

# EXHIBIT D

## TREE RETENTION

1. PEG - Tree Retention Plan, November 9, 2023
2. SUF - April 2024 Audrey Estates Tree Retention and Landscape Plan Review, April 1, 2024
  3. GR3 - Geotechnical Letter (reviewing tree retention on created slopes), April 19, 2024
4. GR4 - Plan Review Letter (reviewing tree retention on created slopes), November 13, 2023

1. PEG

Tree Retention Plan,

November 9, 2023

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## Tree Retention Plan

November 9, 2023

### Client

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### Project Information

Kitsap County Parcel: 242601-3-006-2005  
Parcel Address: No Known Address

### Consultants

John Bornsworth  
Board Certified Master Arborist #7955BM  
Registered Consulting Arborist #724

# CONTENTS

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- 1. Summary ..... 1
- 2. Background ..... 2
- 3. Assignment & Purpose ..... 2
  - 3.1 Assignment..... 2
  - 3.2 Professional Assumptions & Limitations..... 2
  - 3.3 Survey Methodology ..... 2
- 4. Site Characteristics ..... 5
  - 4.1 General Site Characteristics ..... 5
  - 4.2 Forest Composition and Sample Plots ..... 5
  - 4.3 Invasive Plants..... 6
- 5. Tree Retention ..... 7
  - 5.1 Retention Summary ..... 7
  - 5.2 General Description of Tree Retention Areas..... 7
  - 5.3 Tree Retention Areas & Tabulation ..... 8
- 6. Alternative Retention Requirements ..... 9
  - 6.1 Specifications for Tree Installation and Maintenance: ..... 10
  - 6.2 Monitoring & Contingency..... 11
- 7. Conclusions ..... 12
- 8. Recommendations ..... 12
- 9. Maps and Figures ..... 13
  - 6.3 Tree Plot Dataset ..... 14
  - 6.4 Tree Plot Calculation Summary..... 19
- 10. Photos ..... 20
- 11. Closing..... 29
  - 10.1 General Assumptions & Limitations..... 30
- Appendix A. Tree Protection Standards..... 31
  - 9.1 Critical Root Zone Explanation ..... 34
- Appendix B: Site Plan With tree Retention Areas..... 35
- Appendix C: Site Plan Core Design ..... 39

## FIGURES

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Figure 1: General areas of the 12 sample plots. Green circle indicates the 37.2-foot radius of each plot. Red outline is parcel outline. ....	3
Figure 2: Same map as Figure 1 but with the Tree Retention Areas included. ....	4
Figure 3: Site is outlined in light green. Accessed from Kitsap County Parcel Search website. ....	6
Figure 4: Vicinity map with contours. Accessed from Kitsap County Parcel Search website. ....	13
Figure 5: Tree Survey Dataset Plots 1-3 .....	14
Figure 6: Tree Survey Dataset Plots 4-5 .....	15
Figure 7: Tree Survey Dataset Plots 6-7 .....	16
Figure 8: Tree Survey Dataset Plots 8-9 .....	17
Figure 9: Tree Survey Dataset Plots 10-12 .....	18
Figure 10: Tree Sample summary. ....	19

## PHOTOS

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Photo 1: Photo taken by Consultant. Typical forest composition with mature trees a good distance apart with native understory.....	20
Photo 2: Panoramic photo from Site showing typical forest composition. Photo split into two for visual aid.....	21
Photo 3: Forest transition area from Douglas-fir dominated to red alder dominated.....	22
Photo 4: Douglas-fir dominated in foreground with red alders in background. ....	23
Photo 5: Mostly larger trees with some smaller trees scattered throughout.....	24
Photo 6: Large Pacific madrone and bigleaf maple. ....	25
Photo 7: Beginning of red alder dominated forest area.....	26
Photo 8: Wetland area to east of property.....	27
Photo 9: Photo taken from northeast corner overlooking wetand area and showing red alder forest in foreground with Douglas-fir dominated forest behind it. ....	28



## 1. SUMMARY

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JWJ Group, LLC is permitting a planned development on a 25.18-acre parcel within the City of Poulsbo; Kitsap County Parcel: 242601-3-006-2005 (the “Site”). The City of Poulsbo requires a Tree Retention Plan per Poulsbo Municipal Code (“PMC”) 18.180.060. JWJ Group asked Peninsula Environmental to develop this plan in order to meet those requirements. This Tree Retention Plan (Plan) meets the requirements of PMC Chapter 18.180 Tree Retention Plan.

PMC 18.180.030.B.1 requires “*at least twenty-five percent of the existing trees which are ten inches in diameter or greater measured four feet six inches above grade...shall be retained.*” If this number of trees cannot be retained through development, then those trees must be replaced with new plantings, or through a combination of preservation and replacement.

The 25.18-acre property is forested through 19.8 acres. The remaining 5.38 acres are non-forested. The forested area contains an estimated 2,277 trees over ten-inches Diameter at Breast Height (DBH) (Significant Trees). The 25% preservation requirement results in 570 Significant Trees being retained or replanted throughout the Site. Consultant used a plot sampling technique to identify the number of significant trees, and the 25% preservation requirement. This method is explained in 3.3 Survey Methodology below.

The Site is generally a Douglas-fir (*Pseudotsuga menziesii*) and western redcedar (*Thuja plicata*) dominated forest with cohorts of bigleaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*). No forest pests and minimal forest pathogens were observed. The Site is sloped and hilly with some wetlands and wetland buffers. The non-forested acres are predominately fields. The Consultant assessed tree health within each of the tree retention areas and determined the trees to be generally healthy and typical to their growing conditions.

This plan results in the preservation of 3.88 acres of forested land, preserving 445 Significant Trees. To meet the 25% retention requirement (PMC 18.180.040.A), an additional 125 trees will be installed per the Alternative Tree Retention option.

This report includes calculations on tree retention areas, Significant Tree credits, replanting quantities and specifications and mitigation, and Tree Protection Standards for use during construction.



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## 2. BACKGROUND

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JWJ Group, LLC (the “Client”) is the developer for the 25.18-acre property in Poulsbo, WA, Kitsap parcel number 242601-3-006-2005. The Site does not have an address, but is located in Poulsbo, WA northeast of Johnson Rd NE, east of Sunrise Ridge Ave NE, south of Miss Ellis Loop NE, and southwest of Noll Rd NE. The Client contacted Peninsula Environmental Group, Inc. (the “Consultant”) and requested they perform an assessment and write this Arborist Report and included Plan based on PMC.

Our assessment, opinions, and recommendations are included in this report. Please contact us with questions you may have regarding this project.

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## 3. ASSIGNMENT & PURPOSE

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### 3.1 Assignment

1. Perform a site assessment and Plan per PMC Chapter 18.180.060 as necessary for Site.
2. Provide conclusions and recommendations in an Arborist Report that includes a Plan that conforms to City of Poulsbo Standards.

### 3.2 Professional Assumptions & Limitations

This report summarizes the data collected during our site reconnaissance and assessment, our conversations regarding the project, and our professional opinions and recommendations. The results and recommendations of this report represent our professional opinion compiled from biological forensics, information provided to us, referenced material and our experience. Our recommendations are compiled with industry standards, best-available-science and currently accepted best management practices.

#### Additional project specific limitations:

- This report summarizes site characteristics as they were observed April 18<sup>th</sup>, April 26<sup>th</sup>, April 27<sup>th</sup>, 2022 and May 18<sup>th</sup>, 2023 only.
- This report is intended for the exclusive use of the Client and their agents and only for specific application to the referenced property. This report should not be applied to any other tree or other property for any purpose.
- Our evaluation assesses only the trees identified within the scope of this project.
- Fungal isolation, laboratory diagnostics, subsurface explorations, aerial inspections, and other advanced diagnostics were not applied unless specifically identified in this report.

### 3.3 Survey Methodology

In order to calculate the number of significant trees required for retention, Consultant used a plot sampling method across the forested areas of the Site. Consultant sampled the Site through twelve 1/10-acre plot sizes with plot radii of 37.2 feet and a resulting sample error rate of 3.26%. This allows the Consultant to calculate the number of Significant Trees onsite. Due to the extensive canopy, plots were

11-08-2023

Kitsap County Parcel: 242601-3-006-2005

Tree Retention Plan



not randomized plots located with GIS but rather gridded on foot using chains and paces. The Significant Trees were estimated only in the forested areas. As mentioned, the end sample error was calculated as 3.26%, an industry accepted sample error.

Twelve sample plots were identified through on-foot gridding, at approximately 200 feet intervals between each plot on 45–180-degree axis. Plots along the 0–90-degree axis were also measured at 200 feet intervals. Sample plots were 1/10 of an acre (4,356 square feet). For each sample plot a 37.2-foot string was drawn from the plot's center point. All trees over 10-inches in diameter were measured for diameter at 54 inches DBH, their species was tallied, and their general health was taken. See 6.3 Tree Plot Dataset for table of Significant Trees plotted.

Originally, nine sample plots were calculated. These plots were sampled in late 2022. On May 18<sup>th</sup> 2023, Consultant surveyed three additional plots to the east of plots 3, 6, and 9. These new plots are 10, 11, and 12. The forested area to the north was a similar forest composition as the surveyed areas and did not seem necessary to further survey since the sample error rate was within acceptable tolerance.

*Figure 1: General areas of the 12 sample plots. Green circle indicates the 37.2-foot radius of each plot. Red outline is parcel outline.*

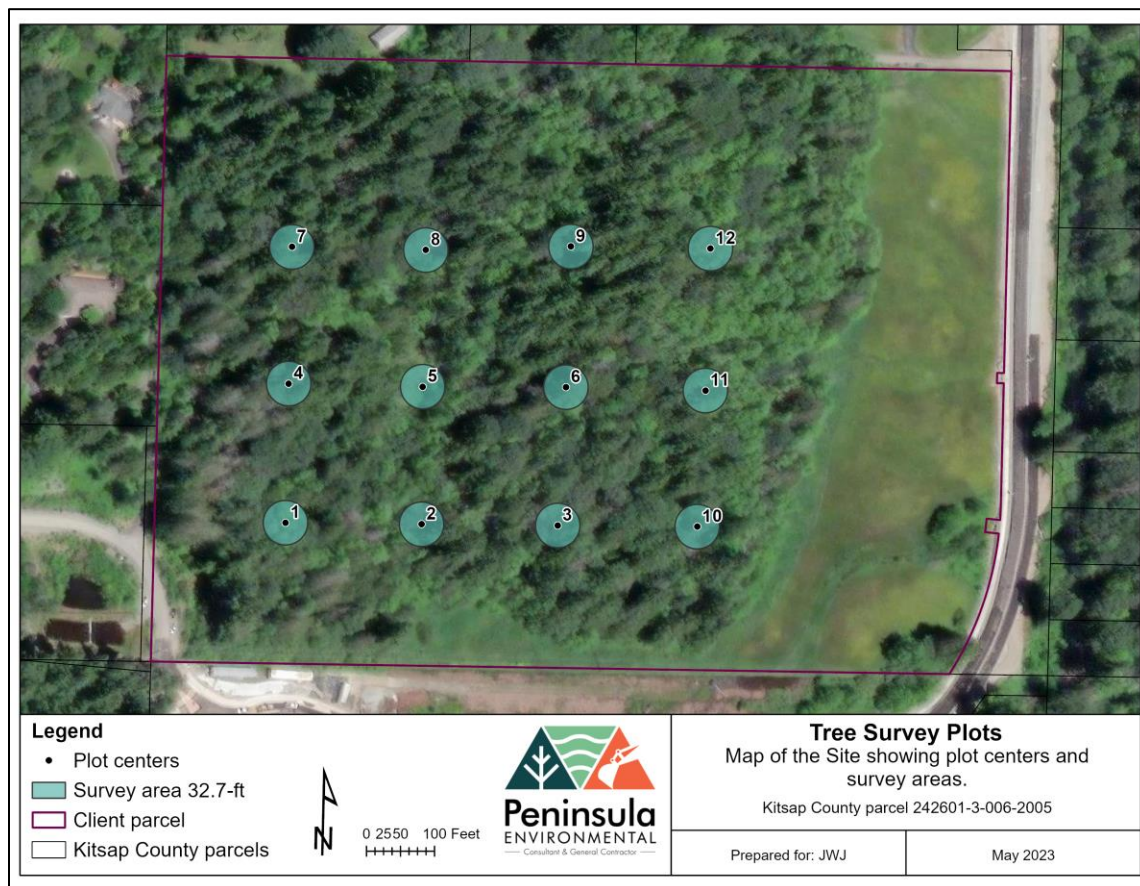
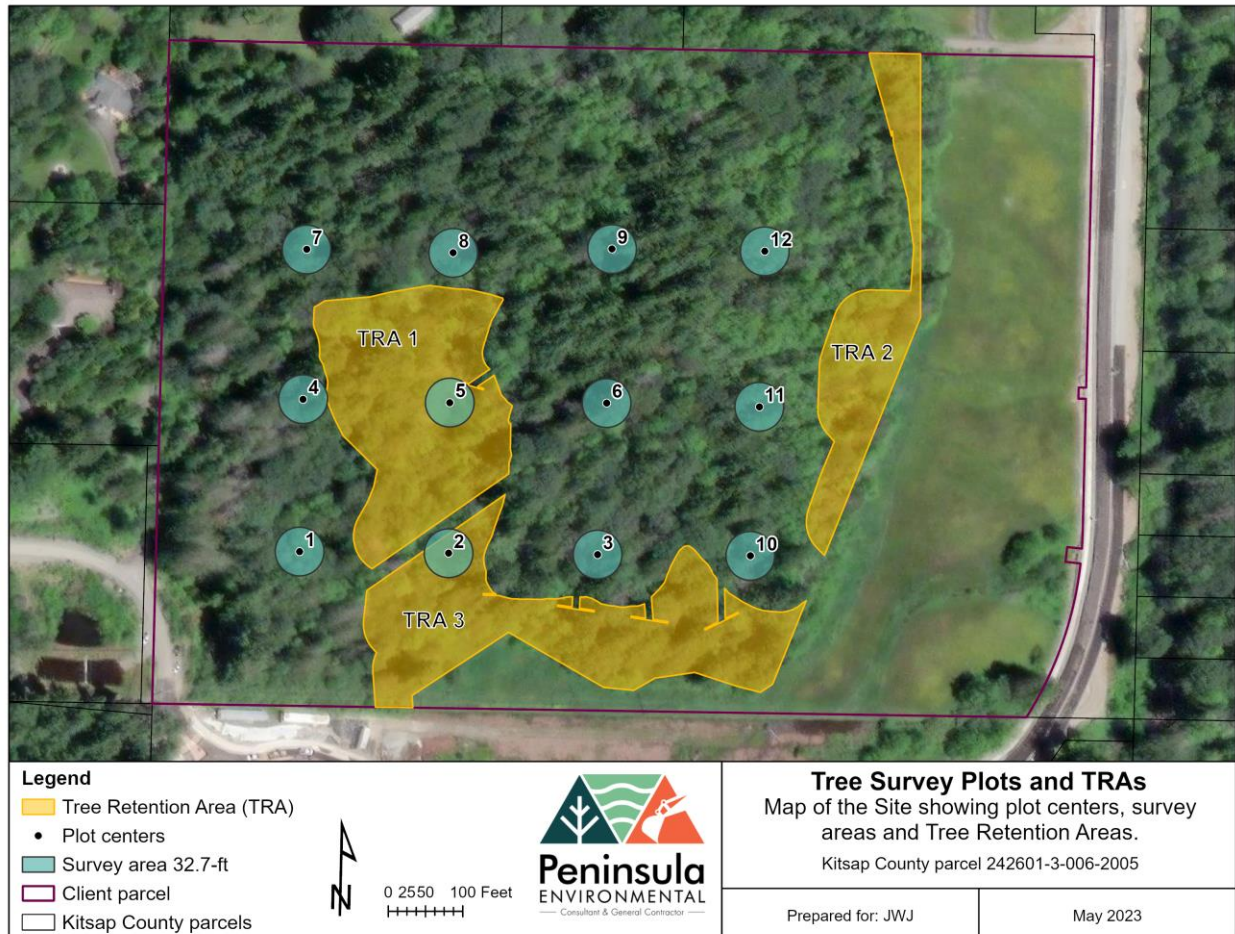






Figure 2: Same map as Figure 1 but with the Tree Retention Areas included.





