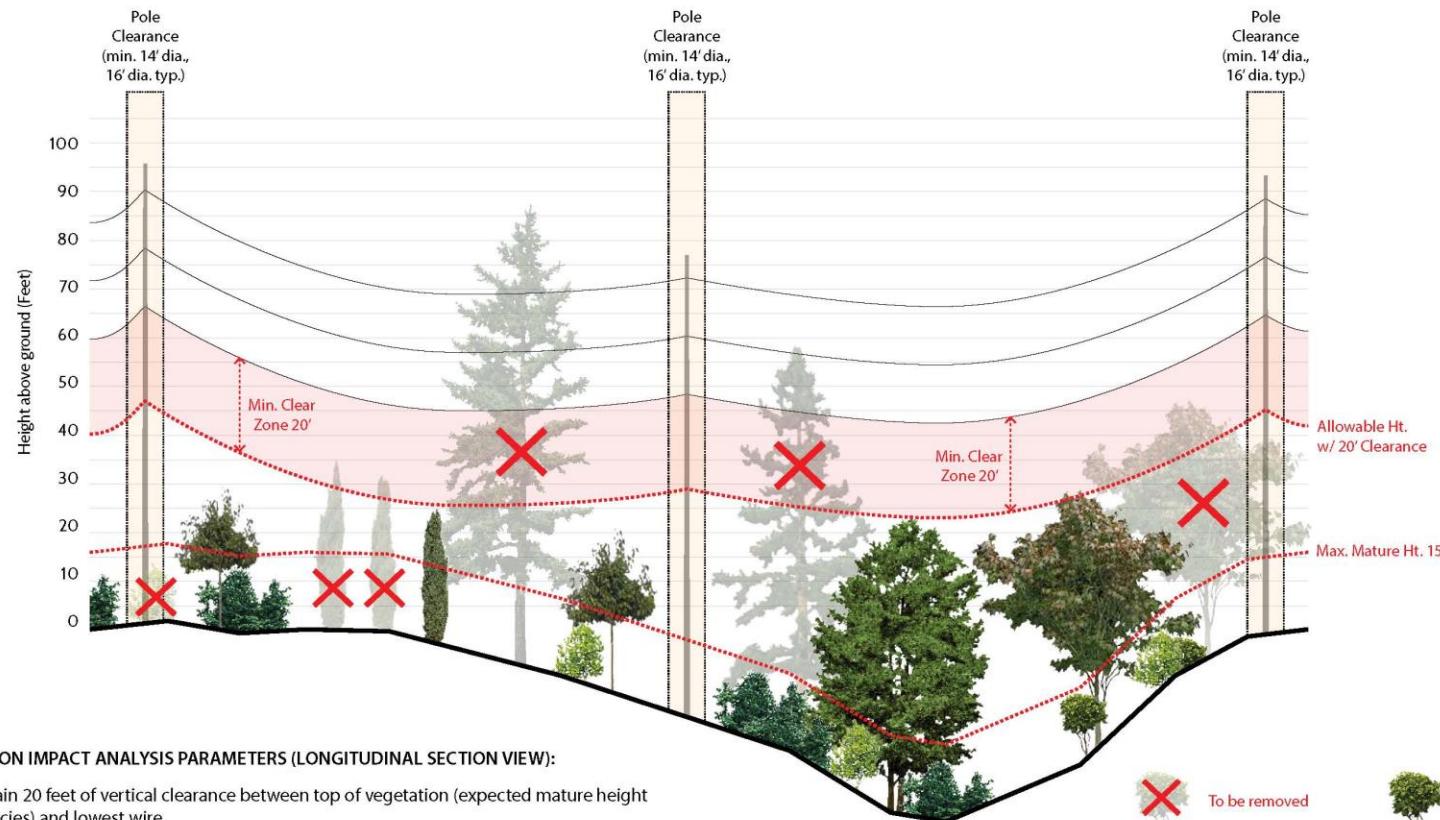
1. Within the wire zone and managed right-of-way (ROW), remove vegetation with an expected mature height greater than 15 feet.
2. Within the legal ROW, remove vegetation with an expected mature height greater than 70 feet.

For illustration purposes, all trees are shown at expected mature height.

