WASHINGTON FORESTRY CONSULTANTS, INC.
FORESTRY AND VEGETATION MANAGEMENT SPECIALISTS

W F C I

360/943-1723
FAX 360/943-4128

1919 Yelm Hwy SE, Suite C
Olympia, WA 98501

-Level I Tree, Soil, and Vegetation Protection Plan-

Matthew Solomon Property

1511 Fairview St. SE
Olympia WA 98510

Prepared for:	Matthew Solomon
Prepared by:	Washington Forestry Consultants, Inc.
Date:	December 15, 2017
RE:	Level I - Tree, Soil, and Native Vegetation Protection and Replacement

Introduction

We were asked to inspect the trees on an undeveloped parcel at 1511 Fairview St. SE in Olympia and prepare a Level I Tree, Soil, and Native Vegetation Protection and Replacement plan per Chapter 16.60.050 of the City of Olympia Municipal Code.

The owner is planning to build a single-family home on the 1.21 acre parcel. The following is a summary of our findings and recommendations.

Observations

Methods: A site visit was conducted to gather information about the size and location of the trees on the lot. During the visit, we inventoried and assessed the existing significant (≥6 in. DBH) trees for suitability for protection during construction.

Soils Description: According to the Natural Resource Conservation Service, there are two types of soil on the parcel; the Grove very gravelly sandy loam and the Yelm fine sandy loam. Based on our examination of the surface soils, the soil typing reasonably appears correct. No additional soils mapping or testing was done.

42 – Grove very gravelly sandy loam: 93%
127 – Yelm fine sandy loam: 7%

The predominant soil type is the Grove very gravelly sandy loam. It is a very deep, somewhat excessively drained soil found on outwash plains. It formed in glacial outwash. Permeability is rapid. Plant available water capacity is low. The effective rooting depth is 60 inches or more and the hazard of runoff and erosion is slight. The potential for windthrow of trees is slight under normal conditions. Seedling mortality is severe and new trees require irrigation to establish.

The Yelm fine sandy loam is a deep, moderately well drained soil on terraces. It occurs in the northwest corner of the project area. It formed in volcanic ash and glacial outwash. Permeability is moderately rapid. Available water capacity is high. The effective rooting depth for trees is 40 to 60 inches. A seasonal high water table fluctuates between depths of 18 to 36 inches from December to March. Runoff is slow and the hazard to erosion is slight. Windthrow potential is rated as 'slight'.

Stand Description: There are 115 significant trees on the parcel ranging in size from 7 inches to 73 inches in diameter at breast height (DBH). Tree condition ranges from 'Very Poor' to 'Good', with most trees described as being in 'Fair' condition. The tree species include bigleaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*) with scattered Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), black locust (*Robinia pseudoacacia*), and wild cherry (*Prunus avium*).

Table 1: Summary of on-site trees at the Solomon property on Fairview St. SE

Species	DBH Range (in.)	Condition Range	Total # of Trees	Retainable Tree Units
Bigleaf Maple	11.5 - 73	'Very Poor' – 'Fair'	36	141
Black Locust	35	'Very Poor	1	0
Douglas-fir	40	'Good'	1	13
Western Redcedar	12 – 22.5	'Fair' – 'Good'	4	9
Western Hemlock	9 - 21	'Fair'	4	7
Red Alder	7 – 24	'Very Poor' – 'Fair'	68	36.5
Wild Cherry	19.5	'Poor'	1	0
Totals	**7 - 73**	**'Very Poor' – 'Good'**	**115**	**206.5**

The understory consists of mostly native plants such as salal (*Gaultheria shallon*), sword fern (*Polystichum munitum*), trailing blackberry (*Rubus ursinus*), ocean spray (*Holodiscus discolor*), and salmonberry (*Rubus spectabilis*). Some invasive plants such as Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera* helix), and yellow archangel (*Lamiastrum galeobdolon*) are also present.

Discussion

The City of Olympia requires 30 tree units to be retained during construction. The following is a summary of planned tree density calculations:

Lot Size (estimated)	1.21 acres
Planned Tree Retention	50 trees
Planned Tree Unit Retention	227 tree units
Tree Units Required	36.3 Tree Units
Excess of Tree Retention Requirements	190.7 tree units

By retaining all of the trees in the lower (southern) portion of the property, this tree protection plan retains 190.7 more tree units than required by the City of Olympia. All of the deciduous trees and most of the conifers in the vicinity of the proposed home are either in the footprint of proposed improvements or unsuitable for retention as landscape trees and should be removed during land clearing. Three conifers near the proposed construction site are suitable for retention and could be retained if protection measures are provided.