## 4. SITE CHARACTERISTICS

**Table 1: Site properties as of assessment date.**

<b>Jurisdiction</b>	Poulsbo
<b>Parcel</b>	242601-3-006-2005
<b>Descriptions</b>	THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER, SECTION 24, TOWNSHIP 26 NORTH, RANGE 1 EAST, W.M., KITSAP COUNTY, WASHINGTON; EXCEPT THE NORTH 429 FEET THEREOF.>>>>EXCEPT THAT PORTION CONVEYED TO THE CITY OF POULSBO FOR NOLL ROAD IMPROVEMENTS UNDER AUDITOR'S FILE NO. 201903220177, RECORDS OF KITSAP COUNTY, WASHINGTON.
<b>Property Class</b>	910 – Undeveloped land
<b>Existing Structures</b>	No

### 4.1 [General Site Characteristics](#)

The Site is accessed through Noll Road to the northeast and Sunrise Ridge Ave NE to the west. The Site was hilled and sloped, with the highest elevation around 310 feet and the lowest elevation around 175 feet. Trees were well-evenly spaced with a healthy native understory. Minimal pest and disease were observed.

Overall trees were mature, healthy, and relatively large. The majority of trees on the property appear to be mature trees with an average of 26-inches DBH. The largest measured tree was 50-inches DBH. Some of the larger mature Douglas-fir, western redcedar, and bigleaf maple grew near the center of the property.

### 4.2 [Forest Composition and Sample Plots](#)

There were two distinct forest compositions on the property.

#### **Forest Composition 1:**

The Site is dominated by this first forest composition consisting of older, more mature Douglas-fir, western redcedar, bigleaf maple, and red alder trees. Subdominant trees include Pacific madrone (*Arbutus menziesii*). The understory is somewhat dense and is dominated by western swordfern, salmonberry, osoberry, and stinging nettle. Subdominant understory includes red elderberry (*Sambucus racemosa*), evergreen huckleberry (*Vaccinium ovatum*), Oregon grape (*Mahonia aquifolium*), trailing blackberry (*Rubus ursinus*), and beaked hazelnut (*Corylus cornuta*).

Plots 1-9 are within Forest Composition 1. Plots 10 and 11 are on the border of the transition between Forest Composition 1 and 2.

11-08-2023

Kitsap County Parcel: 242601-3-006-2005

Tree Retention Plan



### Forest Composition 2:

This is the small eastern most section of forested area and includes more younger red alder trees growing closer to the wetlands and wetland buffers. The understory is dominated by stinging nettle and western swordfern, and also includes trailing blackberry, dull Oregon grape (*Mahonia nervosa*), cleaver (*Galium aparine*), Robert's geranium (*Geranium robertianum*), and English holly. The forest composition is a little more open than the forest to the west. All the red alders surveyed in this plot leaned, as is typical of those species, and they mostly straighten out at the end.

Plot 12 is within Forest Composition 2.

#### 4.3 Invasive Plants

Invasive plants include English Holly (*Ilex aquifolium*) and Himalayan blackberry (*Rubus armeniacus*).

*Figure 3: Site is outlined in light green. Accessed from Kitsap County Parcel Search website.*





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## 5. TREE RETENTION

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### 5.1 Retention Summary

Consultant's data found that the 19.8 forested acres (of the 25.18-acre property) contain 2,277 Significant Trees. This results in approximately 115 Significant Trees per acre (TPA) across the site. Poulsbo's Tree Retention policy requires 25% of Significant Trees across the site be retained. This calculates to 570 (2,277 x 0.25) Significant Trees required to retain or install across the entire parcel.

Current Tree Retention Areas total 3.88 acres of retained trees. Using the TPA above, this calculates to a total of 445 Significant Trees within the Tree Retention Areas. The resulting retention deficit requires the installation of 125 new trees.

As such, tree retention is partially reached through Tree Retention Areas located within wetlands and wetland buffers, and through preserving existing trees outside the planned grading areas. Per PMC 18.180.040 C and D,

- "Applicant shall utilize plant materials which complement the natural character of the Pacific Northwest, and which are adaptable to the climatic, topographic, and hydrologic characteristics of the site. A landscape plan is required to be submitted."
- "Where an alternative proposal includes supplemental or replacement trees in lieu of retention, the application shall be required to provide a maintenance assurance device, as set forth in Section 18.130.060(C) or (D). (Ord. 2013-04 § 2 (Exh. A (part)), 2013)".

### 5.2 General Description of Tree Retention Areas

- Three Tree Retention Areas are located on the Site.
- TRA 1: This TRA is approximately 1.55 acres and is located in the middle of the western half of the Site. TRA 1 includes red alder, Douglas-fir, western redcedar, bigleaf maple, osoberry, Himalayan blackberry, salmonberry, salal, Oregon grape, evergreen huckleberry, western swordfern, red huckleberry, English holly, and stinging nettle. Many of the red alder trees lean, as is typical for their species, and are relatively mature.
- TRA 2: This TRA is approximately 0.82 acres and is located in the eastern half of the Site, just west of wetlands E and F. Much of TRA 2 is dominated by red alder with Himalayan blackberry and stinging nettle. Also present are western redcedar, bigleaf maple, salmonberry, and osoberry. The trees on the northeast side of TRA 2 consists of mostly young red alders. The northwest side of this TRA is less treed than much of the other areas.
- TRA 3: This TRA is approximately 1.51 acres and is located in the middle of the southern part of the Site. The outskirts of TRA 3 includes Douglas-fir, beaked hazelnut, common hawthorn, willow (*Salix* sp.), Nootka rose, and some Pacific madrone saplings. Once in the forest and past the outskirts, the forest includes red alder, western redcedar, bigleaf maple, osoberry, Himalayan blackberry, salmonberry, salal Oregon grape, evergreen huckleberry, western swordfern, red huckleberry, English holly, and stinging nettle.



5.3 Tree Retention Areas & Tabulation

Table 2: Summary of Tree Retention Areas and Replanting Requirement

Tree Retention Areas	Notes	Significant Trees to be Retained <sup>1</sup>
Tree Retention Area 1	1.55 acres.	178 trees
Tree Retention Area 2	0.82 acres.	94 trees
Tree Retention Area 3	1.51 acres.	173 trees
<b>Total Retained Trees in All Tree Retention Areas (3.88 acres)</b>		<b>445 Total Significant Trees Retained (rounded down)</b>
<b>Trees To Be Planted for Mitigation.</b>		125 Trees Required for Installation

<sup>1</sup> Extrapolated from dataset in 6.4 Tree Plot Calculation Summary



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## 6. ALTERNATIVE RETENTION REQUIREMENTS

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Installed trees meant to meet tree retention requirements require a 5-year maintenance bond. As planned, the tree retention deficit requires 125 trees be installed on the property. PMC 18.180.040.A allows an Alternative Tree Retention option that *“incorporates the replacement of trees equal in equivalent diameter inches”*. Applying the Alternative Tree Retention option requires planting native evergreen trees as at least 5-6-feet in height or evergreen trees as at least 2 inches in caliper<sup>2</sup>.

A Certified Arborist should inspect replacement trees annually. Trees that heavily decline or die should be replaced within the 5-year maintenance bond period. After the 5-years, the City of Poulsbo will determine if another maintenance bond is necessary based on tree mortality numbers.

Installed trees are identified on the most current revision of the Landscape Plan by CORE Design.

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<sup>2</sup> Email communication with Poulsbo City Associate Planner Edie Berghoff on February 7, 2022.



6.1 Specifications for Tree Installation and Maintenance:

- 1) Replacement Trees shall be of the following tree species:
  - a. Sitka spruce (*Sitka sitchensis*)
  - b. Vine maple (*Acer circinatum*)
  - c. Pacific dogwood (*Cornus nuttallii*)
  - d. Douglas-fir (*Pseudotsuga menziesii*)
  - e. Cascara (*Frangula purshiana*)
  - f. Western redcedar (*Thuja plicata*)
- 2) Selection should include varied with no less than 12 of any species.
- 3) Evergreen trees shall be at least 5-6 foot tall<sup>3</sup>.
- 4) Deciduous trees shall be a minimum of 2-inch caliper<sup>3</sup>.
- 5) Trees shall be installed using current International Society of Arboriculture planting methods.
- 6) Irrigation:
  - a. Irrigation for replacement trees shall be applied via drip or root bubblers. Do not irrigate with sprinklers.
  - b. Calculate enough irrigation to reach one gallon per inch of diameter per week. Provided the size of the mitigation trees, this would calculate to roughly 1.5 gallons of water per week.
  - c. Meet the above water quantity requirement while irrigating once or twice weekly. Do not irrigate more than once every four days.
  - d. Irrigation systems for replacement trees shall be monitored once a year to ensure functionality.
- 7) A Certified Arborist shall monitor Replacement Trees annually for decline and mortality.

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<sup>3</sup> Email communication with Poulsbo Associate Planner Edie Berghoff on February 7, 2022.



6.2 Monitoring & Contingency

**Year 1-5 after tree installation:**

Standard: Certified Arborist monitor installed trees annually during late summer for excessive decline and mortality.

Mitigation: Replant dead and excessively declining trees with similar species. Review irrigation and species selection for the replaced plants. A Certified Arborist may approve other substitute species.

*Table 3: Tree Maintenance Surety Bond*

Tree Species	Number of Trees	Tree Cost <sup>4</sup>	Cost of Installation and Labor <sup>5</sup>	Total Cost
Sitka spruce	14	\$2,800	\$5,376	\$8,176
Vine maple	16	\$3,200	\$6,144	\$9,344
Pacific dogwood	12	\$2,400	\$4,608	\$7,008
Douglas-fir	46	\$9,200	\$17,664	\$26,864
Cascara	12	\$2,400	\$4,608	\$7,008
Western redcedar	25	\$5,000	\$9,600	\$14,600
<b>Totals</b>	<b>125</b>	<b>\$25,000</b>	<b>\$48,000</b>	<b>\$73,000</b>

*Note: The specific quantity of species may vary with the final Landscape Plan, though the total Replacement Tree number shall remain at 125, and no less than 12 of any species shall be installed<sup>6</sup>.*

<sup>4</sup> Cost per trees estimated at \$200/tree for both evergreen and deciduous trees.

<sup>5</sup> Rate for planting estimated at \$384 per tree.

<sup>6</sup> 6.1 Specifications for Tree Installation and Maintenance:





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## 7. CONCLUSIONS

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The Consultant's data shows the Site's forested 19.8-acres contain an estimated 2,277 Significant Trees. This number of existing Significant Trees requires 570 Significant Tree credits to meet the City of Poulsbo's 25% retention requirement. Currently, there are 445 trees planned to retain within 3.88 acres of Tree Retention Areas. This leaves a deficit of 125 tree credits to make up through installation of new trees, per the Poulsbo Alternative Tree Retention option.

Consultant reviewed the Landscape Plan<sup>7</sup>, which meets the 125-tree installation requirement per the Alternative Retention Requirements.

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## 8. RECOMMENDATIONS

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1. Retain trees as outlined in this plan, using the referenced current Site Plan and Landscape Plan. Any further grading changes that may occur during final design need to be evaluated by Project Arborist to confirm compliance with tree retention standards.
2. Follow Appendix A. Tree Protection Standards for installation of Tree Protection Fencing, signage, and proper protection and management of trees within Tree Retention Areas.
3. Install, maintain, and monitor trees according to 6 Alternative Retention Requirements.
  - Retain maintenance bond for total sum in Table 3: Tree Maintenance Surety Bond (\$73,000).
  - Monitor and irrigate trees for at least 5 years post construction.
  - Consult with Project Arborist and replace trees as necessary to ensure establishment of installed trees.
4. According to PMC 18.180.080, the Tree Retention Areas shall be owned and maintained through a homeowners' association or other common ownership. Review PMC 18.180.080 for details.
5. Contact Project Arborist if trees within Tree Retention Areas are damaged or roots over 2" are severed.

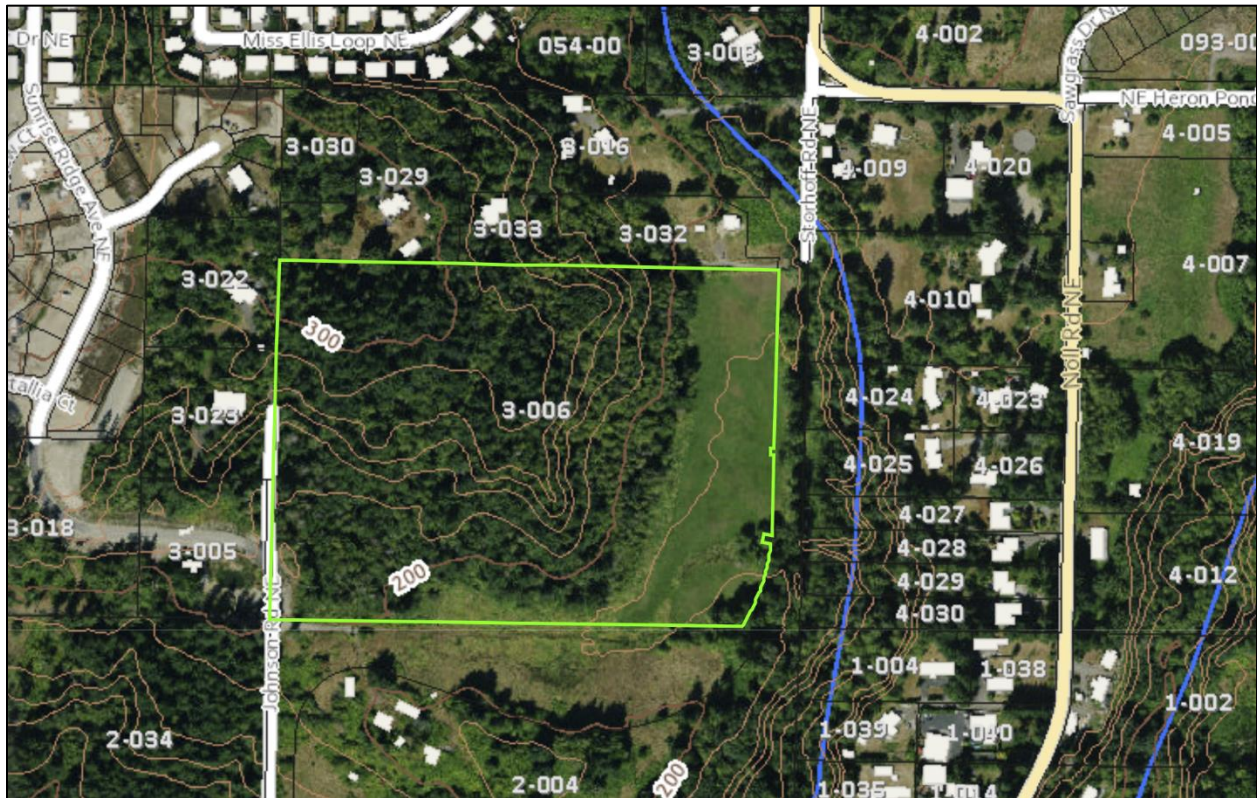
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<sup>7</sup> Core Design Sheets L2.01, L2.02, L2.31, 11/9/2023



## 9. MAPS AND FIGURES

Figure 4: Vicinity map with contours. Accessed from Kitsap County Parcel Search website.