Revised  
February 2, 2018



Figure 2. LONGITUDINAL SECTION (PROFILE) VIEW



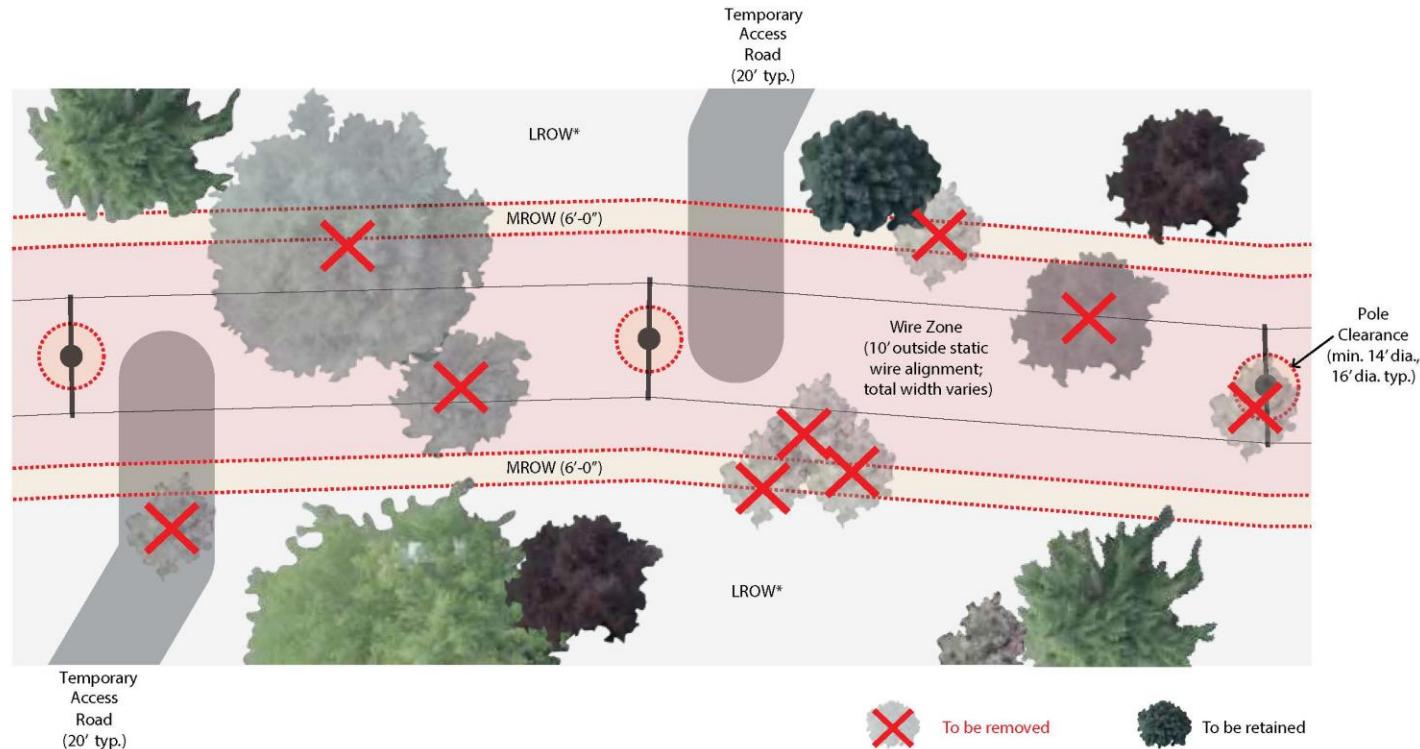
For illustration purposes, all trees are shown at expected mature height.

Revised  
February 2, 2018



Figure 3. PLAN VIEW

Vegetation Impact Analysis - Analysis Parameter Illustration  
Page 3 of 3



**VEGETATION IMPACT ANALYSIS PARAMETERS (PLAN VIEW):**

1. Within the wire zone and managed right-of-way (ROW), remove vegetation with an expected mature height greater than 15 feet.
2. Remove vegetation within 6 feet of proposed pole footprints. Pole footprints range from 2-4-feet in diameter. Pole buffers vary by width of pole footprint, ranging from 14 feet (minimum) to 16 feet (typical) in diameter.
3. Remove vegetation within footprint of proposed temporary access roads; 20-foot width assumed.

For illustration purposes, an expected mature height greater than 15 feet is assumed for all trees shown.