Tree Protection Measures

Trees to be saved must be protected during construction by temporary chain-link fencing on driven posts (Attachment 3), located at the edge of the critical root zone (CRZ). The individual CRZ are a radius 5 ft. outside the dripline of the tree, unless otherwise delineated by WFCI.

There should be no equipment activity (including rototilling) within the critical root zone. No irrigation lines, trenches, or other utilities should be installed within the CRZ. Cuts or fills should impact no more than 20% of a tree's root system. If topsoil is added to the root zone of a protected tree, the depth should not exceed 2 inches of a sandy loam or loamy fine sand topsoil and should not cover more than 20% of the root system.

If roots are encountered outside the CRZ during construction, they should be cut cleanly with a saw and covered immediately with moist soil. Noxious vegetation within the critical root zone should be removed by hand. If a proposed save tree must be impacting by grading or fills, then the tree should be re-evaluated by WFCI to determine if the tree can be saved with mitigating measures, or if the tree should be removed.

Off-Site Trees

There are 7 trees that appear to be growing on City of Olympia property along the pedestrian path to the north of the project area. These trees will require protection if they are to be retained. Tree protection fences should be placed 5 ft. outside of the dripline of these trees.

Photo 1: Two bigleaf maple trees growing in City rights-of-way near the project area.

Table 2: Summary of off-site trees

Tree #	Species	DBH (in.)	Condition	Root Protection Zone (ft. radius)
1	Bigleaf Maple	23	Fair	16S
2	Bigleaf Maple	40	Fair	26S
3	Bigleaf Maple	16	Fair	14S
4	Cherry	12	Fair	12
5	Cherry	14	Fair	14
6	Cherry	6	Poor	6
7	Bigleaf Maple	19, 12, 20	Fair	20

Conclusions and Timeline for Activity

1. Complete all necessary pruning on save trees prior to installation of the tree protection fences. Contact WFCI to meet with the pruning contactor if necessary.
2. Place tree protection fencing 5 ft. outside the dripline of the saved trees. Any variation to these guidelines should be prescribed by WFCI.
3. Remove the 65 trees from within the clearing limits in the construction area
4. Contact WFCI to attend the pre-construction conference to discuss tree protection issues.
5. Maintain all tree protection fences throughout construction.

6. If any unplanned construction activity will impact a 'save' tree, contact WFCI prior to the impact. WFCI can assess the proposed impact and recommend cultural care, mitigation, or removal.
7. Conduct an annual tree evaluation to determine short-and long-term effects of site changes on protected trees. Provide additional cultural care as needed.

Summary: By retaining 50 trees in an undeveloped portion of the property and three trees in the vicinity of the proposed construction site, this plan exceeds the requirements of the City of Olympia municipal code by 190.7 tree units. Three conifers in the vicinity of the proposed construction site are suitable for retention. Seven off-site trees also grow near the proposed developments. These ten trees will require protection fencing. The remaining 50 trees to be retained are isolated from the main portion of the project and will not require individual protection. All other trees should be removed from the site along with any invasive plants.

Please give us a call if you have any questions

Respectfully submitted,

Galen M. Wright, ACF, ASCA
ISA Bd. Certified Master Arborist PN-129BU
Certified Forester No. 44
ISA Tree Risk Assessor Qualified

