Stream Bellingham Townhomes
Potential Retention Tree Analysis

3509 Meridian St.
Bellingham, WA 98225
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Prepared for
Stream Real Estate Development
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August 3, 2022
Revised 1/23/23

Background Information

Stream Real Estate Development is applying to the City of Bellingham Planning and Development Services for the development of the "Stream Bellingham Townhomes" residential construction at 3509 Merdian St. Bellingham, WA. The entire subject property proposes 68 dwelling units within 179,793 square foot site area. All site trees 6" diameter at breast height (dbh) or greater have been identified and mapped. Potential candidate trees for retention were identified. Each potential retention tree was assessed for current condition, relative amount of construction impacts to the tree, and likelihood of survival. This document also provides a Tree Protection Plan for guidance on protection and retention of significant trees located adjacent to planned construction areas.

Existing Conditions

The site is currently occupied by a mature (~ 60 year old) native conifer dominated forest with lesser components of hardwoods. The conifer are predominantly Douglas fir (*Pseudotsuga menziesii*) with minor components of western hemlock (*Tsuga heterophylla*) and western red cedar (*Thuja plicata*). The hardwood species are bigleaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*). The hardwoods are mostly overmature and/or damaged/defective. There are some root rot pockets in the Douglas fir and western hemlock with several dead snags. The forest is interrupted by scattered, small open areas and informal dirt/gravel pedestrian trails. Topography is flat to gently sloping 0-3%. The property is bounded by Birchwood Ave. on the south, Meridian St. on the east, and Bellingham Golf and Country Club on the west and north.

Proposed Work and Methodology

The entire subject property proposes 68 dwelling units within a 179,793 square foot (4.12 acres) site area. The 68 units will be established via subdivision with each having a fee simple lot. The site design/layout has given strong consideration to the preservation of appropriate existing trees that are viewed as an environmental asset and an attractive amenity to the overall project. Stream wishes to retain as many site trees as is feasible and safe while still accomplishing increased residential density as needed by the Bellingham community. The site is more or less fully forested and the significant trees have been identified on the site plan. Kim Rooney, Landscape Architect for the project has identified 91 trees as retention trees based on their location relative to proposed infrastructure and construction activity.

ISA Best Management Practices define the Critical Root Zone (CRZ) as a footprint of ground 1' in radius from the trunk for every inch of diameter at breast height (dbh) of the tree.

Thus, a 20" dbh tree would have a CRZ with a radius of 20'.

See Exhibit A for depictions of CRZ's.

Each retention tree candidate was visited for species and diameter determination/confirmation and given a current condition assessment. Current condition was estimated based upon crown foliage density and color, presence/absence of mechanical/structural defects, and presence/absence of biological defects including fungal decay, insect damage, or other foliar or wood diseases.

Each tree was also analyzed by estimating a Likelihood of Survival rating based upon the current condition of each tree and extent/% of proposed construction activity within the CRZ of each tree. Construction activity can include excavation, grading, pavement/concrete placement, soil compaction, utilities, trenching etc. These activities have the potential to sever roots, reduce soil water/nutrient uptake, or reduce subsoil gas exchange due to soil compaction. These effects can compromise a tree biologically and/or mechanically by lessening physical anchorage to the soil. The time context for Likelihood of Survival is five years.

Table 1 below provides an inventory of the identified potential retention trees.

