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FORESTRY AND VEGETATION MANAGEMENT SPECIALISTS



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- Preliminary Tree Protection Plan-

YORKSHIRE PROJECT

Tumwater Blvd. SW
Tumwater, Washington

Prepared for: Glenn Wells Architects

Prepared by: Washington Forestry Consultants, Inc.

Date: December 1, 2022

The project proponent is proposing to construct a 1,150-unit multi-family complex on three parcels totaling 25.52 acres between Tumwater Blvd. SW and Israel Road SW in Tumwater, WA. Washington Forestry Consultants, Inc. was retained to examine the trees on these proposed new project parcels.

Scope of Work

The purpose of the evaluation was to:

1. Complete an inventory of existing trees, and
2. Make recommendations for retention and/or replacement as per Chapter 16.08.070, the Tumwater Tree Protection Ordinance.
3. Prepare a tree protection plan.

Methodology

WFCI has inventoried all trees 6-inches and larger diameter at breast height (DBH) in the proposed project area using standard forestry sampling methodology. Nineteen variable area plots were installed on a systematic grid across the site. The plot locations are marked in the field with pink and black striped flagging. Data from the counts of significant trees were entered into SuperAce[®], a forest inventory software program that projected the total number of significant trees in the buildable area of the project. This plot data will be used to determine the tree retention requirement. Sampling was designed to, and achieved a 95% confidence level for the projection of the population of significant trees.

The tree evaluation phase used methodology developed by Matheny and Clark (1998)¹ and the International Society of Arboriculture.

Soils and Site Description

The project includes parcels: 12704431300 (8.43-acres), 12704440103 (16.18-acres), and 12704440100 (0.91-acres) located in Sec. 4, T17N, R2W, W.M., City of Tumwater, Thurston County, Washington.

The topography of the project site is flat to gently rolling. It is bordered by Israel Road SW and an undeveloped lot to the north, an undeveloped lot to the east, Tumwater Blvd. SW to the south, and an apartment complex, four undeveloped lots, and a veterinary clinic to the west. There are no improvements on the site.

According to the Natural Resource Conservation Service there are two soil types on the parcels; the Cagey loamy sand, and the Nisqually loamy fine sand.

The first soil type is the Cagey loamy sand, a very deep, moderately well drained soil found on terraces. It formed in sandy glacial drift. Permeability is rapid. Available water capacity is moderate. The effective rooting depth for trees is 60 inches or more. A seasonal high-water table is at a depth on 18 to 30 inches from November to April. Runoff is slow and the hazard of erosion is slight. Windthrow hazard is slight under normal conditions. This is the dominant soil type on the site.

The second soil type is the Nisqually loamy fine sand, a very deep, somewhat excessively drained soil found on terraces. It is formed in sandy glacial outwash. Permeability is moderately rapid in the surface layer and very rapid in the substratum. Available water capacity is moderate. The effective rooting depth for trees is 60 inches or more. The potential for windthrow of trees is slight under normal conditions. New trees require irrigation for establishment.

¹ Nelda Metheny and James R. Clark. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. International Society of Arboriculture, Champaign, IL.

Figure 1: Yorkshire Project soil map.



20 – Cagey loamy sand
73 – Nisqually loamy fine sand

Existing Trees

There are four distinct forest cover types on the site.

Type I. – Type I (8.59-acres) is a well-stocked stand of bigleaf maple (*Acer macrophyllum*), black cottonwood (*Populus trichocarpa*), Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), red alder (*Alnus rubra*), western redcedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*). The diameter of the trees in the stand range in size from 6 to 48 inches DBH. There were few trees in the small diameter classes, most trees were larger than 20 inches DBH. The stand was thinned in the early 2000's. A summary of tree species, diameter range, trees per acre, number of trees and the percent composition of each species are provided in Table 1. The condition of the trees ranges from 'Very Poor' to 'Good'. There are many quality trees in this type to retain.



Photo 1: Typical trees in Cover Type I.

Table 1. -- Inventory summary for forest cover Type I.

Species	DBH Range	Trees/Acre	# of Trees	% Composition
Bigleaf Maple	6 – 38	30	258	37%
Cottonwood	22 – 36	2	17	2%
Douglas-fir	21 – 40	12	103	15%
Grand Fir	25 – 32	2	17	2%
Red Alder	15 – 18	7	60	9%
Western Redcedar	13 – 48	27	232	33%
Western Hemlock	26	1	9	2%
Total	6 – 48	81	696	100%

The understory of this type includes salal (*Gaultheria shallon*), western hazel (*Corylus cornuta*), Oregon grape (*Mahonia nervosa*), sword fern (*Polystichum munitum*), other broadleaf weeds, and grasses.