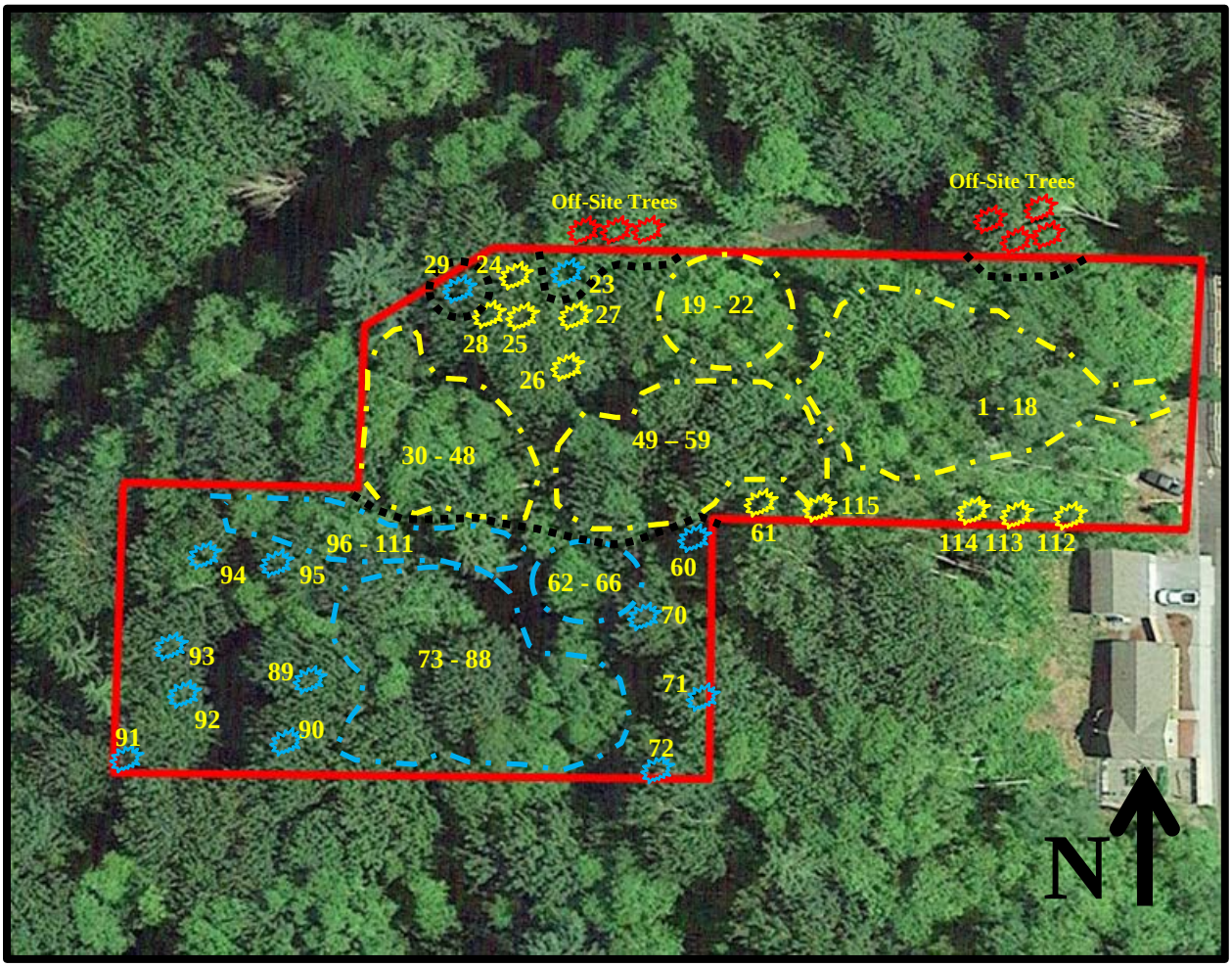
Riley Stark, Professional Forester
ISA Certified Arborist®,
Municipal Specialist, PN-7780AM
ISA Tree Risk Assessor Qualified

Attachment #1. Aerial Photo of 1511 Fairview St. SE

(Thurston County GeoData 2015)

Parcel Boundary
Fairview St.
Pedestrian Path

Attachment #2. Site Plan/Tree Map – Approximate tree locations.



Parcel Boundary
On-Site Tree to Remove
On-Site Tree to Retain
Off-Site Tree to Protect
Tree Protection Fence Location