\*For simplification, tree removal in the Legal ROW is not shown in plan view. Refer to cross section on Figure 1 for removal in Legal ROW.

Revised  
February 2, 2018





## Appendix D

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# **CONCEPTUAL LANDSCAPE AND TREE RETENTION PLAN**



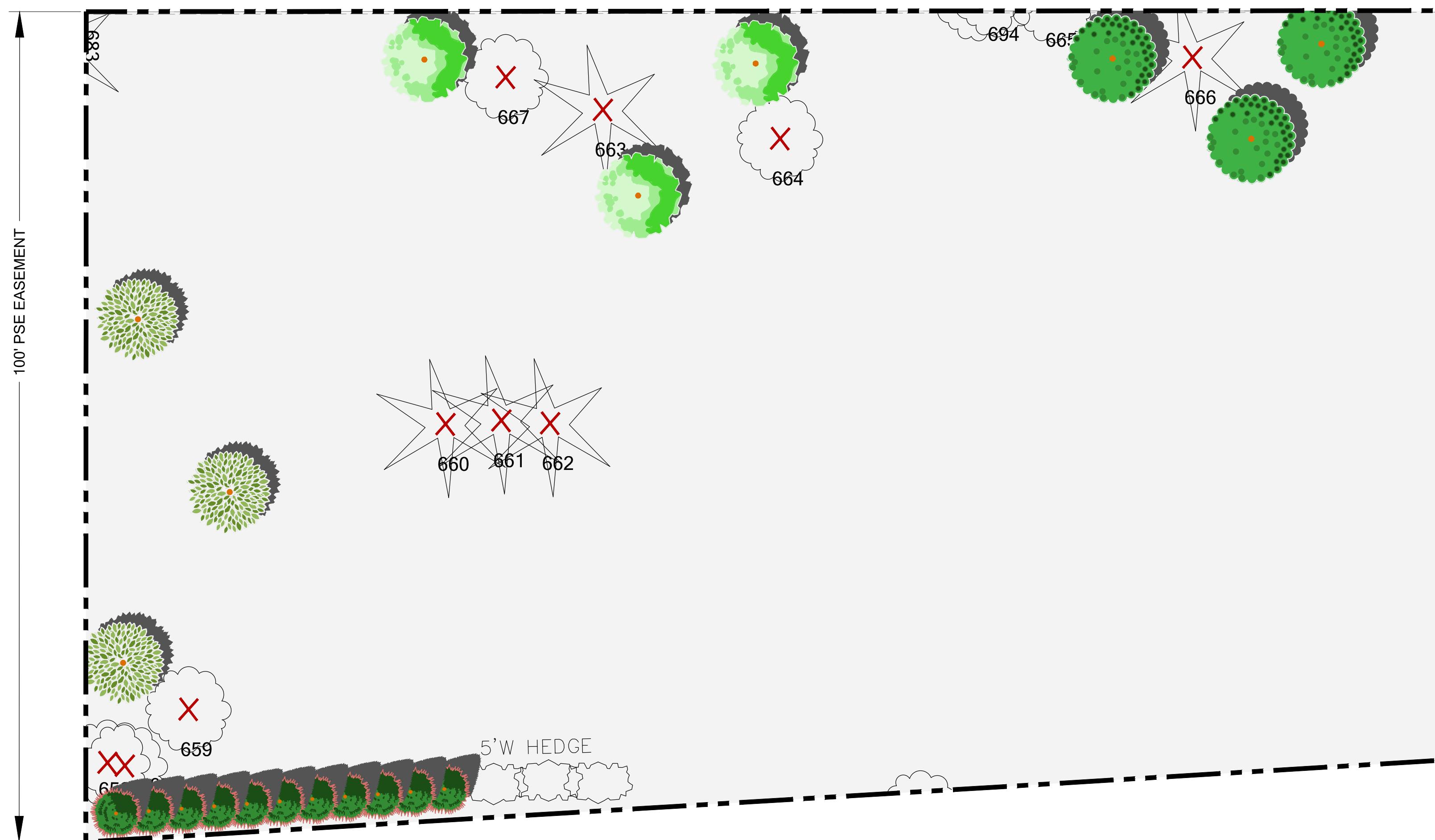
# SAMPLE

## JOHN SAMPLE LANDSCAPE PLAN

## PARCEL # SAMPLE SAMPLE AVE SE

NO.	DATE	SUBMITTALS & REVISIONS	DESCRIPTION	BY
1	XX-XX-XXXX		PSE REVIEW 1	

SHEET  
NUMBER:  
1 OF 1  
CONCEPTUAL\_PROPERTY\_OWNER.DWG



American arborvitae

Japanese snowbell Serviceberry

Red kousa dogwood

## PLANT SCHEDULE CONCEPT LANDSCAPE

TREES	COMMON NAME / BOTANICAL NAME	QTY
	SERVICEBERRY / AMELANCHIER ALNIFOLIA	3
	RED KOUSA DOGWOOD / CORNUS KOUSA 'SATOMI'	3
	JAPANESE SNOWBELL / STYRAX JAPONICUS	3
	AMERICAN ARBORVITAE / THUJA OCCIDENTALIS	11

## LEGEND

- PSE EASEMENT
- APPROXIMATE PARCEL BOUNDARY
- TREES TO BE REMOVED

## TREE TABLE

TAG #	COMMON NAME / BOTANICAL NAME	DBH (IN)	REMOVE	TRUNK TREATMENT
657	Flowering plum / Prunus cerasifera	7.6	Yes	Grind
658	Flowering plum / Prunus cerasifera	2.5	Yes	Grind
659	Flowering plum / Prunus cerasifera	11.4	Yes	Grind
660	Austrian pine / Pinus nigra	19.5	Yes	Grind
661	Austrian pine / Pinus nigra	13.2	Yes	Grind
662	Austrian pine / Pinus nigra	15.5	Yes	Grind