Type II. – Type II (8.59-acres) is a very poorly stocked stand of bigleaf maple, Douglas-fir, western redcedar, and western hemlock. The area was previously cleared of most trees. The type was not replanted after it was harvested. A summary of tree species, diameter range, trees per acre, number of trees and the percent composition of each species are provided in Table 2. The condition of the trees ranges from ‘Very Poor’ to ‘Good’. Only the conifer trees in this type would be suitable for retention.



Photo 2: Typical appearance Cover Type II.

Table 2. -- Inventory summary for forest cover Type II.

Species	DBH Range	Trees/Acre	# of Trees	% Composition
Bigleaf Maple	28	1	9	10%
Douglas-fir	22 – 35	5	43	50%
Western Redcedar	25 – 40	2	17	20%
Western Hemlock	18	2	17	20%
Total	18 – 40	10	86	100%

The understory of the type includes salmon berry (*Rubus spectabilis*), bitter cherry (*Prunus emarginata*), western hazelnut, Scotch broom (*Cytisus scoparius*), trailing blackberry (*Rubus ursinus*), Himalayan blackberry (*Rubus armeniacus*), broadleaf weeds and grasses.

Type III. – Type III (3.49-acres) is a moderately stocked stand of lodgepole pine (*Pinus contorta*), bigleaf maple, black cottonwood, noble fir (*Abies procera*), red alder, and western redcedar. The type was also thinned in the early 2000’s. The main part of the stand is lodgepole pine with the secondary species growing on the perimeter. A summary of tree species, diameter range, trees per acre, number of trees and the percent composition of each species are provided in Table 3. The condition of the trees ranges was ‘Very Poor to ‘Good’. The conifer in this type would be suitable for retention.



Photo 3: Typical appearance of trees in Cover Type III.

Table 3. -- Inventory summary for forest cover Type I.

Species	DBH Range	Trees/Acre	# of Trees	% Composition
Bigleaf Maple	18	4	14	8%
Cottonwood	18 – 22	17	59	36%
Lodgepole Pine	15 – 22	21	73	44%
Noble Fir	32	1	3	2%
Red Alder	26	2	7	4%
Western Redcedar	34 – 52	3	10	6%
Total	18 - 52	48	166	100%

The understory of the type includes trailing blackberry, Himalayan blackberry, salmon berry, western hazelnut, broadleaf weeds and grasses.

Type IV. – Type IV (4.86-acres) is a moderately stocked stand of bigleaf maple, western redcedar and Douglas-fir. The diameters of trees in the stand range in size from 10 to 52 inches DBH. A summary of tree species, diameter range, trees per acre, number of trees and the percent composition of each species are provided in Table 4. The condition of the trees ranges from ‘Poor’ to ‘Good’. There are some quality trees in this type to retain.



Photo 4: Typical appearance of trees in Cover Type IV.

Table 4. -- Inventory summary for forest cover Type IV.

Species	DBH Range	Trees/Acre	# of Trees	% Composition
Bigleaf Maple	14 – 38	20	97	36%
Douglas-fir	24 – 34	4	19	7%
Western Redcedar	10 – 52	31	151	57%
Total	10 – 52	55	267	100%

The understory of the type includes salmon berry western hazelnut, Scotch broom (*Cytisus scoparius*), trailing blackberry, Himalayan blackberry, broadleaf weeds and grasses.

Historic Trees. -- No Historic Trees occur on the site.

Specimen Trees. – No trees were considered to be specimen trees.

Off-Site Trees. -- Tree removal on this parcel will increase wind exposure to off-site trees on the undeveloped parcels to the east of the site.

Tree Protection Areas

The City of Tumwater requires 5% of the total buildable area of the site to be set aside as tree protection area. The site plan provided, with a 5-lane option on Tyee Drive, shows tree protection in three ‘Tree Tact Open Space’ areas totaling 1.09 acres in the southwest and southeast corners of the site.

Minimum Stocking Calculation

The City of Tumwater Tree and Vegetation Protection Ordinance requires that 20% of the existing trees (or 12 trees per acre, whichever is larger) be saved on site.

The following is a summary of the proposed tree retention:

Total Project Acreage:	25.52 acres
Total # of trees on the Project	1,215 trees
Required Retention (12 Trees/acre) *	306 trees
Required Retention (20%): **	243 trees
Site Area	25.52 acres
Rights-of-way Dedication	3.82 acres
Buildable Area	21.70 acres
Required Tree Tract Acreage (5% of buildable area)	1.09 acres
Proposed Tree Tract Areas	1.09 acres

Planned Tree Retention in Tree Tracts: 91 trees

Shortfall of Required Retention (306 - 91) 215 trees

* Used for required tree retention calculation.