Attachment #3. List of Trees at 1511 Fairview St. SE

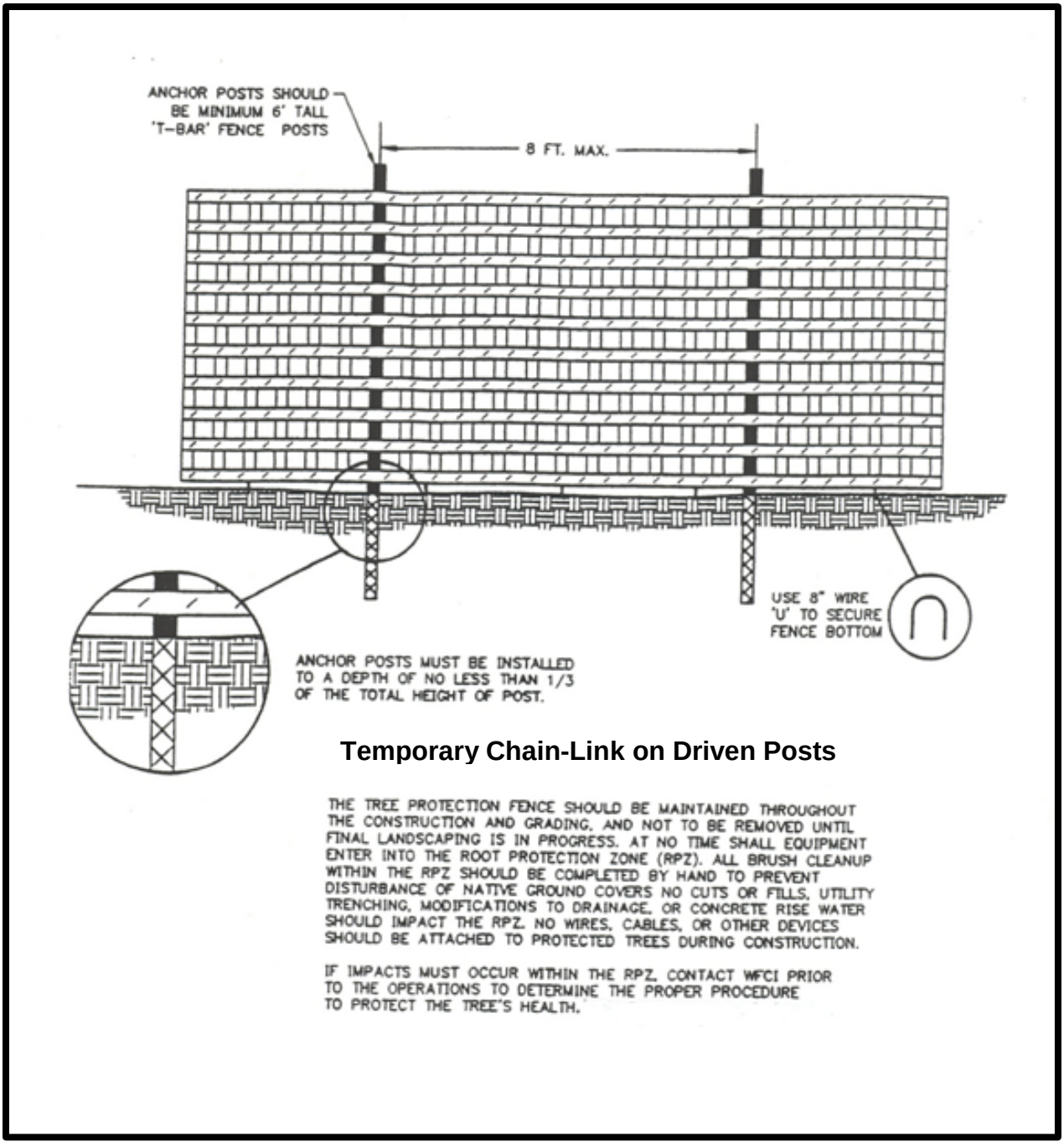
Tree #	Species	DBH (in.)	Condition	Save Tree – Yes or No	Minimum RPZ (ft. Radius)	Save Tree Units
1	Locust	35	Very Poor - Hazard Tree	No		
2	Red Alder	12.5	Fair	No		
3	Red Alder	10	Fair	No		
4	Red Alder	14	Fair	No		
5	Red Alder	14.5	Poor - Dead top	No		
6	Bigleaf Maple	23.5	Fair	No		
7	Red Alder	17	Fair	No		
8	Red Alder	19.5	Good	No		
9	Bigleaf Maple	31	Fair	No		
10	Red Alder	16	Fair	No		
11	Bigleaf Maple	14, 14	Fair	No		
12	Red Alder	20	Fair	No		
13	Red Alder	18.5	Fair	No		
14	Red Alder	15	Very Poor - Stem Decay	No		
15	Red Alder	18.5, 15.5	Fair	No		
16	Red Alder	16	Poor - Root Rot, Stem Decay	No		
17	Red Alder	14, 13	Poor - Root Rot, Stem Decay	No		
18	Bigleaf Maple	25	Fair	No		
19	Bigleaf Maple	28	Fair	No		
20	Bigleaf Maple	15, 9	Poor - In Decline	No		
21	Bigleaf Maple	14	Very Poor, Hazard Tree	No		
22	Red Alder	16	Fair	No		
23	Cedar	12	Fair	Yes	18	1.5
24	Bigleaf Maple	19, 19, 14	Very Poor - Heavy Dieback	No		
25	Bigleaf Maple	54.5	Fair	No		
26	Bigleaf Maple	73, 29	Poor - Heavy Dieback	No		
27	Bigleaf Maple	38, 29, 32	Fair	No		
28	Wild Cherry	19.5	Poor - Heavy Lean	No		
29	Douglas-fir	40	Good	Yes	28S	13
30	Red Alder	16	Fair	No		
31	Red Alder	9.5, 13	Fair	No		
32	Red Alder	15	Fair	No		
33	Red Alder	14.5	Fair	No		
34	Red Alder	11	Fair	No		
35	Red Alder	10.5	Fair	No		
36	Red Alder	16	Fair	No		