663	Grand fir / Abies grandis	15.8	Yes	Grind
664	Scoulder's willow / Salix scouleriana	2.1	Yes	Grind
666	Douglas-fir / Pseudotsuga menziesii	8.4	Yes	Grind
667	European mountain ash / Sorbus aucuparia	3.9	Yes	Grind

## NOTES

1. THIS PLAN IS FOR DISCUSSION PURPOSES ONLY. PSE DOES NOT REPRESENT, WARRANT OR GUARANTEE THAT THE FINAL VEGETATION PLAN WILL INCLUDE THE TREES AND SHRUBS, AND PLANTING LOCATIONS DEPICTED IN THIS CONCEPTUAL PLAN. THE PLAN IS SUBJECT TO CHANGE SUBJECT TO FURTHER DESIGN, ENVIRONMENTAL REVIEW, PERMITTING, AND CONSTRUCTION NEEDS THAT MAY ARISE AT A LATER DATE.
2. PLEASE BE AWARE THAT CONSTRUCTION ACCESS, POLE TYPES, POLE HEIGHTS, AND POLE LOCATIONS ARE SUBJECT TO CHANGE PENDING FURTHER DESIGN, ENVIRONMENTAL REVIEW, PERMITTING AND IN-FIELD CONSTRUCTION NEEDS.
3. REPLACEMENT TREES AND SHRUBS WILL BE PLANTED AT LESS MATURE HEIGHTS THAN WHAT IS SHOWN IN THE PLAN.

# SAMPLE RESIDENCE

CONCEPTUAL PROPERTY RESTORATION AND PLANTING PLAN

0 5' 10' 20' 40'

NOT FOR CONSTRUCTION



11/30/2017 LOGAN MCCLISH



## Appendix E

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# SAMPLE PLANT PALETTES



# Sample plant palette for vegetated screen

Replacement options are subject to location-specific approval and will be planted at less mature heights than shown below