** Ordinance requires 20% or 12 trees/acre, whichever is greater – Sample calculation.

A Tree Replacement Plan is necessary since planned retention is short of the minimum stocking requirement by 215 trees. The Tumwater tree ordinance requires that 3 replacement trees be planted for every tree short of the required tree retention. This means that **645** trees will need to be replanted on the site in addition to the required landscaping.

Tree Species for Inter-planting

We recommend that the following conifer tree species be used to interplant any gaps in the tree protection areas:

- Western redcedar
- Douglas-fir
- Incense-cedar
- Austrian pine

The trees should be at least 6-7 foot tall balled and burlap trees with well-developed central leaders.

The landscape plan (prepared by others) should incorporate some deciduous accent and shade trees to provide a mix of color, texture, and size across the site. The street tree selection should correspond to the Tumwater Comprehensive Street Tree Plan recommendations. All tree species should be planted and mulched according to industry standards.

Tree Protection during Construction

The tree protection fence should be orange mesh plastic, and be erected after logging and clearing, but prior to grading. No trenches, cuts, fills, drainage modification, irrigation lines, storing of materials, equipment operation, or other activity should occur within the critical root zone of protected trees. The tree protection and silt fences should be installed at least 5 feet beyond the driplines of trees to be saved.

If there are to be encroachments on any trees due to any change in the site plan, each tree should be evaluated to determine the impacts on tree survival and safety prior to the impact.

Pruning

All trees to be retained near structures, streets, or other targets should be crown cleaned to remove dead, dying, diseased, structurally defective, or extra branches. Crown raising or side trimming may be necessary to provide building and ground clearances for sidewalks and parking lots. All pruning should conform to the ANSI A300² standards for proper pruning, and be completed by or supervised by an ISA Certified Arborist®.

Landscape Installation

Grading, rototilling, and installation of irrigation lines should not impact the critical root zones (CRZ) of the protected trees. Noxious vegetation such as blackberry and Scotch broom should be selectively removed from tree tract areas by hand.

If additional fill is required to achieve desired grades, no more than 20% of the protected trees root zone should be covered with fill depths over 2 inches. If impacts must exceed 20% of the CRZ, the tree should be further evaluated by a Washington Forestry Consultants, Inc. (WFCI) to determine if removal and replacement is more appropriate.

Monitoring

Tree protection fences should be inspected by WFCI after installation to insure that they are properly located and installed. The fences should be maintained until installation of the final landscaping.

² American National Standard ANSI A300 (Part 1). 2008. Pruning for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning). Tree Care Industry Association. Londonderry, NH. 13 pgs.

Sequence of Events for Tree Protection Activity

1. Stake the clearing limits.
2. Contact WFCI to inspect and re-inspect trees in the final tree protection areas to confirm that no hazardous trees are retained and that tree counts are correct.
3. Applicant can then complete necessary pruning and hazard tree removal from the tree protection areas if necessary.
4. Heavily mark the clearing limits adjacent to the tree tracts.
5. Complete logging and clearing.
6. Install tree protection fences prior to the start of grading as prescribed by WFCI.
7. If unforeseen changes will impact a tree(s), then WFCI should re-evaluate the tree(s) before construction, to design mitigation if necessary.
8. Complete construction.
9. Contact WFCI to inspect all large trees **after** construction is complete to ensure that protected trees were not damaged or made hazardous.
10. Conduct **annual** hazard tree evaluation to determine short- and long-term effects of site changes on protected trees.

Summary

The 5% tree protection requirement has been met by saving 1.09 acres of tree tract. It is projected that a total of 91 healthy trees can be protected on the site. This is below the minimum requirement of 12 trees per acre (306) by 215 trees.

A total of 645 trees, in addition to the required landscaping, will need to be replanted to meet the city of Tumwater minimum stocking requirement. We suggest that inter-planting the tree tracts with suitable tree species where gaps in the tree cover occur. Payment for the shortfall of planted trees can, with approval, be made to the Tumwater Tree Fund.

Please give us a call if you have any questions.