Tree #	Species	DBH (in.)	Condition	Save Tree – Yes or No	Minimum RPZ (ft. Radius)	Save Tree Units
37	Red Alder	16, 6.5	Fair	No		
38	Red Alder	9	Fair	No		
39	Red Alder	14	Fair	No		
40	Red Alder	17	Fair	No		
41	Bigleaf Maple	24, 14	Fair	No		
42	Red Alder	17	Fair	No		
43	Red Alder	18	Fair	No		
44	Red Alder	15	Fair	No		
45	Red Alder	11.5	Fair	No		
46	Red Alder	10	Poor - Heavy Lean	No		
47	Red Alder	12.5	Poor - Heavy Lean	No		
48	Red Alder	14.5	Poor - Heavy Lean	No		
49	Red Alder	13.5	Fair	No		
50	Bigleaf Maple	36	Very Poor - Heavy Dieback	No		
51	Red Alder	24	Fair	No		
52	Cedar	13.5	Fair	No		
53	Red Alder	23	Poor - Heavy Lean	No		
54	Bigleaf Maple	38	Very Poor - Heavy Dieback	No		
55	Red Alder	18	Poor - Heavy Lean	No		
56	Bigleaf Maple	12, 14, 16	Poor - Suppressed	No		
57	Hemlock	21	Fair	No		
58	Bigleaf Maple	19	Poor - Heavy Lean	No		
59	Bigleaf Maple	30	Very Poor - Heavy Dieback	No		
60	Cedar	22.5	Good	Yes	16	6
61	Bigleaf Maple	50	Poor - Stem Decay, Dieback	No		
62	Red Alder	15	Fair	No		
63	Bigleaf Maple	18, 14, 10, 10, 12	Poor - Stem Decay, Dieback	No		
64	Red Alder	10.5	Poor - Heavy Lean	No		
65	Red Alder	11.5	Fair	Yes		1.5
66	Red Alder	12	Fair	Yes		1.5
67	Red Alder	10.5	Fair	Yes		1.5
68	Red Alder	8.5	Fair	Yes		1.5
69	Red Alder	8.5	Fair	Yes		1.5
70	Bigleaf Maple	34	Fair	Yes		12

Tree #	Species	DBH (in.)	Condition	Save Tree – Yes or No	Minimum RPZ (ft. Radius)	Save Tree Units
71	Bigleaf Maple	46.5, 14	Fair	Yes		13
72	Red Alder	17.5	Fair	Yes		3
73	Red Alder	12.5	Fair	Yes		1.5
74	Red Alder	10.5	Fair	Yes		1.5
75	Red Alder	17.5	Fair	Yes		3
76	Red Alder	13, 16	Fair	Yes		3
77	Red Alder	13.5	Fair	Yes		1.5
78	Hemlock	9	Fair	Yes		1.5
79	Red Alder	13	Fair	Yes		2
80	Red Alder	13.5	Fair	Yes		2
81	Red Alder	15	Fair	Yes		2
82	Red Alder	14.5	Fair	Yes		2
83	Red Alder	7	Fair	Yes		1.5
84	Red Alder	14	Fair	Yes		2
85	Red Alder	10	Fair	Yes		1.5
86	Red Alder	11, 12	Fair	Yes		1.5
87	Bigleaf Maple	16	Fair	Yes		3
88	Bigleaf Maple	20	Fair	Yes		5
89	Bigleaf Maple	20	Fair	Yes		5
90	Bigleaf Maple	39.5	Fair	Yes		13
91	Red Alder	15	Poor - leaning	Yes		3
92	Bigleaf Maple	43	Poor - Stem Decay	Yes		13
93	Bigleaf Maple	30.5	Fair	Yes		10
94	Bigleaf Maple	34, 28	Fair	Yes		13
95	Bigleaf Maple	30.5	Poor - Stem Decay	Yes		10
96	Red Alder	12.5	Fair	Yes		1.5
97	Bigleaf Maple	16.5	Fair	Yes		3
98	Cedar	13	Good	Yes		1.5
99	Red Alder	14.5	Poor - Stem Decay, leaning	Yes		2
100	Hemlock	18.5	Fair	Yes		4
101	Hemlock	10.5	Fair	Yes		1.5
102	Bigleaf Maple	16, 28	Fair	Yes		9
103	Red Alder	13.5	Fair	Yes		1.5
104	Red Alder	12	Very Poor - Stem Decay	Yes		1.5
105	Red Alder	18.5	Fair	Yes		4
106	Bigleaf Maple	24, 26	Fair	Yes		9
107	Bigleaf Maple	18	Poor - In Decline	Yes		4
108	Red Alder	20.5	Poor - In Decline	Yes		5
109	Red Alder	17	Fair	Yes		3
110	Bigleaf Maple	28, 26	Fair	Yes		9
111	Bigleaf Maple	31	Fair	Yes		10
112	Red Alder	17.5	Fair	No		