6.3 Tree Plot Dataset<sup>8</sup>

Figure 5: Tree Survey Dataset Plots 1-3

Sample Tree	Plot	SPP	DBH	Health Class (Excellent=1, Good=2, Fair=3, Poor=4)	Running Sample Error (DBH)
1		1 BLM	17.1		2
2		1 WRC	15.5		2
3		1 RA	14.5		2 ✓
4		1 BLM	17.5		2 ✓
5		1 WRC	13.5		2 ✓
6		1 WRC	28.5		2 ✓
7		1 WRC	17		2 ✓
8		1 WRC	26		2 ✓
9		2 RA	9		2 ✓
10		2 RA	16.6		2 ✓
11		2 WRC	18.2		2 ✓
12		2 BLM	17.9		2 ✓
13		2 RA	12.3		2 ✓
14		2 BLM	15		2 ✓
15		2 RA	10.5		2 ✓
16		2 DF	11.1		2 ✓
17		3 DF	11.2		2 ✓
18		3 WRC	33.5		2 ✓
19		3 WRC	17.3		2 ✓
20		3 DF	33.5		2 ✓
21		3 WRC	15.7		2 ✓
22		3 DF	40		2 ✓
23		3 WRC	14		2 ✓
24		3 BLM	14.5		2 ✓
25		3 DF	29		2 ✓
26		3 RA	17		2 ✓
27		3 WRC	40		2 ✓
28		4 BLM	15.5		2 ✓

<sup>8</sup> For SPP (Species): BLM=Bigleaf maple, WR=Western redcedar, RA=Red alder, DF=Douglas-fir

11-08-2023

Kitsap County Parcel: 242601-3-006-2005

Tree Retention Plan



Figure 6: Tree Survey Dataset Plots 4-5

Sample Tree	Plot	SPP	DBH	Health Class (Excellent=1, Good=2, Fair=3, Poor=4, Dead=5)	Running Sample Error (DBH)
29	4	WRC	50		2 7.674991888
30	4	DF	27.2		2 7.388460109
31	4	DF	26		2 7.119477289
32	4	DF	30.5		2 6.895824822
33	4	DF	30.3		2 6.682587017
34	4	DF	27.2		2 6.464475433
35	4	DF	18		2 6.318615803
36	4	DF	14.2		3 6.247258034
37	4	DF	11		2 6.250802809
38	4	DF	37.4		3 6.187149606
39	4	DF	24.5		2 6.011778876
40	4	DF	12.2		2 5.990811301
41	4	DF	29.8		2 5.840724401
42	4	DF	14.5		2 5.779613458
43	5	WRC	20.5		2 5.648925155
44	5	WRC	19		2 5.536074939
45	5	WRC	33.6		2 5.444492635
46	5	RA	11.6		2 5.442146444
47	5	RA	14		2 5.397736173
48	5	RA	20		2 5.290743243
49	5	BLM	22		2 5.177637089
50	5	WRC	28		2 5.068059667
51	5	WRC	32		2 4.984308166
52	5	WRC	29.5		2 4.887825524
53	6	DF	26		2 4.786651249

11-08-2023

Kitsap County Parcel: 242601-3-006-2005

Tree Retention Plan



Figure 7: Tree Survey Dataset Plots 6-7

Sample Tree	Plot	SPP	DBH	Health Class (Excellent=1, Good=2, Fair=3, Poor=4, Dead=5)	Running Sample Error (DBH)
54	6	DF	12		2 4.785623999
55	6	WRC	50		2 4.975313707
56	6	WRC	14		2 4.947026131
57	6	WRC	35.5		2 4.887648895
58	6	RA	19		2 4.818598647
59	6	BLM	15		2 4.783168474
60	6	WRC	13		2 4.768170458
61	6	WRC	10.5		2 4.781561387
62	6	WRC	11.3		2 4.782864965
63	6	WRC	14		2 4.754284804
64	6	DF	37.8		2 4.725604255
65	6	WRC	15.6		2 4.685545988
66	6	WRC	37		2 4.649235211
67	6	DF	29.5		2 4.575719373
68	6	DF	20		3 4.514742758
69	6	DF	17.2		4 4.469715312
70	7	DF	26.3		2 4.399061717
71	7	DF	28.8		2 4.332825411
72	7	DF	19.6		2 4.280246065
73	7	DF	30		2 4.220232884
74	7	DF	19.3		2 4.171977307
75	7	BLM	16.4		2 4.139291696
76	7	DF	28.5		2 4.081210774
77	7	DF	21.2		2 4.029901771
78	7	DF	22		2 3.977837775

11-08-2023

Kitsap County Parcel: 242601-3-006-2005

Tree Retention Plan



Figure 8: Tree Survey Dataset Plots 8-9

Sample Tree	Plot	SPP	DBH	Health Class (Excellent=1, Good=2, Fair=3, Poor=4, Dead=5)	Running Sample Error (DBH)
79		7 DF	18		2 3.940664207
80		7 DF	20.8		2 3.893941106
81		7 DF	19		2 3.854232814
82		7 DF	11		2 3.862672712
83		7 DF	12.8		2 3.856525406
84		8 DF	15		2 3.836076316
85		8 BLM	34.5		2 3.807803183
86		8 DF	38.2		2 3.79881434
87		8 DF	22.5		2 3.753798615
88		8 DF	11.5		2 3.757480845
89		8 DF	21.7		2 3.715189344
90		8 DF	14.7		2 3.698976406
91		8 DF	16.5		2 3.674167037
92		8 DF	38.2		2 3.666869443
93		9 WRC	12.4		2 3.664186497
94		9 DF	39.3		2 3.661506493
95		9 RA	10.2		2 3.672691123
96		9 RA	11		2 3.677738435
97		9 RA	10.2		2 3.687175687
98		9 DF	27.7		2 3.646531405
99		9 DF	28.2		2 3.607208088
100		9 DF	41.4		2 3.615020577
101		9 DF	28		2 3.576335683
102		9 WRC	18		2 3.550311356



Figure 9: Tree Survey Dataset Plots 10-12

103	10 DF	29	2	3.7606
104	10 RA	21	3	3.739954
105	10 WRC	10	2	3.707245
106	10 WRC	13	2	3.682058
107	10 WRC	29	2	3.679959
108	10 RA	25	3	3.66634
109	10 BLM	65	4	3.641769
110	10 DF	28	2	3.628395
111	10 RA	14	2	3.625951
112	10 RA	12	2	3.606725
113	10 RA	13	2	3.577705
114	11 WRC	44	2	3.586253
115	11 RA	10	2	3.59377
116	11 RA	12	2	3.591548
117	11 WRC	26	2	3.557489
118	11 RA	16	2	3.540706
119	11 RA	19	4	3.516203
120	11 RA	20	3	3.490015
121	11 RA	20	3	3.464212
122	11 DF	17	2	3.445491
123	11 WH	11	2	3.447487
124	11 DF	25	2	3.416932
125	11 BLM	10	2	3.423028
126	11 RA	20	3	3.398388
127	11 BLM	11	3	3.399876
128	11 WRC	16	2	3.38433
129	12 RA	20	2	3.140025
130	12 BLM	16	2	3.114193
131	12 RA	22	4	3.126967
132	12 BLM	18	2	3.12487
133	12 RA	11	2	3.097166
134	12 RA	14	2	3.068607
135	12 RA	18	2	3.263269
136	12 RA	14	2	3.233335
137	12 RA	11	2	3.227228
138	12 RA	16	2	3.259404



6.4 Tree Plot Calculation Summary

Figure 10: Tree Sample summary.

Tree Count	Sum of DBH	Average of DBH
138	2930.7	21.2
Sqft per acre		43560
Sqft per Tree Plot		4356
Project Parcel Acreage		19.8
Project Parcel Sqft		862,488
Number of Plots		12
Total Sqft of all Tree Plots		52,272
Sampled Significant Trees		138
Significant Trees Extrapolated Across Site		2277
Retained Tree Acreage Total		3.88
Significant Trees Per Acre		115
Significant Trees in Retention Areas		446
25% of Significant Trees - Poulsbo Retention Requirement		569
<b>Calculated Number of Replacement Trees</b>		<b>123</b>

Note: Tree Retention Calculations in **Table 1** are rounded to up 125 replacement trees.





## 10. PHOTOS

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*Photo 1: Photo taken by Consultant. Typical forest composition with mature trees a good distance apart with native understory.*





*Photo 2: Panoramic photo from Site showing typical forest composition. Photo split into two for visual aid.*



LEFT SIDE



RIGHT SIDE



*Photo 3: Forest transition area from Douglas-fir dominated to red alder dominated.*





*Photo 4: Douglas-fir dominated in foreground with red alders in background.*





*Photo 5: Mostly larger trees with some smaller trees scattered throughout.*





*Photo 6: Large Pacific madrone and bigleaf maple.*





*Photo 7: Beginning of red alder dominated forest area.*





*Photo 8: Wetland area to east of property.*







*Photo 9: Photo taken from northeast corner overlooking wetland area and showing red alder forest in foreground with Douglas-fir dominated forest behind it.*





## 11. CLOSING

Work for this project was performed and this report prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. No warranty, expressed or implied, is made. Neither the Consultants, nor Peninsula Environmental Group, Inc., has any current or prospective interest in the plants or properties discussed. Acceptance of this report acknowledges receipt and agreement with Peninsula Environmental Groups, Inc. attached Assumptions & Limiting Conditions.

Thank you for the opportunity to evaluate your project. We appreciate your business and look forward to working with you in the future. If you have questions now, or in the future, do not hesitate to contact us.

A handwritten signature in black ink that reads "J Bornsworth".

John Bornsworth  
Board Certified Master Arborist #7955BM  
Registered Consulting Arborist #724  
Tree Risk Assessment Qualified  
WSDA Licensed Herbicide Operator



John Bornsworth is the owner and Principal at Peninsula Environmental Group, Inc., a Board-Certified Master Arborist, Registered Consulting Arborist, Municipal Arborist, Tree Risk Assessment Qualified, Tree and Plant Appraisal Qualified and Certified Wildfire Mitigation Specialist with over 20 years of urban and community forestry management experience. John specializes in urban & community forestry planning and policy; tree forensics, pathology, risk management, and providing expert witness testimony.



### 10.1 General Assumptions & Limitations

1. Any legal description provided to Consultant is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. Consultant assumes no responsibility for verification of ownership or locations of property lines, or for results of any actions or recommendations based on inaccurate information. It is assumed that any property is not in violation of any applicable codes, ordinances, statutes or other governmental regulations, unless explicitly stated otherwise.
2. Consultant assumes no responsibilities for legal matters in character. Consultant assumes all property appraised or evaluated is free and clear and is under responsible ownership and competent management.
3. Any evaluation or assessment carried out was restricted to the property and the plants or landscapes within the Scope of Assignment. No assessment of any other plants or landscapes has been undertaken by Consultant. The conclusions of this report do not apply to any zones, landscapes, trees, plants, or any other property not explicitly covered in the Scope of Assignment.
4. The total monetary amount of all claims or causes of action the Client may have as against Consultant, including but not limited to claims for negligence, negligent misrepresentation, and breach of contract, shall be strictly limited to solely the total amount of fees paid by the Client to Consultant pursuant to the Agreement for Services as dated for which this Assignment was carried out. Further, under no circumstance may any claims be initiated or commenced by the Client against Consultant, or any of its directors, officers, employees, contractors, agents, or Assessors, in contract or in tort, more than 12 months after the date of this Assignment.
5. Although Consultant has taken care to obtain all information from reliable sources and to verify the data insofar as possible, Consultant does not guarantee and is not responsible for the accuracy of information provided by others.
6. Consultant shall not be required to testify or attend court due to any report unless mutually satisfactory contractual arrangements are made, including payment of an additional fee for such Services as described in a Consulting Arborist Agreement.
7. Unless otherwise required by law, possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the parties to whom it is addressed, without the prior expressed written or verbal consent of the Consultant.
8. Neither all or any part of the contents of this report, nor copy thereof, shall be conveyed to anyone, including the client, to the public through advertising, public relations, news, sales or other media, without prior expressed written consent of Consultant. Particularly as to value conclusions, identify of Consultant, or any reference to any professional society or to any initialed designation conferred upon Consultant as stated in its qualifications.
9. This report and any values expressed herein represent the opinion of the Consultant, and the Consultant's fee is in no way contingent upon the reporting of a specific value, a stipulated result, the occurrence of a subsequent event or upon any finding to be reported.
10. All photographs included in this report were taken by Consultant during the documented site visit, unless otherwise noted.
11. Sketches, drawings and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys. The reproduction of any information generated by architects, engineers or other Consultants and any sketches, drawings or photographs is for the express purpose of coordination and ease of reference only. Inclusion of such information on any drawings or other documents does not constitute a representation by Consultant as to the sufficiency or accuracy of the information.
12. Unless otherwise agreed, (1) information contained in this report covers only the items examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, climbing, or coring. Consultant makes no warranty or guarantee, express or implied, that the problems or deficiencies of the plans or property in question may not arise in the future.
13. This report is based on the condition of the trees, landscape, or plants at the time of inspection.
14. Loss or alteration of any part of this report invalidates the entire report. This report is only valid if reproduced from a digital file.



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## APPENDIX A. TREE PROTECTION STANDARDS

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PROJECT NAME: AUDREY ESTATES

*Applicability: JWJ Group LLC, and all project prime and sub-contractors.*

*Property Parcel: 242601-3-006-2005*

### 1) Definitions

- a) Project Arborist – John Bornsworth with Peninsula Environmental.
- b) City Arborist – City of Poulsbo Arborist – Kevin McFarland, or other delegated staff.
- c) Project Manager – Debra Purcell with JWJ Group LLC, or other delegated staff.

### 2) Responsibilities

- a) These Tree Protection Specifications are applicable to all disturbance or activity within and near the Critical Root Zone of all retained trees on this project.
  - i) The Critical Root Zone (CRZ) is the area of soil around the tree where the majority of the roots are located. The roots within this area provide stability and are responsible for the uptake of water and nutrients to maintain tree health. Any level of compaction limits root growth due to lack of available oxygen.
  - ii) See attached Critical Root Zone Explanation for reference.
- b) These Guidelines shall apply to work near protected trees provided by all contractors and sub-contractors working on the Site.
- c) All Tree Protection Areas and Tree Protection Fencing (TPF) shall be clearly delineated on all site plans provided to the City of Poulsbo, contractors and subcontractors.
- d) Educate all applicable workers on site about tree protection techniques and these requirements during preconstruction meetings.
- e) Share these Tree Protection Standards by posting them in entirety on the jobsite.
- f) Project Arborist shall be contacted prior to any work requiring entrance to tree protection fencing. Two days' notice shall be provided to Project Arborist. A proposed method for work near any retained trees shall be provided. This method shall be reviewed by the Project Arborist and approved or commented on prior to commencing work with the TPF.
- g) Project Arborist should be notified within 8 hours should any (1) injury occurs to any protected trees and/or (2) roots greater than 2 inches are severed.