Respectfully submitted,

Washington Forestry Consultants



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APPENDIX I - Yorkshire Project Site Aerial Photo with Forest Cover Types
(Thurston County Geodata 2018)

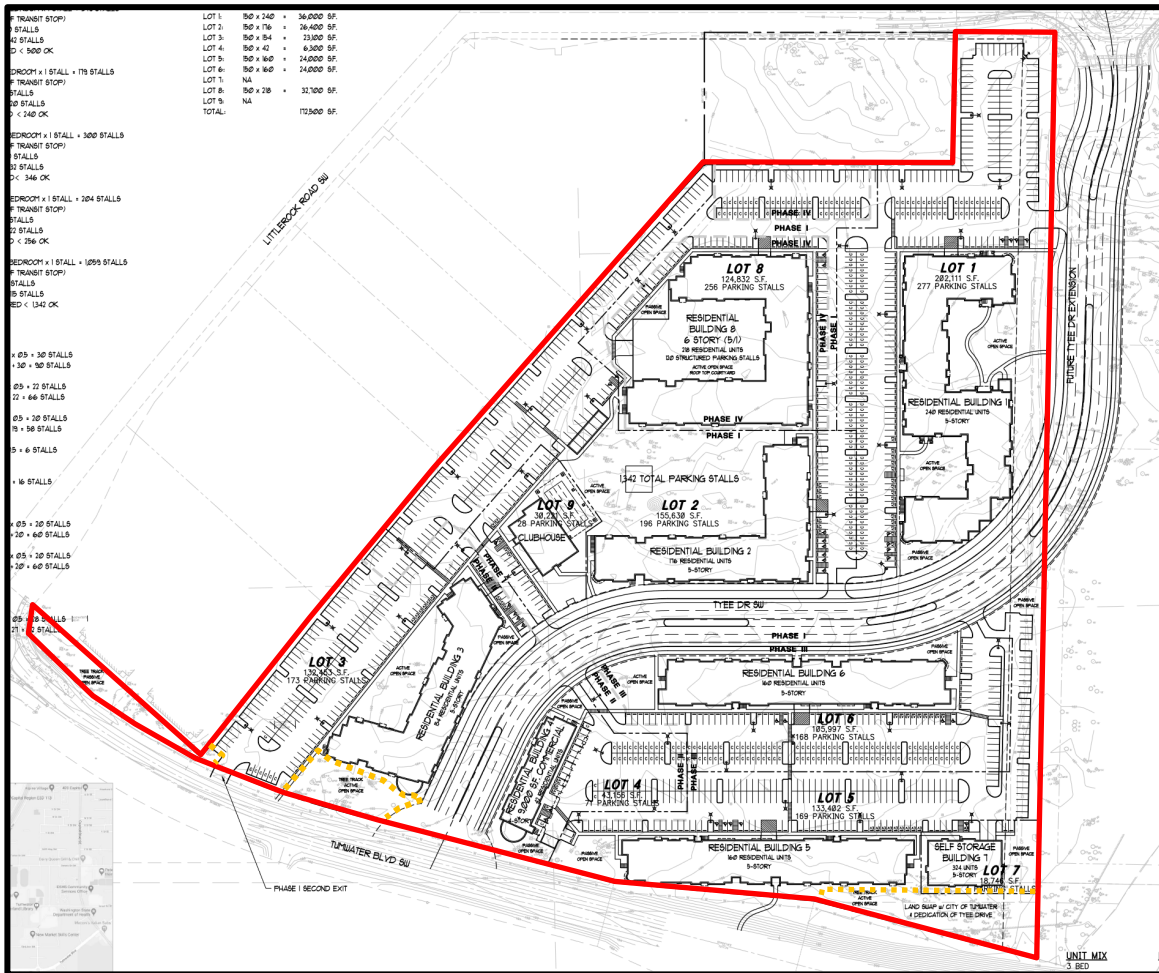


— Project Boundaries
●●●●● Forest Cover Type Lines

Type I: BM, cw, df, gf, ra, rc, wh – 6 – 48 DBH – 81 Trees/acre
Type II: DF, bm, rc, wh – 18 – 40” DBH – 10 Trees/acre
Type III: LP, bm, cw, nf, ra, rc – 15 – 52” DBH – 48 Trees/acre
Type IV: RC, bm, df – 10 – 52” DBH – 55 Trees/acre