Tree #	Species	DBH (in.)	Condition	Save Tree – Yes or No	Minimum RPZ (ft. Radius)	Save Tree Units
113	Red Alder	15.5	Fair	No		
114	Red Alder	12	Fair	No		
115	Bigleaf Maple	11.5	Poor - In Decline	No		
Sum						**227**

Attachment 4. Tree Protection Fence Detail



Temporary Chain-Link on Driven Posts

THE TREE PROTECTION FENCE SHOULD BE MAINTAINED THROUGHOUT THE CONSTRUCTION AND GRADING, AND NOT TO BE REMOVED UNTIL FINAL LANDSCAPING IS IN PROGRESS. AT NO TIME SHALL EQUIPMENT ENTER INTO THE ROOT PROTECTION ZONE (RPZ). ALL BRUSH CLEANUP WITHIN THE RPZ SHOULD BE COMPLETED BY HAND TO PREVENT DISTURBANCE OF NATIVE GROUND COVERS NO CUTS OR FILLS. UTILITY TRENCHING, MODIFICATIONS TO DRAINAGE, OR CONCRETE RISE WATER SHOULD IMPACT THE RPZ. NO WIRES, CABLES, OR OTHER DEVICES SHOULD BE ATTACHED TO PROTECTED TREES DURING CONSTRUCTION.

IF IMPACTS MUST OCCUR WITHIN THE RPZ, CONTACT WFCI PRIOR TO THE OPERATIONS TO DETERMINE THE PROPER PROCEDURE TO PROTECT THE TREE'S HEALTH.

Attachment #5. Photo Log (WFCI 11/30/17)

Photo 2: Trees in poor condition can provide habitat for wildlife if retained away from buildings and other developments

Photo 3: One Douglas-fir tree (#29) currently grows on site and could be retained.

Attachment #6. Glossary of Forestry and Arboricultural Terminology

DBH: Diameter at Breast Height (measured 4.5 ft. above the ground line on the high side of the tree).

Live Crown Ratio: Ratio of live foliage on the stem of the tree. Example: A 100' tall tree with 40 feet of live crown would have a 40% live crown ratio. Conifers with less than 30% live crown ratio are generally not considered to be long-term trees in forestry.

Crown: Portion of a trees stem covered by live foliage.

Crown Position: Position of the crown with respect to other trees in the stand.

Dominant Crown Position: Receives light from above and from the sides.

Codominant Crown Position: Receives light from above and some from the sides.

Intermediate Crown Position: Receives little light from above and none from the sides. Trees tend to be slender with poor live crown ratios.

Suppressed Crown Position: Receives no light from above and none from the sides. Trees tend to be slender with poor live crown ratios.

Attachment #7. 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.

2) It is assumed that any property is not in violation of any applicable codes, ordinances, statutes, or other governmental regulations, unless otherwise stated.

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.

4) Washington Forestry Consultants, Inc. shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

5) Loss or alteration of any part of this report invalidated the entire report.

6) Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of Washington Forestry Consultants, Inc.

7) Neither all or any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of Washington Forestry Consultants, Inc. -- particularly as to value conclusions, identity of Washington Forestry Consultants, Inc., or any reference to any professional society or to any initialed designation conferred upon Washington Forestry Consultants, Inc. as stated in its qualifications.

8) This report and any values expressed herein represent the opinion of Washington Forestry Consultants, Inc., and the fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence neither of a subsequent event, nor upon any finding in to reported.

9) Sketches, diagrams, graphs, 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.

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.