### 3) Limits of Disturbance

- a) No disturbance, clearing, grading filling, operating heavy-equipment, trenching or other earthwork activity shall occur without all plans submitted and approved by the presiding jurisdiction.
- b) No soil disturbance shall take place before required mitigating measures and Tree Protection Fences are installed and inspected by Project Arborist.

### 4) Tree Protection Fencing

- a) Tree Protection Fencing (TPF) shall be installed immediately after the clearing limits are delineated and flagged.
- b) TPF shall be installed along the clearing limits, around retained trees and groves of trees. The TPF is generally installed along the Critical Root Zone (CRZ) of a tree, which is generally 1 foot radius or every inch of tree diameter, i.e. a 12 inch diameter tree has a CRZ extending 12 feet from the trunk in all directions. See Critical Root Zone Explanation below.
- c) Once installed and inspected by Project Consultant, the TPZ shall not be moved without approval from Project Arborist.
- d) City Arborist may or may not require post installation inspection and approval.
- e) TPZ shall be constructed of at least 4-foot-tall chain link fence with cement footings at surface of grade. Do not auger and cement fence posts into ground.

### 5) Tree Protection Signs

- a) An 11-inch by 17-inch, laminated or otherwise plastic covered sign, shall be posted every 50 feet, or once every side if less than 50- feet, of Tree Protection Fencing. Sign must display the following information in bold writing:
  - i) "TREE PROTECTION FENCING"
  - ii) "Protect Tree, Limbs and Soil inside Tree Protection Fencing. No soil disturbance, mixing, parking, storage, dumping, or burning of materials is allowed within the Tree Protection Fence."
  - iii) Prime Contractor contact phone number.
  - iv) Project Arborist phone number.
  - v) City Arborist or delegate phone number.

### 6) Tree Protection Fencing and Critical Root Zone

- a) There may be scenarios where the CRZ of a retained tree is not entirely fenced with TPF. In these scenarios, a 6- to 10-inch layer of mulch shall be placed in the CRZ of retained trees, outside the protective fencing. Additional compression support can be provided through adding sheets of plywood atop the mulch.



## 7) Silt Fencing

- a) If a silt fence is required to be installed within a CRZ, the bottom flap of the silt fence shall not be buried in a trench but instead placed on the ground. The flap portion of the silt fence shall be covered with gravel or soil from outside the CRZ for anchorage.

## 8) Root Pruning

- a) Required work may result in the cutting of roots of retained trees. Cutting roots greater than 2 inches should be avoided. If this occurs, please consult with Project Arborist two days prior to cutting.
- b) Root pruning should be performed in a way to reduce root fracturing and tearing. Severed roots of retained trees that are over two inches in diameter, shall be cut off cleanly with a sharp reciprocating saw or pruning shears. Severed roots shall be covered immediately with moist soil.
- c) Equipment operators shall take extreme care to not grip and pull on the roots of retained trees, or any roots nearby retained trees.
- d) In all scenarios, equipment shall be placed outside the TPF and preferably outside the CRZ. When excavation is required in the CRZ, or placement of heavy equipment is over CRZ, contractor shall follow mitigation steps below.

## 9) Mitigation and Supplemental Irrigation

- a) If heavy equipment will be placed over the CRZ of a tree (outside the TPF), mulch and sheets of wood shall be placed over the CRZ to absorb and disperse weight.
  - i) Identify areas where heavy equipment will be placed over CRZ.
  - ii) Place 6 inches of clean woodchip mulch (not bark mulch) over that area of identified CRZ.
  - iii) Place 7/8" sheets of plywood, OSB or other similar wood product over the mulch.
  - iv) No equipment over 18,000 lbs shall be placed over the CRZ.
- b) After excavation is complete, remove sheets of wood and mulch.
- c) Retained trees may require supplemental irrigation. Specifications for supplemental irrigation will be provided for each tree damaged by compaction by Project Arborist. Generally, supplemental irrigation should be applied through less than 0.55 gallons per minute drip commercial grade drip irrigation, installed with 1 drip emitter every inch of tree diameter.



### 9.1 Critical Root Zone Explanation

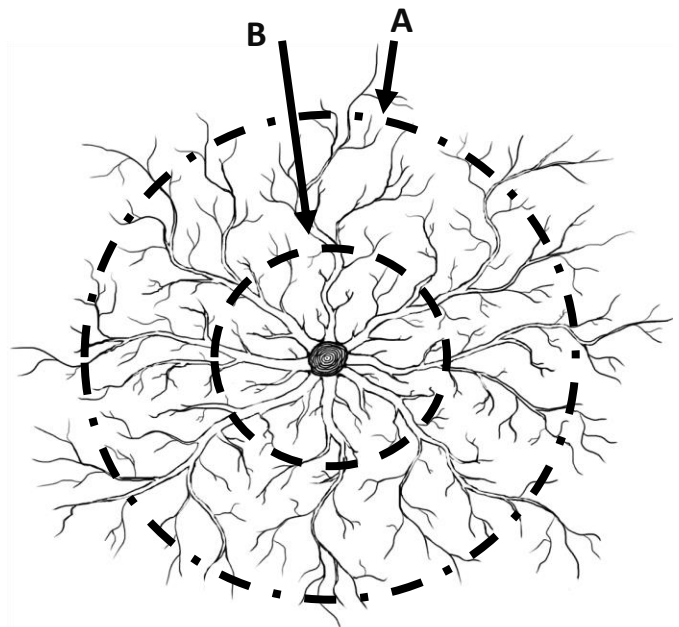
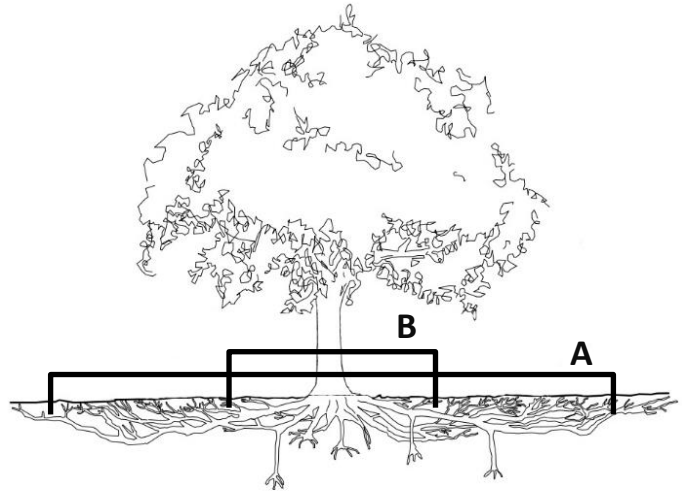
The Critical Root Zone (CRZ) of a tree is determined by the tree trunk DBH, tree species, and tree condition. Prescriptively and without advanced diagnostics, the CRZ is circular in shape around a tree trunk with a radius of one foot for every inch of tree diameter (**Label A**). Soil, hydrology, environmental conditions and tree species all influence a roots spread and depth. The outer perimeter of branches, often referred to as the *dripline*, does not correspond to tree root extent.

Protecting the CRZ from all soil, water and root disturbance often results in limited adverse impact to the protected tree. It should be noted that the CRZ is not the full extent of tree roots. Tree roots may extend much farther.

We can further differentiate the CRZ into an inner and outer perimeter. The inner perimeter can be referred to as a Structural Root Zone (SRZ; **Label B**). Generally speaking, the outer CRZ is made up of smaller, nutrient absorbing roots, the SRZ is made of larger, anchoring and structural roots. This SRZ radius is greater than the rootball size required to transplant subject tree. The first impact after severing roots inside the SRZ is tree stability. This normally requires extensive Post Care Treatment and stabilization with guy-wires and posts.

Incursion into the CRZ with any development activity, i.e. transit, storage, grading, filling, trenching, washing, burning, etc., should be restricted. When full-restriction of the CRZ is incompatible with development plans, incursion into the CRZ should be limited depending on trees species and tree condition.

Construction Mitigation includes such activities as; long periods of non-contact drip irrigation, hormonal root treatment to activate new growth, inoculating roots with mycorrhizae, mulching, and guy-wire stabilization. Multiple years of supplemental irrigation are normally required to retain large trees damaged by construction and development.





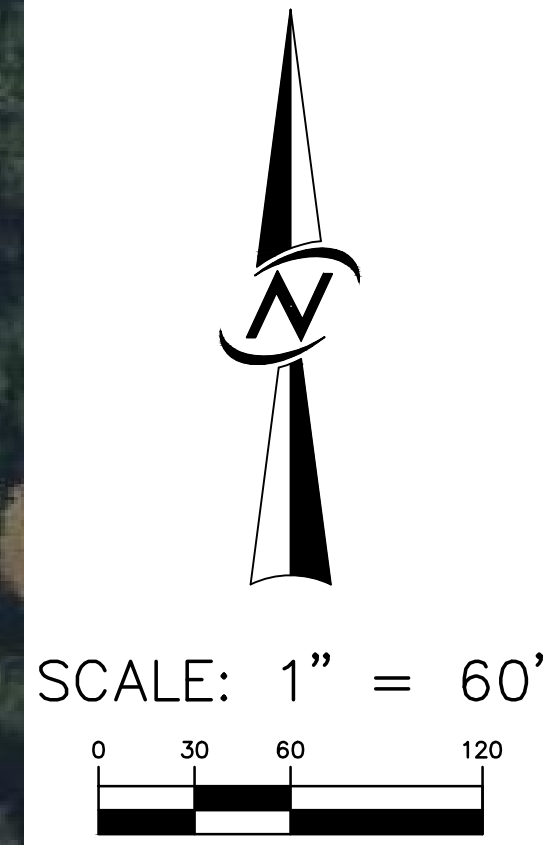
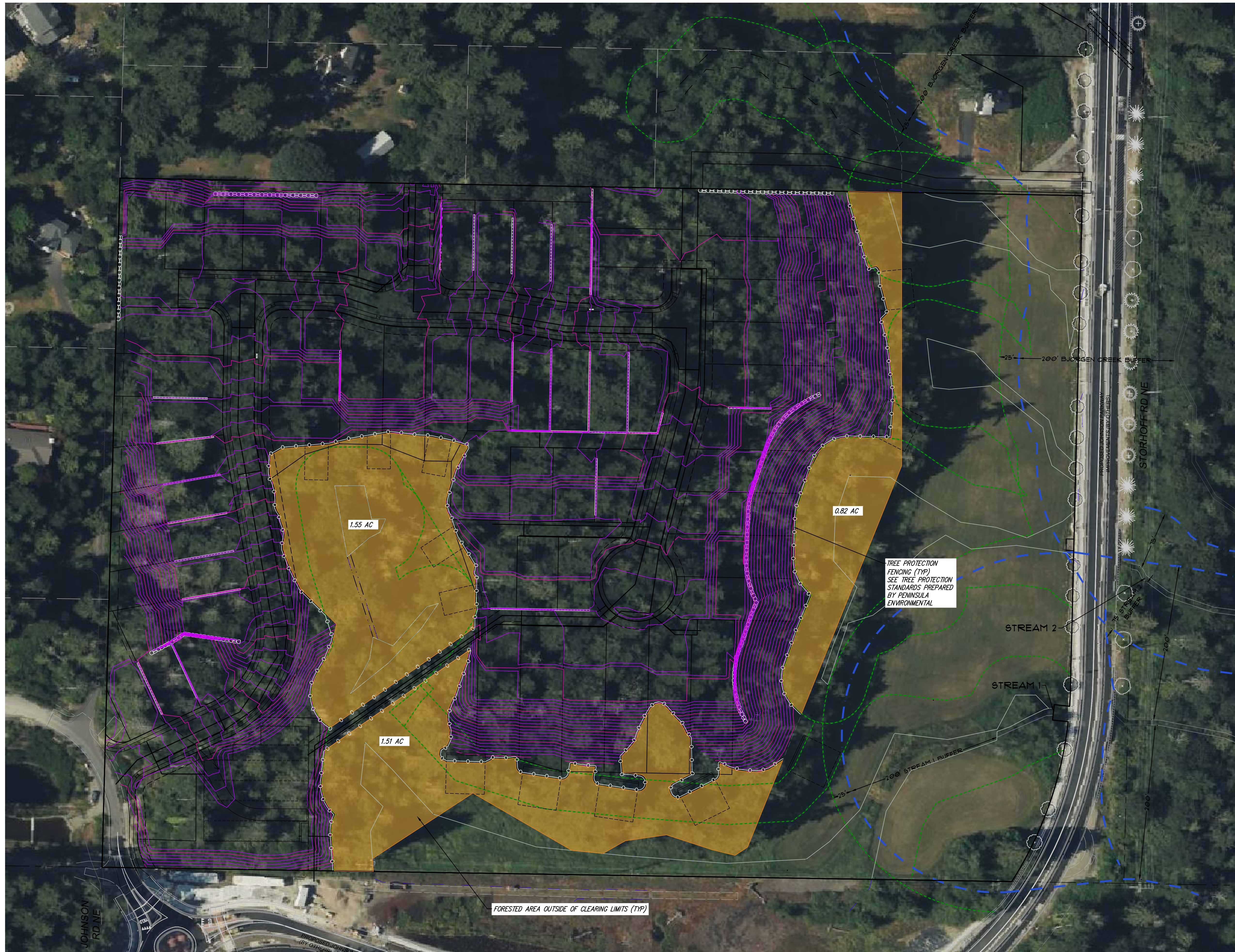
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## APPENDIX B: SITE PLAN WITH TREE RETENTION AREAS

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NO.	REVISIONS	DATE

CIVIL ENGINEERING  
LANDSCAPE ARCHITECTURE  
PLANNING  
SURVEYING

**CORE DESIGN**  
12100 NE 195th St, Suite 300, Bothell, Washington 98011, 425.885.7877

**TREE PROTECTION PLAN**  
**AUDREY ESTATES**  
**JWJ GROUP, LLC**  
3599 NW CARLTON ST, SUITE 201  
SILVERDALE, WA 98383