APPENDIX II

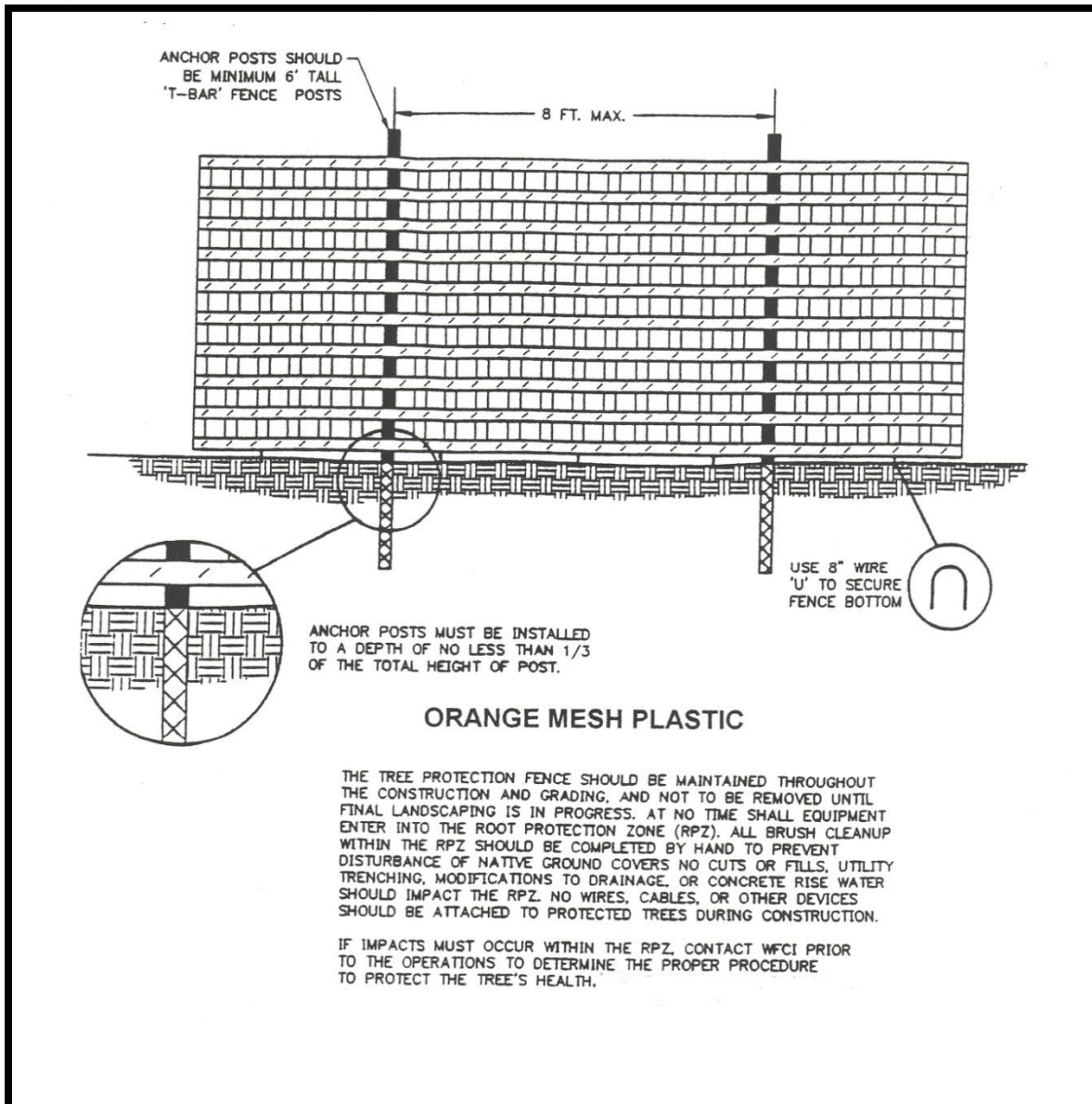
Yorkshire Project Site Plan



- ■ ■ ■ ■ Tree Protection Fence Locations - at perimeter of tree tract.
- Site Boundary

APPENDIX III

Tree Protection Fence Detail



APPENDIX IV

Assumptions and Limiting Conditions

- 1) Any legal description provided to the Washington Forestry Consultants, Inc. is assumed to be correct. Any titles and ownership's to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.
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- 3) Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, Washington Forestry Consultants, Inc. can neither guarantee nor be responsible for the accuracy of information.
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- 10) Unless expressed otherwise: 1) information contained in this report covers only those items that were 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, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the tree or other plant or property in question may not arise in the future.

Note: Even healthy trees can fail under normal or storm conditions. The only way to eliminate all risk is to remove all trees within reach of all targets. Annual monitoring by an ISA Certified Arborist or Certified Forester will reduce the potential of tree failures. It is impossible to predict with certainty that a tree will stand or fail, or the timing of the failure. It is considered an 'Act of God' when a tree fails, unless it is directly felled or pushed over by man's actions.