*Arbutus unedo 'Compacta'*  
Dwarf Strawberry Tree

Four-season interest; edible summer fruit; evergreen foliage

## Plant Characteristics:



*Camellia sasanqua*  
Sasanqua Camellia

Great early-spring flowers with fragrance; glossy, dark evergreen foliage

## Plant Characteristics:



*Kalmia latifolia*  
Mountain Laurel

Flowers mid-June; evergreen foliage

## Plant Characteristics:



*Mahonia x media 'Charity'*  
Hybrid Mahonia

Great winter interest; coarse leaves with sharp margins; evergreen foliage

## Plant Characteristics:



*Myrica californica*  
California Wax Myrtle

Small, evergreen leaves; can be sheared or left to grow in loose mounds

## Plant Characteristics:



*Taxus baccata*  
Yew

Upright form; can be sheared; evergreen needle-like leaves

## Plant Characteristics:



*Thuja occidentalis*  
Arborvitae

Tight, pyramidal, evergreen form

## Plant Characteristics:



DONT USE  
*Ts*  
Dwarf Mountain Hemlock

Slender, small tree; evergreen foliage; slow growing

## Plant Characteristics:



*Ceanothus 'Victoria'*  
California Lilac

Dark, evergreen foliage; fragrant blue / purple blooms

## Plant Characteristics:

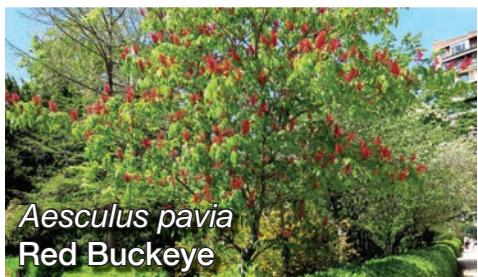


## Legend

	Approximate Size		Sun Requirement		Water Requirement		Friendly to Pollinators		Native Planting		Edible Parts		Maintenance Requirement
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# Sample plant palette for low-growing trees

Replacement options are subject to location-specific approval and will be planted at less mature heights than shown below



*Aesculus pavia*  
Red Buckeye

Showy, 4-10" long pinnacles of red to orange-red flowers in spring

**Plant Characteristics:**



*Acer palmatum var. dissectum*  
Japanese Maple

Lace-like leaves, mounding form, attractive branching pattern

**Plant Characteristics:**



*Amelanchier alnifolia*  
Western Serviceberry

Star-shaped white flowers, attractive fall color; edible fruit

**Plant Characteristics:**



*Hamamelis virginiana*  
Common Witch Hazel

Small tree or deciduous shrub; blooms yellow October - December

**Plant Characteristics:**



*Cornus kousa 'Satomi'*  
Red Flowering Kousa Dogwood

Disease resistant; pink flowers in June

**Plant Characteristics:**



*Parrotia persica*  
Persian Ironwood

Deciduous tree with nice fall color; exfoliating bark on mature trees

**Plant Characteristics:**



*Cryptomeria japonica*  
'Black Dragon'  
Black Dragon Japanese Cedar

Slow-growing evergreen tree; dense and irregular form

**Plant Characteristics:**



*Pyrus calleryana 'Jac Zam'*  
Jack Ornamental Pear

Compact deciduous tree with white flowers; golden fall color

**Plant Characteristics:**



*Styrax japonicus*  
Japanese Snowbell

Compact, deciduous tree with white flowers which bloom May - June

**Plant Characteristics:**



**Legend**

	Approximate Size		Sun Requirement		Water Requirement		Friendly to Pollinators		Native Planting		Edible Parts		Maintenance Requirement
--	------------------	--	-----------------	--	-------------------	--	-------------------------	--	-----------------	--	--------------	--	-------------------------

# Sample plant palette for low-growing trees

Replacement options are subject to location-specific approval and will be planted at less mature heights than shown below



*Acer buergerianum*  
Trident Maple

Easy growing; deciduous tree with tri-lobed, glossy green leaves; and vibrant fall color

Plant Characteristics:



*Amelanchier x grandiflora*  
'Autumn Brilliance'  
Autumn Brilliance® Serviceberry

Upright, moderately spreading canopy; four-season interest; vibrant white flowers and vivid red fall color

Plant Characteristics:



*Chionanthus retusus*  
'Tokyo Tower'  
Tokyo Tower Fringe Tree

Small, deep green showy foliage; upright vase shaped tree with exfoliating bark year-round

Plant Characteristics:



*Acer platanoides 'Globosum'*  
Globe Norway Maple

Dense and round canopy; near-perfect symmetry; and vibrant fall color

Plant Characteristics:



*Amelanchier grandiflora*  
'Princess Diana'  
Princess Diana Serviceberry

A gracefully spreading small tree with excellent long-lasting fall color; pollinator friendly

Plant Characteristics:



*Crataegus x mordenensis*  
'Toba'  
Toba Hawthorn

A showy tree with fragrant pink clustered flowers in spring; showy red berries in fall

Plant Characteristics:



*Halesia carolina*  
'UConn Wedding Bells'  
Wedding Bells Silverbell

Compact, oval shaped canopy; large and significant flowers; yellow fall foliage

Plant Characteristics:



*Malus 'Adirondack'*  
Adirondack Crabapple

Compact, dense, medium-green foliage; very heavy white flower clusters

Plant Characteristics:



*Malus 'JFS KW214MX'*  
Ivory Spear™ Crabapple

Narrow, tightly-columnar, dark green canopy; bright cherry-red fruit; vibrant yellow fall color

Plant Characteristics:



Legend

	Approximate Size		Sun Requirement		Water Requirement		Friendly to Pollinators		Native Planting		Edible Parts		Maintenance Requirement
--	------------------	--	-----------------	--	-------------------	--	-------------------------	--	-----------------	--	--------------	--	-------------------------

# Sample plant palette for low-growing trees

Replacement options are subject to location-specific approval and will be planted at less mature heights than shown below



*Maackia amurensis*  
Amur Maackia

Hardy; small upright vase-shaped canopy; medium green foliage with white flower clusters

#### Plant Characteristics:



*Malus 'Schmidtcutleaf'*  
Golden Raindrops® Crabapple

Delicate looking and fine textured leaves; elegant form with slender, vase-shaped limbs

#### Plant Characteristics:



*Malus 'Red Barron'*  
Red Barron Crabapple

Narrow and columnar canopy; ascending branch structure; purple, year-round seasonal foliage interest

#### Plant Characteristics:



*Malus 'Jewelcole'*  
Red Jewel™ Crabapple

Bright red, non-edible fruit; upright and pyramidal canopy; white flowers in spring

#### Plant Characteristics:



*Prunus 'Frankthrees'*  
Mt. St. Helens® Plum

Small, rounded, upright spreading canopy; purple foliage; hardy with strong truck and branch form

#### Plant Characteristics:



*Syringa reticulata 'Ivory Silk'*  
Ivy Silk® Japanese Tree Lilac

Large, white plumes of flowers smother the branches in early spring; round upright canopy

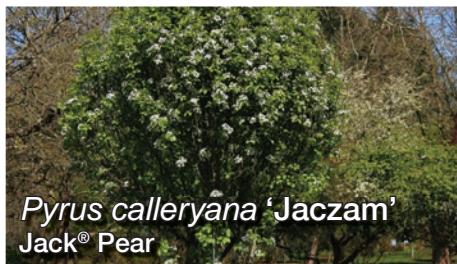
#### Plant Characteristics:



*Prunus x cistena 'Schmidtcis'*  
Big Cis® Plum

Rounded dense, purple foliage; light pink and fragrant flowers

#### Plant Characteristics:



*Pyrus calleryana 'Jaczac'*  
Jack® Pear

Tight, upright, compact and oval form; dark green foliage; bright yellow fall color

#### Plant Characteristics:



*Tilia cordata 'Halka' PP 10589*  
Summer Sprite® Linden

Semi-dwarf; dense, rounded, rounded pyramid canopy; sheared appearance; green foliage

#### Plant Characteristics:



#### Legend

	Approximate Size		Sun Requirement		Water Requirement		Friendly to Pollinators		Native Planting		Edible Parts		Maintenance Requirement
--	------------------	--	-----------------	--	-------------------	--	-------------------------	--	-----------------	--	--------------	--	-------------------------

# Sample plant palette for edible landscape

Replacement options are subject to location-specific approval and will be planted at less mature heights than shown below



*Corylus avellana 'Theta'*  
Theta Hazelnut

Multi-stemmed deciduous shrub; cross pollination required

#### Plant Characteristics:



*Ficus carica*  
Edible Fig

Deciduous shrub; spreading form; cross pollination not needed

#### Plant Characteristics:



*Malus domestica*  
Dwarf Apple

Deciduous small tree; requires pollination; many proven varieties in PNW

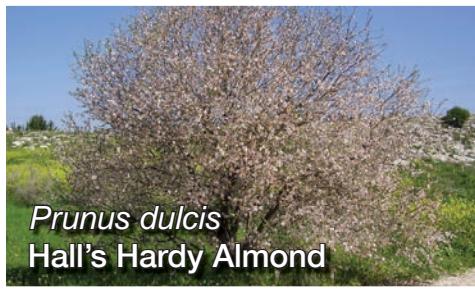
#### Plant Characteristics:



*Malus domestica*  
Espalier Apple Tree

Trained table apple to grow horizontally; great for small spaces

#### Plant Characteristics:



*Prunus dulcis*  
Hall's Hardy Almond

Small, nut-bearing tree with ornamental value

#### Plant Characteristics:



*Prunus spp.*  
Cherry

Deciduous dwarf tree; numerous varieties from sweet to bitter (pie cherry)

#### Plant Characteristics:



*Pyrus communis*  
Pear

Deciduous tree; requires cross-pollination

#### Plant Characteristics:



*Vaccinium corymbosum*  
Northern Highbush Blueberry

Best in acidic, well-drained soils; cross-pollination recommended

#### Plant Characteristics:



*Vitis labrusca*  
Table Grapes

Best in rich, well-drained soils; the more sun, the sweeter the fruit

#### Plant Characteristics:



#### Legend

	Approximate Size		Sun Requirement		Water Requirement		Friendly to Pollinators		Native Planting		Edible Parts		Maintenance Requirement
--	------------------	--	-----------------	--	-------------------	--	-------------------------	--	-----------------	--	--------------	--	-------------------------

# Sample plant palette for pollinator landscapes



*Achillea millefolium*  
Yarrow

Herbaceous perennial; attracts butterflies; blooms June - September

**Plant Characteristics:**



*Echinacea purpurea*  
Purple Coneflower

Herbaceous perennial; attracts birds and butterflies; blooms June - August

**Plant Characteristics:**



*Mahonia nervosa*  
Dull Oregon Grape

Evergreen shrub; attracts bees; blooms in May; blue berries in fall

**Plant Characteristics:**



*Ribes sanguineum*  
Flowering Currant

Deciduous shrub; attracts bees; blooms June - August

**Plant Characteristics:**



*Hydrangea quercifolia*  
Oakleaf Hydrangea

Deciduous shrub; attracts bees; blooms July - August

**Plant Characteristics:**



*Lavandula spp.*  
Lavendar

Herbaceous perennial; attracts butterflies, bees; blooms June - August

**Plant Characteristics:**



*Holodiscus discolor*  
Oceanspray

Broadleaf deciduous; attracts bees; blooms May - June

**Plant Characteristics:**



*Hylotelephium 'Herbstfreude'*  
Autumn Joy Sedum

Herbaceous perennial; attracts butterflies; blooms September - October

**Plant Characteristics:**



*Spiraea japonica*  
Japanese Spirea

Deciduous shrub; attracts butterflies; blooms June - July

**Plant Characteristics:**



**Legend**

	Approximate Size		Sun Requirement		Water Requirement		Friendly to Pollinators		Native Planting		Edible Parts		Maintenance Requirement
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# Sample habitat snag features



A habitat snag is an alternative where the lower portion of the tree remains. The upper portion of the tree is removed and the tree is then 5 feet to 15 feet above the ground. The coronet cut (see below) at the top of the tree can then provide habitat for birds, amphibians, bees, bats and small mammals as it decomposes in place.

## How the habitats are created

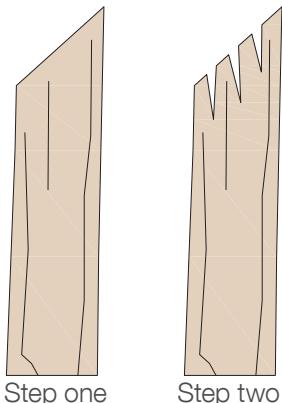


Photo example

### Coronet cut notes:

A coronet cut is a technique for producing a natural fracture effect in cut stub ends:

1. Cut at an angle to height as individually confirmed in the field by restoration consultant;
2. After slicing, cut down into the tree to create crevices at the top; and
3. Cut further by “bouncing” the chain saw on the top to create multiple incisions to encourage decay and colonization by insects and fungi.

### Chain saw / tool notes:

1. Use biodegradable bar and chain oil such as “motion lotion” or “Stihl.”

(Brown, Timothy K. 2002. Creating and Maintaining Wildlife, Insect, and Fish Habitat Structures in Dead Wood. U.S. Forest Service Gen. Tech. Rep. PSW-GTR-181; Missouri Department of Conservation. 1994. Forest and Wildlife Benefits on Private Land, Snags and Den Trees.)