DATE	5/16/23
DESIGNED	KATIE E. LANE
DRAWN	MARY MOORE
APPROVED	HOLLI H. HEAVIN, PE
	HOLLI H. HEAVIN, PE
	PROJECT MANAGER

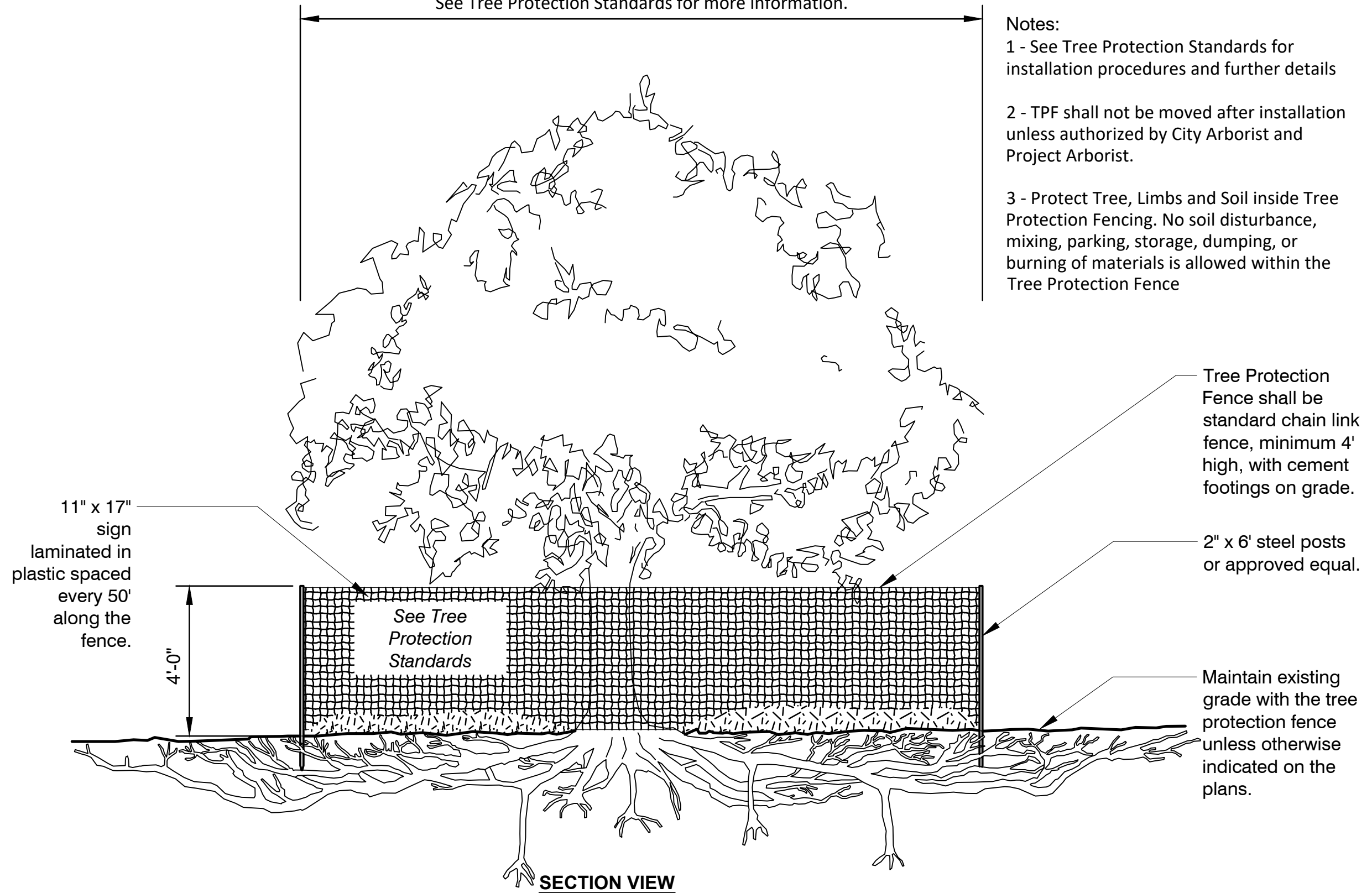
SHEET	OF
<b>1</b>	<b>1</b>
PROJECT NUMBER	
<b>21199</b>	

11/10/2023 7:42 AM v. 12021/21199 (C:\ENGINEERING\CHARTERS\21199 UNCLEARED FORESTING

Place Tree Protection Fencing at limits of disturbance, noted on Tree Protecting Fencing Plans.  
See Tree Protection Standards for more information.

**Notes:**

- 1 - See Tree Protection Standards for installation procedures and further details
- 2 - TPF shall not be moved after installation unless authorized by City Arborist and Project Arborist.
- 3 - Protect Tree, Limbs and Soil inside Tree Protection Fencing. No soil disturbance, mixing, parking, storage, dumping, or burning of materials is allowed within the Tree Protection Fence



11" x 17" sign laminated in plastic spaced every 50' along the fence.

4'-0"

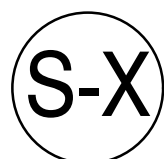
See Tree Protection Standards

**SECTION VIEW**

Tree Protection Fence shall be standard chain link fence, minimum 4' high, with cement footings on grade.

2" x 6' steel posts or approved equal.

Maintain existing grade with the tree protection fence unless otherwise indicated on the plans.



# TREE PROTECTION For Audrey Estates - City of Poulsbo



## APPENDIX C: SITE PLAN CORE DESIGN

---

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LANDSCAPE AREA CALCULATIONS

SEE SHEET L2.02 FOR FULL PLANTING SCHEDULE

GENERAL PLANTING AREA:	20,474 SF
LAWN AREA:	9,042 SF
NATIVE PLANTING AREA:	5,604 SF
R.O.W. PLANTING AREA:	14,058 SF
FORESTED PLANTING AREA:	28,189 SF
<b>TOTAL LANDSCAPE AREA:</b>	<b>77,367 SF</b>

REPLACEMENT TREE CALCULATIONS

SEE SHEET L2.02 FOR SPECIES AND INSTALLATION SIZES

REQUIRED REPLACEMENT TREES:	125 TREES*
PROVIDED REPLACEMENT TREES:	125 TREES
SITKA SPRUCE	14 TREES
VINE MAPLE	16 TREES
PACIFIC DOGWOOD	12 TREES
DOUGLAS FIR	46 TREES
CASCARA	12 TREES
WESTERN RED CEDAR	25 TREES

\* SEE ARBORIST REPORT FOR DETAILS.  
\*\* REPLACEMENT TREES DISPLAYED IN COLOR ON PLANS.

NO.	REVISIONS PER CITY COMMENTS	DATE
1	REVISED PER CITY COMMENTS	6/9/23
2	REVISED PER CITY COMMENTS	11/9/23



CIVIL ENGINEERING  
LANDSCAPE ARCHITECTURE  
PLANNING  
SURVEYING

**CORE DESIGN**

12100 NE 195th St, Suite 300, Bothell, Washington 98011 425-865-7877

COMPOSITE LANDSCAPE PLAN  
AUDREY ESTATES  
A PRELIMINARY PLAT

DATE	SEE STAMP DATE
DESIGNED	SHAHILA L. BOWEN
DRAWN	JOSIAH M. PEARSON
APPROVED	LINDSEY B. SOLORIO, P.L.A.
	HOLI H. HEAVRIN, PE
	PROJECT MANAGER

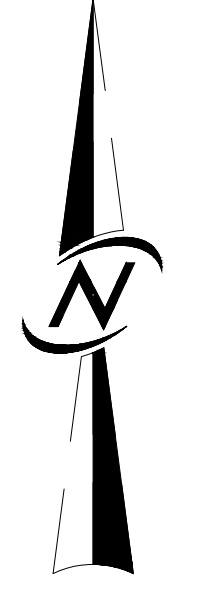
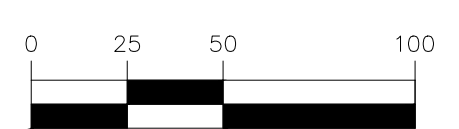


SEE SHEET L2.02

COMPOSITE LANDSCAPE PLAN

SCALE: 1" = 50'-0"

SCALE: 1" = 50'



SHEET	OF
<b>L2.01</b>	<b>30</b>
PROJECT NUMBER	<b>21199</b>



OPEN SPACE ENLARGEMENT

SCALE: 1" = 20'-0"

FORESTED AREA PLANT SCHEDULE - 28,189 SF

NATIVE TREES	BOTANICAL NAME	COMMON NAME	SIZE
	ACER MACROPHYLLUM	BIG LEAF MAPLE	2" CAL. MIN.
	ARBUTUS MENZIESII	PACIFIC MADRONE	2" CAL. MIN.
	PINUS CONTORTA	SHORE PINE	6" HT. MIN.
GROUNDCOVERS	BOTANICAL NAME	COMMON NAME	
	CORNUS SERICEA	RED TWIG DOGWOOD	
	HOLIDISCUS DISCOLOR	OCEAN-SPRAY	
	MAHONIA AQUIFOLIUM	OREGON GRAPE	
	POLYSTICHUM MUNIUM	WESTERN SWORD FERN	
	RIBES SANGUINEUM	RED FLOWERING CURRANT	
	ARCTOSTAPHYLOS UVA-URSI	KINNIKINNICK	
	FRAGARIA CHILOENSIS	BEACH STRAWBERRY	

EVERGREEN ONLY PLANT SCHEDULE - 10,244 SF

TREES	BOTANICAL NAME	COMMON NAME	SIZE	SHRUBS	BOTANICAL NAME	COMMON NAME
	PICEA SITCHENSIS	SITKA SPRUCE	5-6" HT. MIN.		LONICERA NITIDA	BOX LEAF HONEYSUCKLE
	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	5-6" HT. MIN.		NANDINA DOMESTICA 'SIENNA SUNRISE'	HEAVENLY BAMBOO
	THUJA PLICATA	WESTERN RED CEDAR	5-6" HT. MIN.		OSMANTHUS HETEROPHYLLUS 'GOSHIKI'	GOSHIKI HOLLY OLIVE
	ABELIA X GRANDIFLORA	GLOSSY ABELIA			PIERIS JAPONICA 'CAVATINE'	LILY OF THE VALLEY BUSH
	BUXUS SEMPERVIRENS 'SUFFRUTICOSA'	TRUE DWARF BOXWOOD			PRUNUS LAUROCERASUS 'OTTO LUYKEN'	LUYKENS LAUREL
	CALLUNA VULGARIS	HEATHER			SARCOCOCCA RUSCIFOLIA	FRAGRANT SARCOCOCCA
	LEUCOTHOE FONTANESIANA 'RAINBOW'	RAINBOW LEUCOTHOE			VIBURNUM DAVIDII	DAVID VIBURNUM
					VIBURNUM X BODNANTENSE 'PINK DAWN'	VIBURNUM
					GAULTHERIA SHALLON	SALAL

NATIVE PLANTING SCHEDULE - 5,604 SF

TREES	BOTANICAL NAME	COMMON NAME	SIZE	SHRUBS	BOTANICAL NAME	COMMON NAME
	ACER CIRCINATUM	VINE MAPLE	5-6" HT. MIN.		POLYSTICHUM MUNIUM	WESTERN SWORD FERN
	RHAMNUS PURSHIANA	CASCARA	2" CAL. MIN.		RIBES SANGUINEUM	RED FLOWERING CURRANT
	THUJA PLICATA	WESTERN RED CEDAR	5-6" HT. MIN.		ROSA NUTKANA	NOOTKA ROSE
	MAHONIA NERVOSA	OREGON GRAPE			SPIRAEA DOUGLASSII	WESTERN SPIREA
	MYRICA CALIFORNICA	PACIFIC WAX MYRTLE			SYMPHORICARPOS ALBUS	COMMON WHITE SNOWBERRY
	PHILADELPHUS LEWISII	WILD MOCKORANGE			VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY
	PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK			GAULTHERIA SHALLON	SALAL

GENERAL PLANTING SCHEDULE - 20,474 SF

TREES	BOTANICAL NAME	COMMON NAME	SIZE	SHRUBS	BOTANICAL NAME	COMMON NAME
	ACER CIRCINATUM	VINE MAPLE	5-6" HT. MIN.		LAVANDULA ANGUSTIFOLIA 'HIDCOTE'	HIDCOTE LAVENDER
	CORNUS NUTTALLII	PACIFIC DOGWOOD	2" CAL. MIN.		PHILADELPHUS X 'BELLE ETOILE'	MOCK ORANGE
	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	5-6" HT. MIN.		RHODODENDRON X PJM	PJM RHODODENDRON
	THUJA PLICATA	WESTERN RED CEDAR	5-6" HT. MIN.		ROSA RUGOSA	RUGOSA ROSE
	ABELIA X EDWARD GOUCHER	PINK ABELIA			SPIRAEA X BUMALDA 'GOLDFLAME'	GOLDFLAME SPIREA
	BERBERIS THUNBERGII 'CRIRUZAM'	CRIMSON RUBY JAPANESE			ASTER SUBSPICATUS OR SYMPHYOTRICHUM SUBSPICATUM	DOUGLAS ASTER
	CORNUS STOLONIFERA 'KELSEY'	KELSEY DOGWOOD			CAMPANULA ROTUNDIFOLIA	COMMON HAREBELL
	FORSYTHIA X INTERMEDIA 'FIESTA'	FIESTA FORSYTHIA			ERIOPHYLLUM LANATUM	OREGON SUNSHINE
	HAKONECHLOA MACRA 'BENI-KAZE'	GREEN FOREST GRASS			CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS
	HEMEROCALLIS X 'STELLA DE ORO'	STELLA DE ORO DAYLILY			DESCHAMPSIA CESPIIOSA	TUFTED HAIR GRASS
	ILEX CRENATA 'GREEN ISLAND'	GREEN ISLAND JAPANESE			LIRIOPE MUSCARI	LILY TURF

R.O.W. PLANT SCHEDULE - 14,058 SF

STREET TREES		BOTANICAL NAME	COMMON NAME	SIZE	SPACING
	24	ACER HENRYI	HENRY'S MAPLE	1.5" CAL. MIN.	30' O.C. OR AS SHOWN
	3	CARPINUS BETULUS 'FASTIGIATA'	PYRAMIDAL EUROPEAN HORNBEAN	1.5" CAL. MIN.	40' O.C. OR AS SHOWN
	10	FAGUS SYLVATICA 'FASTIGIATA'	EUROPEAN BEECH	1.5" CAL. MIN.	30' O.C. OR AS SHOWN
	14	MALUS TRANSITORIA	TSCHONOSKII CRABAPPLE	1.5" CAL. MIN.	30' O.C. OR AS SHOWN
	8	OSTRYA VIRGINIANA	AMERICAN HOPHORNBEAM	1.5" CAL. MIN.	30' O.C. OR AS SHOWN
	20	STYRAX OBASSIA	FRAGRANT SNOWBELL	1.5" CAL. MIN.	30' O.C. OR AS SHOWN
GROUNDCOVERS		BOTANICAL NAME	COMMON NAME		
		HELICOTRICHON SEMPERVIRENS	BLUE OAT GRASS		
		MISCANTHUS SINENSIS 'ADAGIO'	ADAGIO EULALIA GRASS		
		COTONEASTER DAMMERI 'CORAL BEAUTY'	BEARBERRY COTONEASTER		

\* REPLACEMENT TREES ARE DISPLAYED IN COLOR ON PLANS.

DATE: 6/9/23  
 DESIGNED: SHAHILA L. BOWEN  
 DRAWN: JOSIAH M. PEARSON  
 APPROVED: LINDSEY B. SOLORIO, P.L.A.  
 HOLLI H. HEAVRIN, PE  
 PROJECT MANAGER

REVISIONS:  
 1 REVISED PER CITY COMMENTS  
 2 REVISED PER CITY COMMENTS

NO. 1

STATE OF WASHINGTON  
 LAND SURVEYING  
 LICENSE NO. 12183  
 EXPIRES ON 11/15/24  
 CORE LANDSCAPE ARCHITECTURE

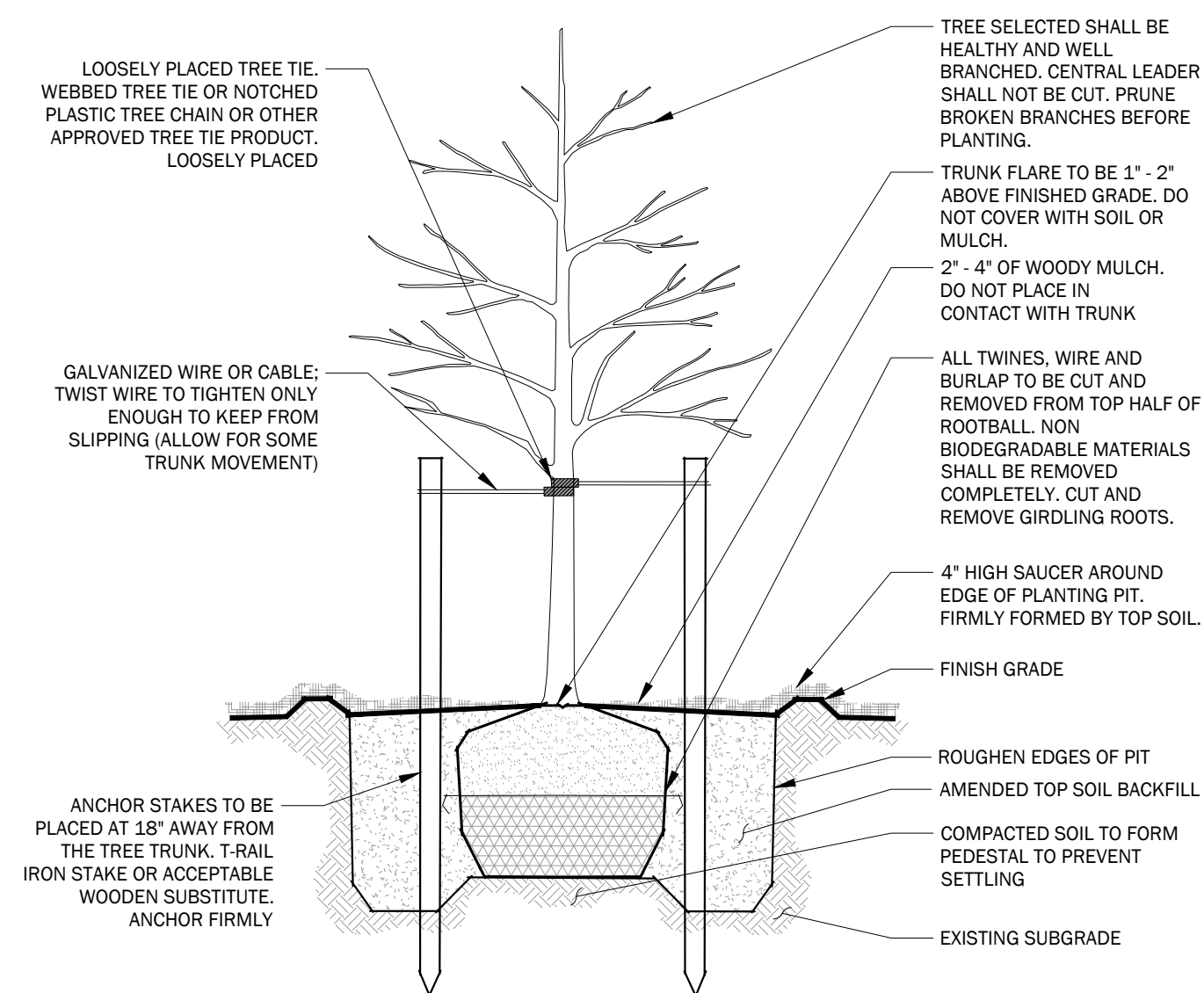
CIVIL ENGINEERING  
 LANDSCAPE ARCHITECTURE  
 PLANNING  
 SURVEYING

CORE DESIGN  
 12100 NE 195th St., Suite 300, Bothell, Washington 98011 425.885.7877

OPEN SPACE ENLARGEMENT & PLANT SCHEDULE  
 AUDREY ESTATES  
 A PRELIMINARY PLAN

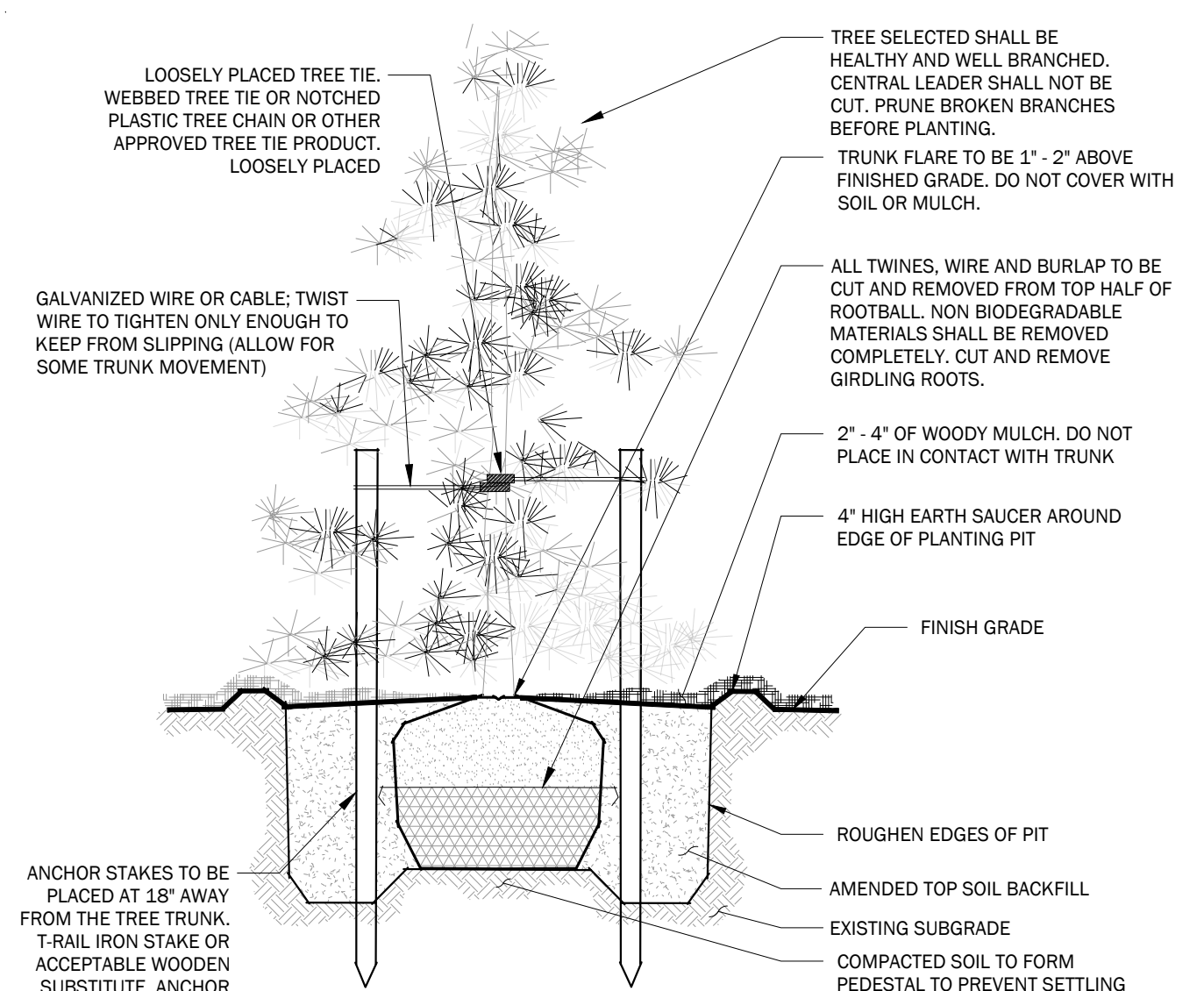
SHEET 30 OF 30  
 PROJECT NUMBER 21199

11/13/2023 9:24 AM \\A:\2021\21199\LANDSCAPE\PRELIMINARY SHEETS\21199\_L2\_01.DWG



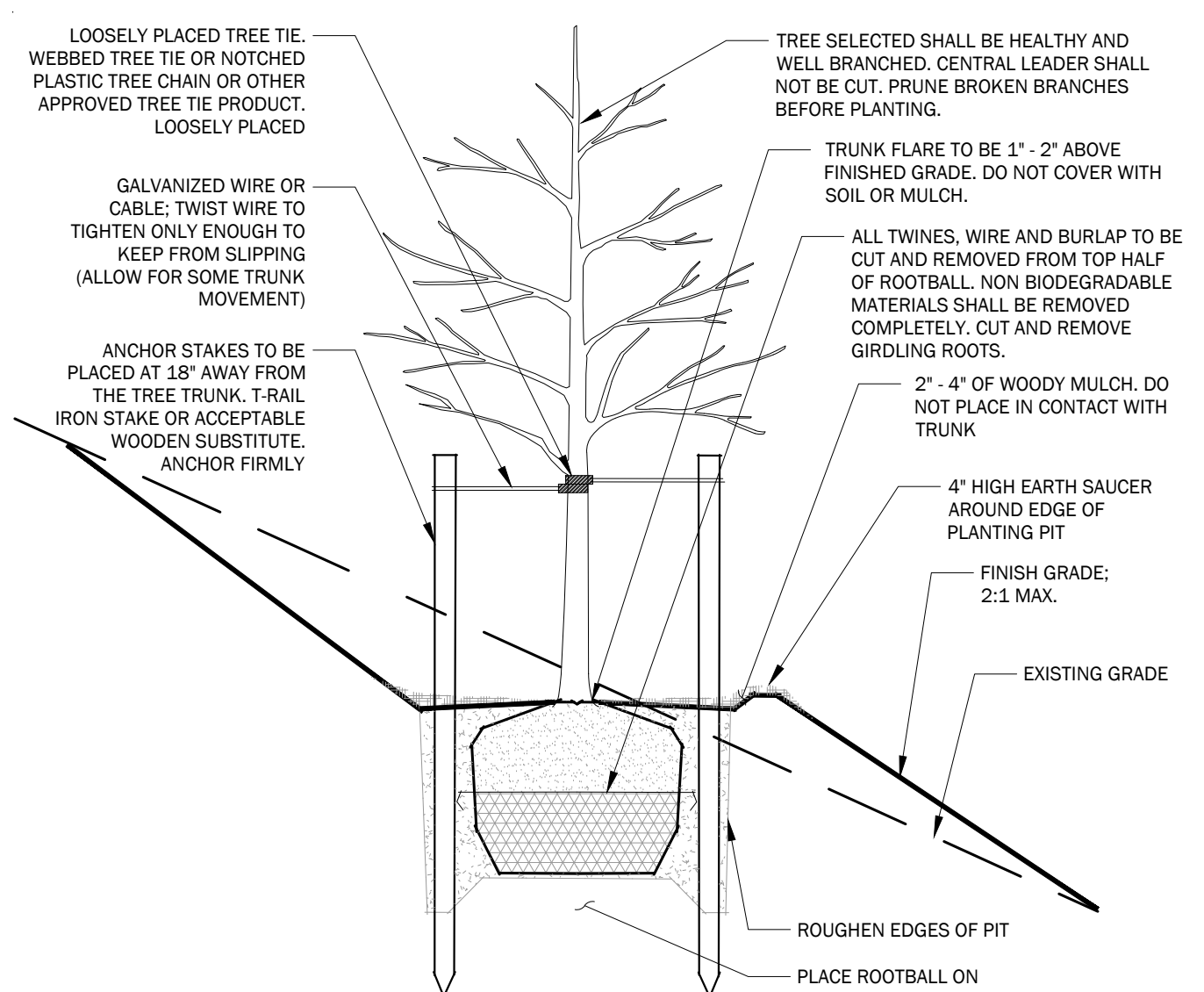
PLANTING DECIDUOUS TREE

NOT TO SCALE



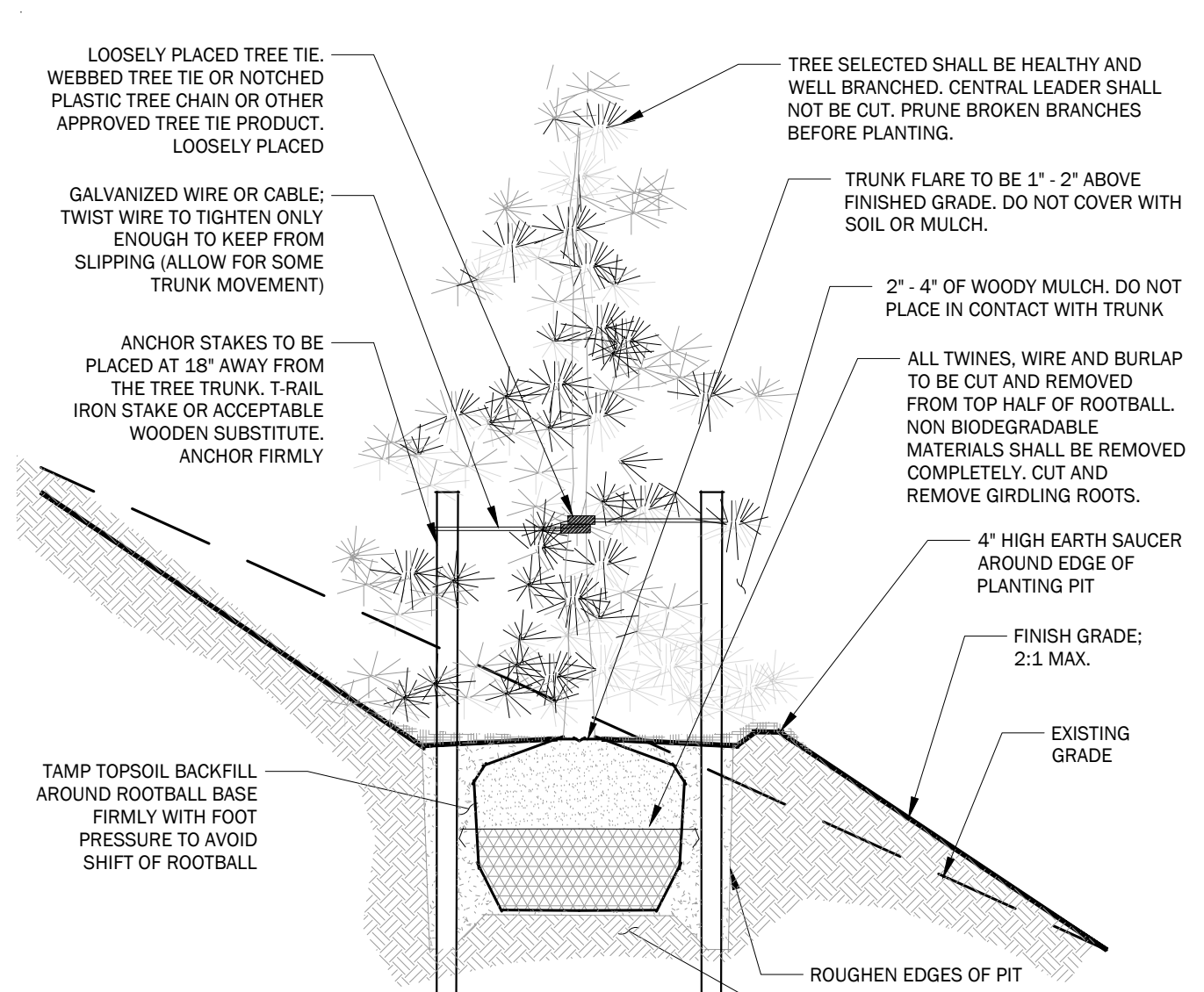
PLANTING CONIFER TREE

NOT TO SCALE



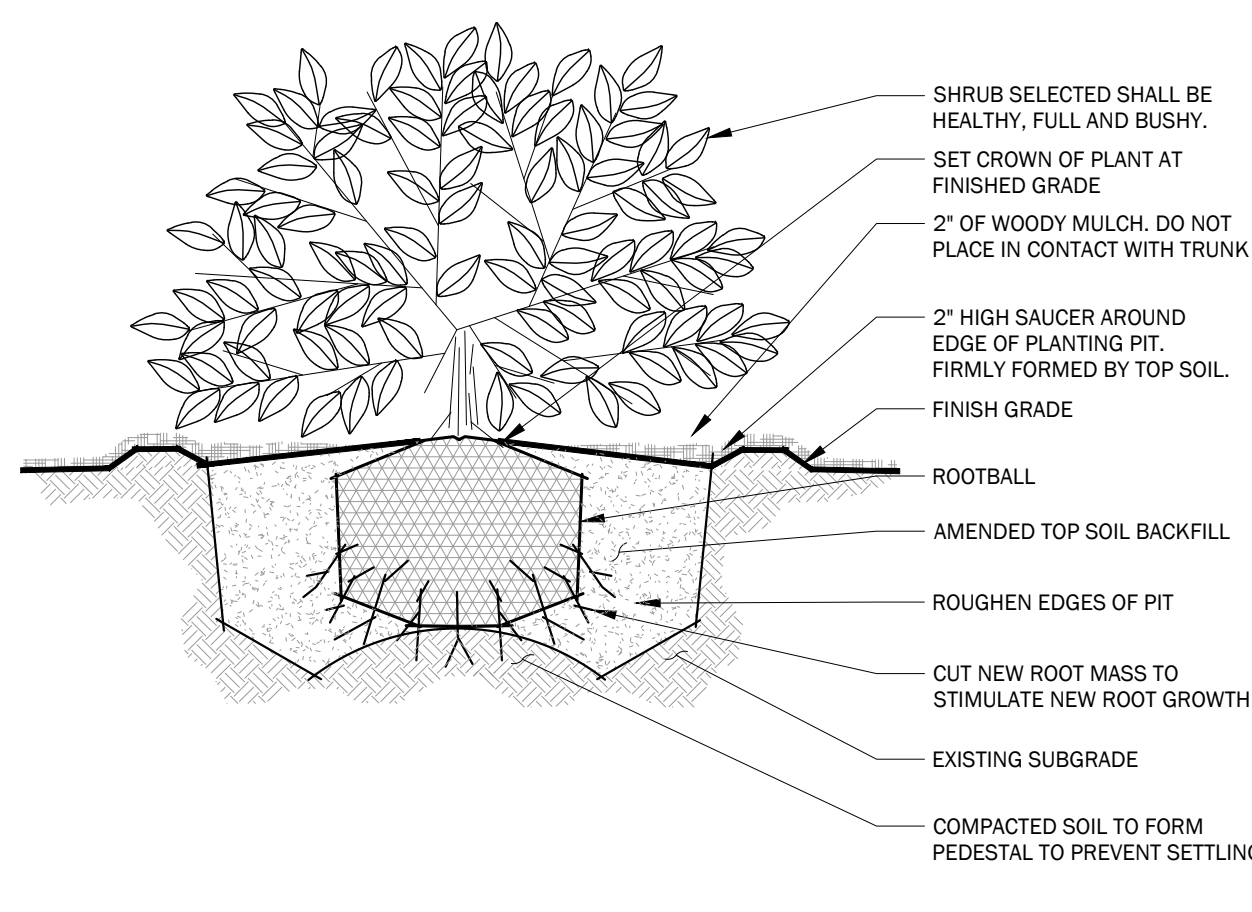
PLANTING DECIDUOUS TREE ON SLOPE

NOT TO SCALE



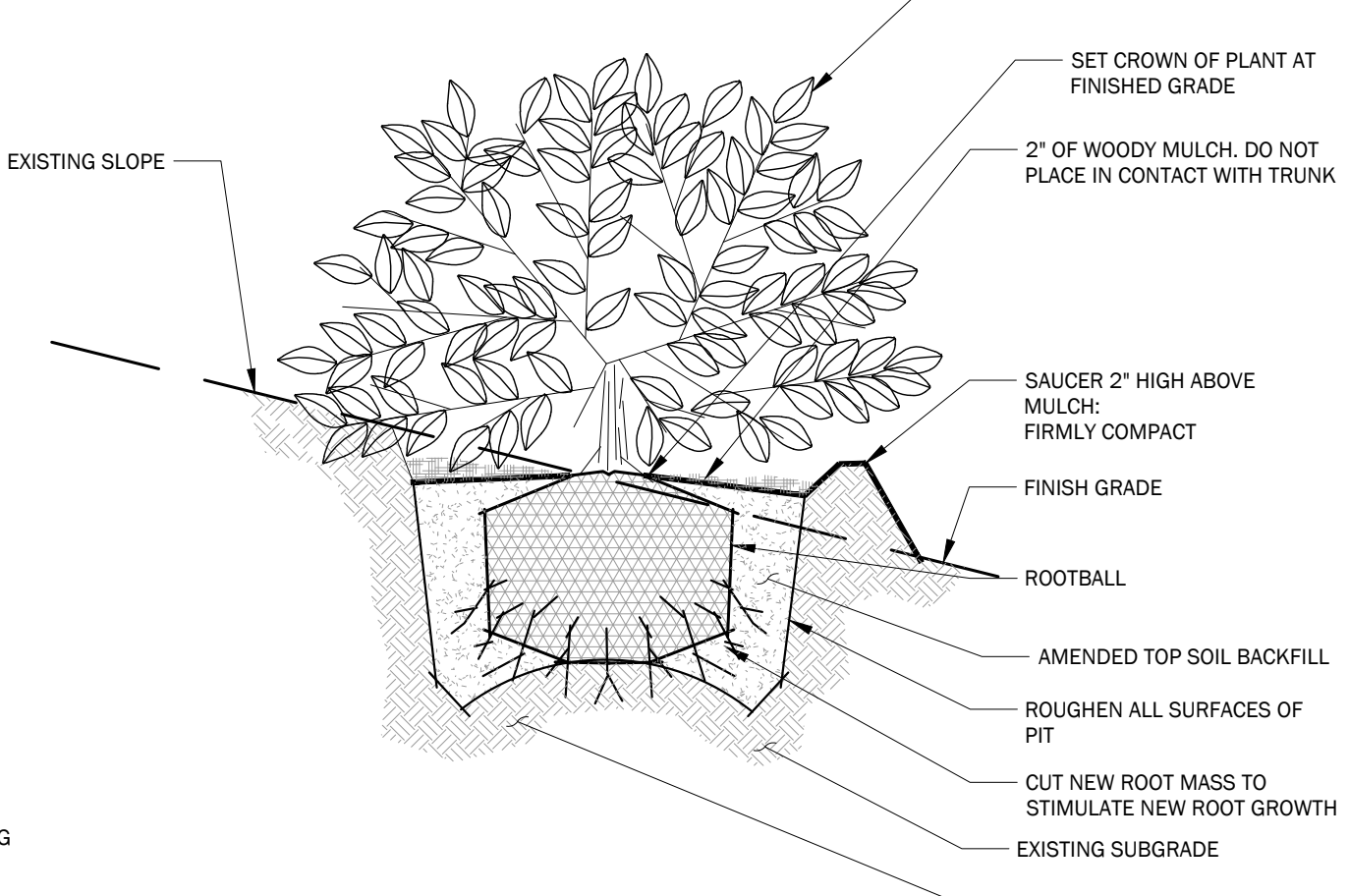
PLANTING CONIFER TREE ON SLOPE

NOT TO SCALE



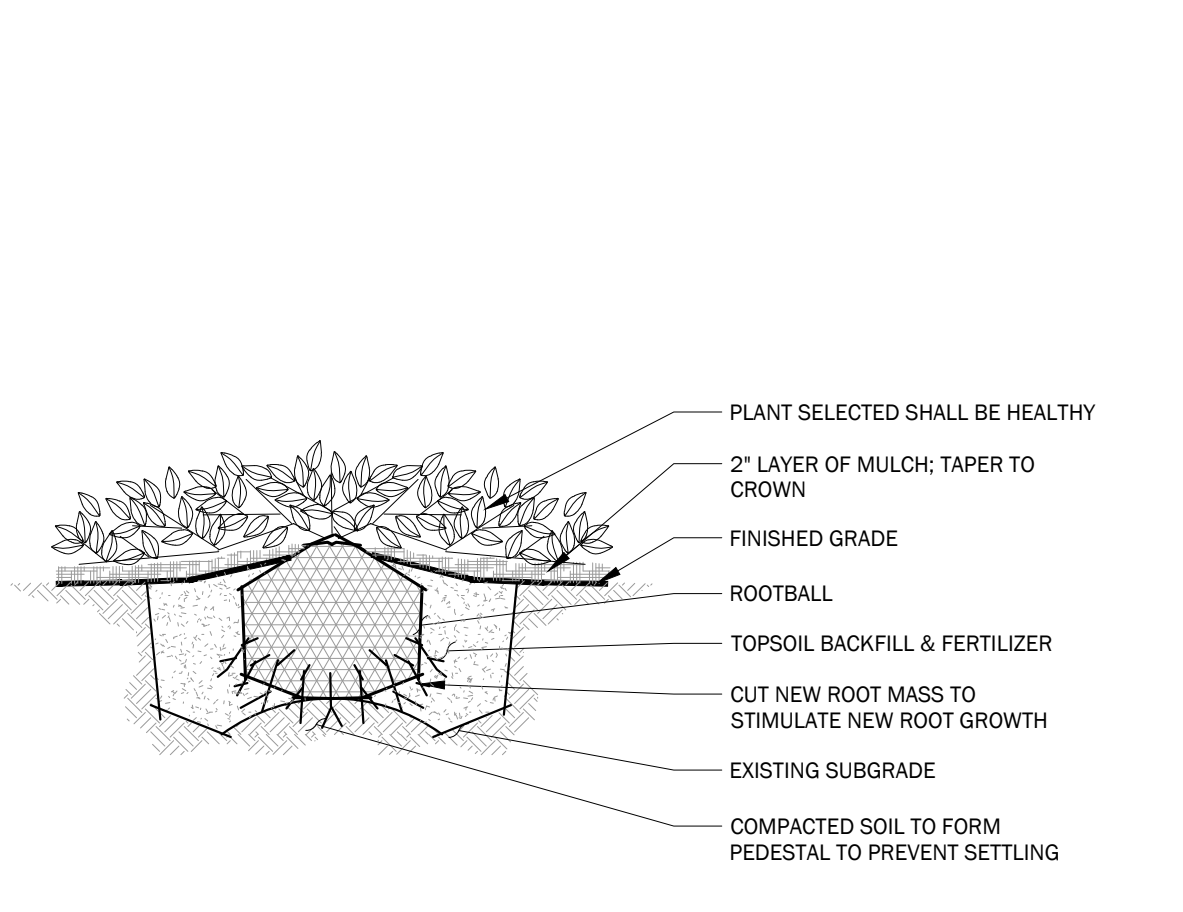
PLANTING SHRUB

NOT TO SCALE



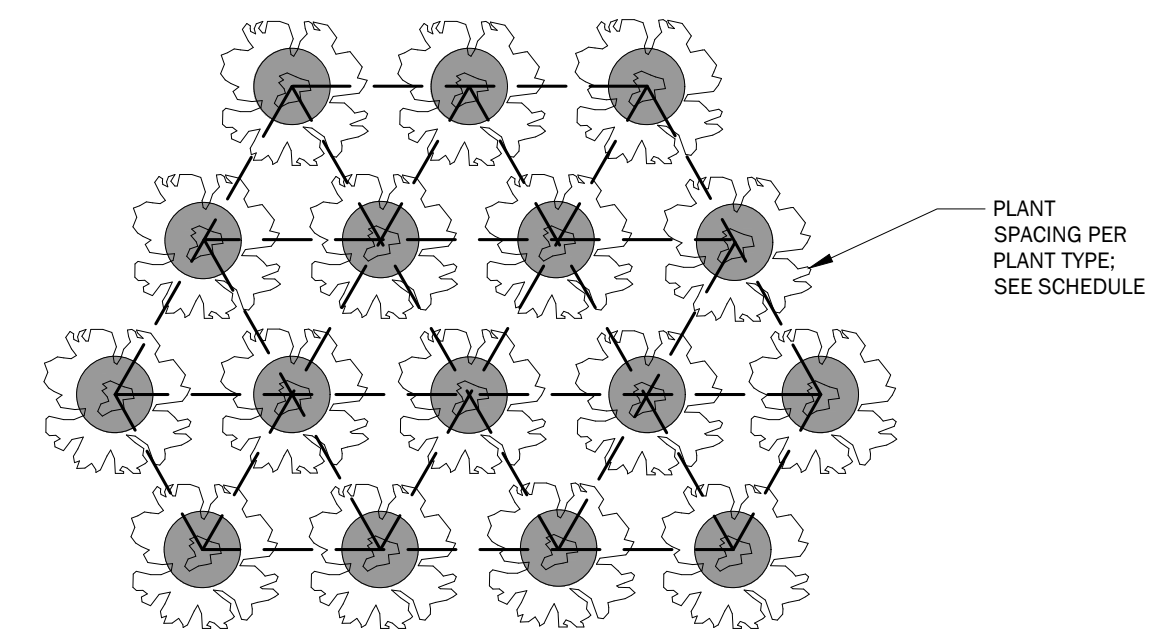
PLANTING SHRUB ON SLOPE

NOT TO SCALE



PLANTING GROUNDCOVER

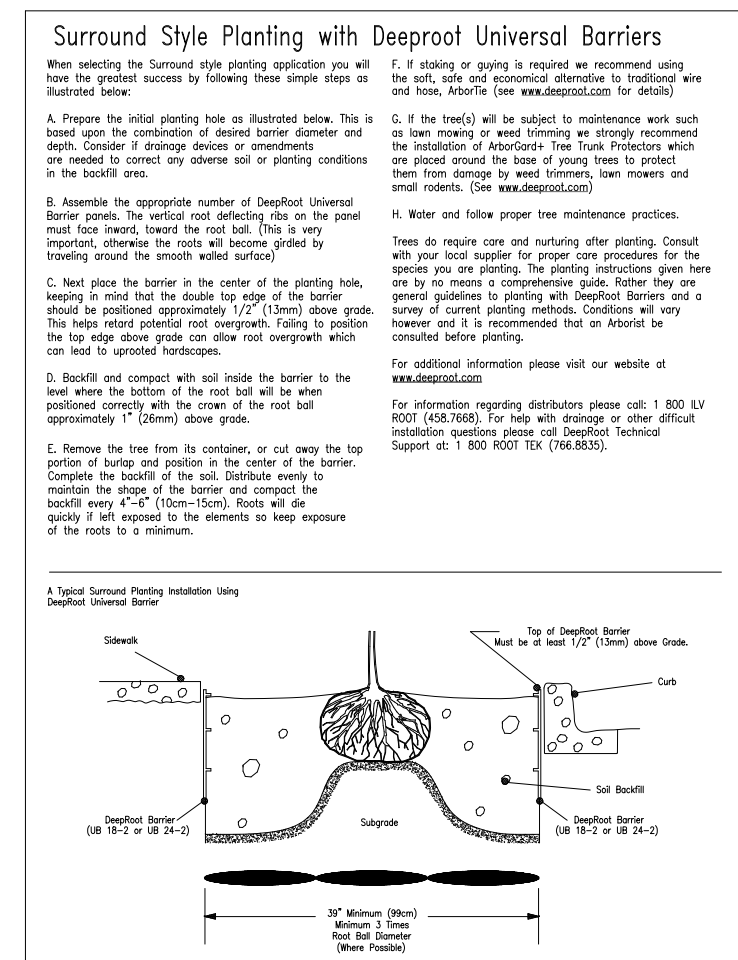
NOT TO SCALE



PLANT SPACING

NOT TO SCALE

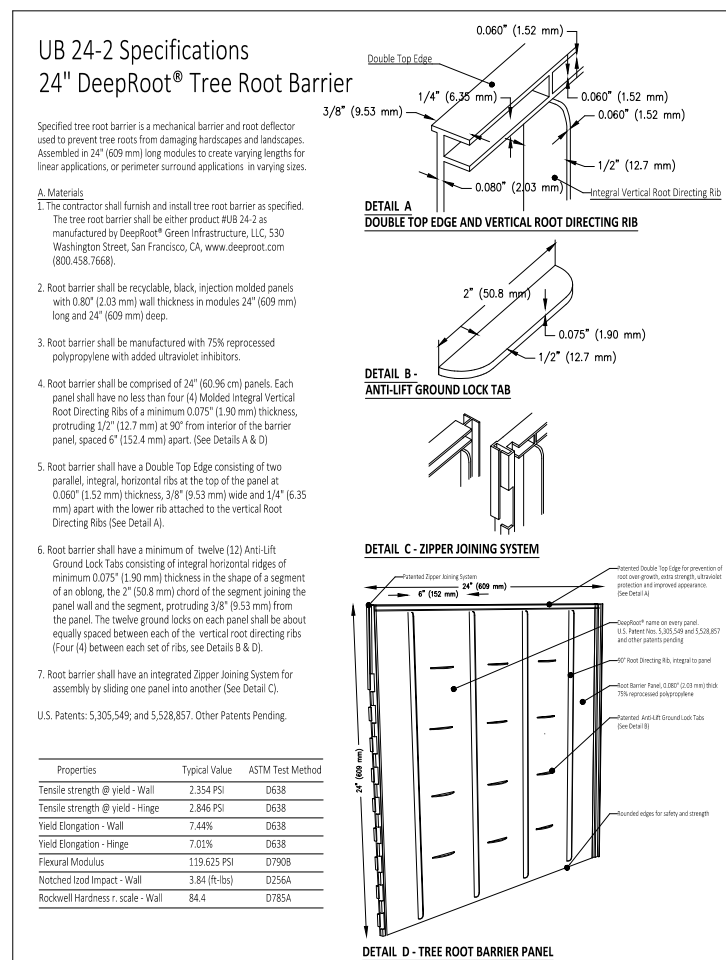
NOTE:  
TO AVOID LANDSCAPE INTRUSION INTO PATHS, THE FOLLOWING PLANTING SPACING OFF-SETS FROM EDGE OF ALL PATHS, DRIVES, ACCESS ROUTES, ETC. SHALL BE MET:  
GROUND COVER: 18"  
SMALL SHRUBS (UNDER 3' TALL): 30"  
MEDIUM SHRUBS (FROM 3' TALL TO 6'): 42"  
LARGE SHRUBS (OVER 6' TALL): 48"



ROOT BARRIER (DEEPROOT UNIVERSAL BARRIER OR SIMILAR)

NOT TO SCALE

SOURCE: DEEPROOT



DATE	6/9/23
DESIGNED	SHAHILA L. BOWEN
DRAWN	JOSHUA M. PEARSON
APPROVED	LINDSEY B. SOLORIO, P.L.A.
PROJECT MANAGER	HOLLI H. HEAVRIN, PE

NO.	1	REVISIONS PER CITY COMMENTS
NO.	2	REVISIONS PER CITY COMMENTS

STATE OF WASHINGTON  
LANDSCAPE ARCHITECT  
LINDSEY B. SOLORIO, P.L.A.  
12100 NE 195th St., Suite 300, Bothell, Washington 98011 425.855.7877

CIVIL ENGINEERING  
LANDSCAPE ARCHITECTURE  
PLANNING  
SURVEYING  
DESIGN

**CORE DESIGN**

LANDSCAPE DETAILS  
AUDREY ESTATES

**A PRELIMINARY PLAT**

DATE	SEE STAMP DATE
SHEET	OF
<b>12.31</b>	<b>30</b>
PROJECT NUMBER	
<b>21199</b>	

2. SUF

April 2024 Audrey Estates Tree Retention and Landscape Plan Review,

April 1, 2024

## Memo

**To:** Edie Berghoff, City of Poulsbo Associate Planner  
**From:** Kevin M. McFarland, City of Poulsbo Contracted Arborist  
**Date:** 4/11/2024  
**Re:** April 2024 Audrey Estates Tree Retention and Landscape Plan Review

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Upon the request of the City of Poulsbo, I have reviewed the re-submitted materials pertaining to the proposed Audrey Estates residential project. This memo presents my findings and comments associated with my most recent comments dated 7/14/2023, communications with the applicant team since then and my original review from 12/28/22.

### Tree Retention and Protection

- Proposed Tree Retention: Areas 2 & 3 were visibly staked and I was able to review the trees proposed for retention. They are in fair to good condition and meet the City's standards.
- Tree Protection: This still has not been properly addressed. There is no mention of tree protection measures along the trails or edge trees on the grading or landscape plans. The Tree Protection Plan does not address the request for tree protection fencing around trees to be retained or for those on adjacent properties. Fencing is not shown and/or specified within the legend in the Civil Plans nor the Grading/Construction Notes. This all needs to be addressed, in particular that fencing needs to be installed and inspected prior to any grading. A fencing detail shall be included as well.
- Dispersion Trenches: Approximately eleven of the proposed dispersion trenches may have an impact on the trees within the buffers. Conflicts with the critical root zones is anticipated. I am requesting that their installation be supervised by the project arborist so that protection measures can be put in place and damage limited. This should be a line item within the Dispersion Trench Notes on Sheets C4.01 & C4.02.
- MSE Wall/RSS Fill Slope: There is concern that the proposed slope and wall will not provide the necessary rooting volume for the replanting to take place at the upper level. The details and Geotech report indicate that there will be cuts/slices in the upper level and 18" of amended soil added but this is not conducive for proper rooting, particularly for the species of trees specified. The applicant will need to submit more information as to how this will provide the rooting needed for these trees to survive long-term before I can approve this replanting.



## **Landscape Plans**

- Trails: There are no trails or information about the construction and tree protection associated with these trails shown on the landscape plans. This needs to be included.
- Callery Pears: The 14 Callery pears have been substituted with Tschnoskii crabapples, this is an acceptable replacement.

If you should have questions, please feel free to contact me at 360-870-2511 or [suf1234@comcast.net](mailto:suf1234@comcast.net)

3. GR3

Geotechnical Letter (reviewing tree retention on created slopes),

April 19, 2024



# GEORESOURCES

earth science & geotechnical engineering

4809 Pacific Hwy. E. | Fife, Washington 98424 | 253.896.1011 | www.georesources.rocks

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April 18, 2024

The JWJ Group, LLC  
3599 NW Carlton Street  
Silverdale, Washington 98383  
(360) 626-1146

Attn: Debra Purcell  
Project Manager  
JWJ Group, LLC

Geotechnical Letter  
Audrey Estates Preliminary Plat  
xxx – Johnson Parkway  
Poulsbo, Washington  
PN: 242601-3-006-2005  
Doc ID: JWJGroup.AudreyEstates.Landscaping.L

## INTRODUCTION

This *Geotechnical Letter* addresses planting verbal comments from the City of Poulsbo that was provided to us from Berni Kenworthy of Axis Land Consulting on April 4, 2024. The verbal comments stated: “The city would like confirmation that the proposed plant types, sizes, and spacing recommended by the landscape architect conform with the geotech recommendations.” In addition, the [City] wants confirmation that only top layers of geogrid are proposed for cutting (i.e., planting requirements don’t require puncturing beyond the top layers), that the grid is permeable (i.e., trees won’t dry out), and that roots can penetrate to whatever depth needed for the trees to be stable (i.e., the grid doesn’t present a barrier to growth).”

In our *Geotechnical Engineering Report* revised November 13, 2023 for the Audrey Estates Preliminary Plat, we recommended an open mesh uniaxial geogrid for slope reinforcement. The uniaxial open mesh design allows for the passing of soil through the grid; therefore, we are not concerned with the permeability of the geogrid. Furthermore, uniaxial geogrids are typically resistant to installation damage and chemical or biological long-term degradation. Open mesh geogrid reinforcement can allow for roots to grow through the grid and further “knit” the system together (Elias et. al., March 2001). Another option is geocomposites, which are a geosynthetic product consisting of a combination of two or more geosynthetic materials like geotextiles, geogrids, geonets, and/or geomembranes. Geocomposites provide both reinforcement and lateral drainage, which enhances the healthy development of woody vegetation (Elias et. al., March 2001).

We reviewed the Landscaping Plans (sheets L2.01, L2.02, and L2.31) revised by Core Design on February 13, 2024. We offer the following comments based on our review of the prepared Landscaping Plans:

- Sheet L2.01: For plantings on the reinforced soils slopes (RSS) proposed on the east and south side of the proposed plat, the landscaping plan shows trees (Sitka Spruce) being planted on the slope east of Lots 27 to 31; trees and shrubs (Sitka Spruce, Douglas Fir, and Western Red Cedar) being planted on the slope east of Lot 36; and trees and shrubs (Sitka Spruce, Douglas Fir, and Western Red Cedar) being planted on the slope west of

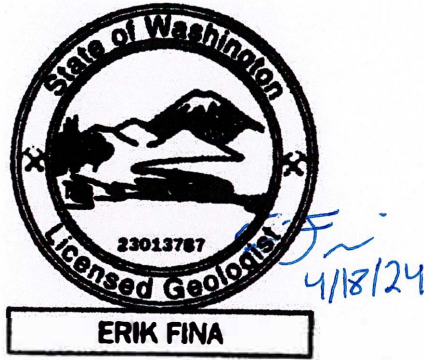
- Lot 41. A “General Note” on this sheet states that only two layers of geosynthetic grid be cut to facilitate planting of the trees and planting along the RSS slopes be staggered on altering contours to limit excess cutting of the primary and secondary geogrid reinforcement. The plan also shows various trees and shrubs being planted on the cut slopes in Tract A, Tract H, and Tract I. These cut slopes will not have geogrid reinforcing.
- Sheet L2.02: This sheet shows an enlargement of the Tract A planting and has planting schedules for Evergreens, Native Plants, General Plantings, and ROW Plants. The plant schedule details list minimum tree size for planting to have a minimum height of 5-6 feet. While not listed on the schedules, the typical depth of pots or rootballs for this size planting will typically be between 2 and 3 feet. Geogrid spacing is proposed as 3 vertical feet for primary and secondary geogrid. The spacing between the primary and secondary is proposed as 1.5 vertical feet. We do not anticipate the geogrid beyond the one layer of secondary and one layer of primary geogrid will need to be cut to allow for planting of the pots or rootballs.

In our November 13, 2023 revised *Geotechnical Engineering Report* we recommended that “only the top layers of geogrid may be cut to allow planting of tree balls.” This comment can be revised to include the one layer of the primary and one layer of secondary geogrid reinforcement for the RSS design, equal to the two layers of geogrid. Based on our review of the preliminary landscape sheets in the *Audrey Estates A Preliminary Plat* plan set by Core Design, it is our opinion the recommendations in our *Geotechnical Engineering Report* for the Audrey Estates plat dated November 13, 2023 and this comment response letter have been incorporated into the revised February 13, 2024 Core Design preliminary landscape plans.



We appreciated working for you on this project. Please do not hesitate to call at your earliest convenience if you have any questions or comments.

Respectfully submitted,  
GeoResources, LLC



Erik J. Fina, LG  
Project Geologist



Eric W. Heller, PE, LG  
Senior Geotechnical Engineer

EJF:EWH/kss/ejf  
Doc ID: JWJGroup.AudreyEstates.Landscaping.PRL  
Attachments: none

## REFERENCES

We referenced the following manual as a guide for addressing comments for soil bioengineering on a reinforced soil slope.

- Victor Elias, P.E.; Barry R. Christopher, Ph.D, P.E.; and Ryan R. Berg, P.E. Ryan r. Berg & Associates, Inc. (March 2001). *Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines*. National Highway Institute Federal Highway Administration U. S. Department of Transportation. FHWA-NHI-00-043.

4. GR4

Plan Review Letter (reviewing tree retention on created slopes),

November 13, 2023



November 13, 2023

The JWJ Group, LLC  
3599 NW Carlton Street  
Silverdale, Washington 98383  
(360) 626-1146

Attn: Debra Purcell  
Project Manager  
JWJ Group, LLC

Plan Review Letter  
Proposed Audrey Estates Residential Plat  
xxx – Johnson Parkway  
Poulsbo, Washington  
PN: 242601-3-006-2005  
Doc ID: JWJGroup.NoIRdE.PRL

## INTRODUCTION

This *Plan Review Letter* provides a summary of our review of plans prepared to date for the proposed Audrey Estates Residential Plat in Poulsbo, Washington. The most recent revision to our *Updated Geotechnical Engineering Report* was prepared on November 13, 2023. We reviewed the civil plan set and landscaping plan set for the proposed development that includes information relevant to geotechnical aspects of the project.

- *Civil Engineering Plan Set, Audrey Estates, A Preliminary Plan Set, Poulsbo, Washington* prepared by Core Design on November 9, 2023.
- *Landscaping Plan Set, Audrey Estates, Poulsbo, Washington* prepared by Core Design on November 9, 2023.

The landscaping plans should incorporate the planting recommendations presented in the “Biotechnical Stabilization Recommendations” section of our November 13, 2023 *Updated Geotechnical Engineering Report* specifically regarding planting on Reinforced Soil Slopes.

Other than the planting guidelines, the preliminary plan sets appear to satisfactorily incorporate our geotechnical recommendations in the design. In our opinion, no revisions or updates to our original report and subsequent addendum report is required.

## LIMITATIONS

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this letter or our previous documents may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.



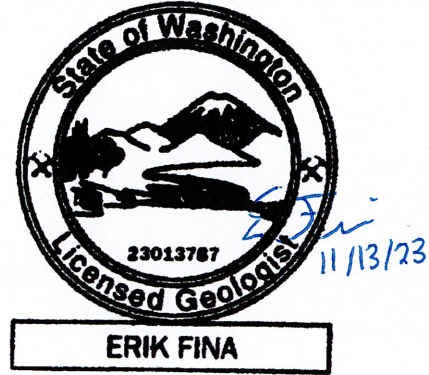


We appreciated working for you on this project. Please do not hesitate to call at your earliest convenience if you have any questions or comments.

Respectfully submitted,  
GeoResources, LLC



Eric W. Heller, PE, LG  
Senior Geotechnical Engineer



Erik J. Fina, LG  
Project Geologist