Tree	Species	Dbh	Condition	%CRZ impacted	Likelihood of Survival	Comments
333	Douglas fir	30"	Good	40	Fair	
334	Douglas fir	30"	Good	75	Poor	resin flow
343	Douglas fir	16"	Fair	15	Good	narrow crown
344	W. red cedar	16"	Good	20	Good	suppressed
345	Douglas fir	24"	Good	20	Good	
346	Bigleaf maple	10"	Poor	5	Poor	suppressed
426	Bigleaf maple	10"	Fair	5	Fair	suppressed
352	Douglas fir	36"	Good	10	Good	resin flow
353	Douglas fir	24"	Good	10	Good	
348	Douglas fir	29"	Good	40	Fair	resin flow
347	Douglas fir	30"	Good	35	Fair	gird rt, slough bark
349	W. red cedar	10"	Good	40	Fair	
354	Douglas fir	30"	Good	30	Fair	mod. ivy
362	Douglas fir	35"	Good	5	Good	
360	Douglas fir	10"	Poor	5	Poor	supp./weak crown
359	Douglas fir	16"	Fair-Good	25	Fair-Good	
327	Dougals fir	20"	Fair	90	Very Poor	supp., kink 20' up
328	Douglas fir	18"	Fair	90	Very Poor	suppressed
322	Douglas fir	24"	Good	75	Very Poor	crown hvy to east
323	Douglas fir	12"	Poor	0	Poor-Fair	top b.o. 20'
324	Douglas fir	8"	Poor	0	Poor-Fair	top b.o. 20'
427	Red alder	24"	Poor	30	Poor	basal rot
424	Paper birch	12"	Poor	30	Poor	basal rot b.o. top
305	Bitter cherry	10", 16"	Poor	0	Poor	gummosis, hvy ivy
303	Bitter cherry	18"	Fair	50	Poor	
283	Bigleaf maple	5,7,10"	Poor	50	Poor	dead crown ptns

282	Douglas fir	32”	Fair	30		Fair	b.o. top 80’
261	Douglas fir	30”	Fair-Good	50		Fair-Poor	
259	W. red cedar	14”	Fair	15		Fair	
258	Paper birch	9,11,12”	Very poor	45		Very Poor	nearly dead
257	Paper birch	8”	Fair	0		Fair	
256	W. red cedar	14”	Good	25		Fair-Good	
234	Douglas fir	18”	Fair	30		Fair	b.o. top 50’
233	Douglas fir	24”	Good	15		Good	
232	Douglas fir	24”	Fair	10		Fair-Good	b.o. top 60’, resin
231	Douglas fir	22”	Fair	55		Poor	b.o. top 75’
226	Douglas fir	40”	Good	50		Fair-Poor	resin flow
224	NOT FOUND						
223	NOT FOUND						
222	Bitter cherry	10”	Dead				
221	NOT FOUND						
220	W. red cedar	8”	Fair	20		Fair	suppressed
219	W. red cedar	19”	Good	40		Fair	
203	Bigleaf maple	13”,14”	Fair	40		Fair	b.o. top
202	Douglas fir	40”	Good	45		Poor	
201	W. red cedar	11”	Good	40		Fair	
200	Douglas fir	28”	Good	40		Fair	mild sweep
199	Red alder	16”	Fair	60		Poor	
198	W. red cedar	10”	Good	30		Good	suppressed
197	Douglas fir	36”	Fair-Good	40		Fair	resin flow
196	Bitter cherry	8”	Dead				
144	Paper birch	18”	Poor	30		Poor	dead top
142	W. red cedar	15”	Fair	15		Fair	decay lower trunk
141	W. red cedar	16”	Good	25		Fair-Good	
143	Paper birch	10”, 9”	Fair	10		Fair	weak crown
137	Douglas fir	44”	Good	40		Fair	butt swell, sidewalk
149	Douglas fir	34”	Good	60		Poor	
43	Douglas fir	32”	Good	40		Fair	6’ w of sidewalk
42	W. red cedar	26”	Good	45		Fair	trunk divides 6’ up
41	Douglas fir	28	Good	45		Fair	
40	NOT FND						
19	W. red cedar	18”	Good	20		Good	
18	W. red cedar	24”	Good	10		Good	
17	W. red cedar	12”	Fair	15		Fair	suppressed dbl top
16	Paper birch	12”	Dead			Dead	
13	Bigleaf maple	16”,16”	Fair-Good	80		Poor	
12	W. red cedar	18”	Fair	10		Fair-Good	weak crown
10	W. red cedar	24”	Fair	10		Good	
9	W. red cedar	16”	Poor	10		Poor	supp. b.o. top 25’
8	W. red cedar	20”	Fair	20		Fair	b.o. top 45’
7	Bigleaf maple	24”	Good	35		Fair	against chain link
6	W. red cedar	12”	Poor	10		Poor	weak crwn, b.o. top
5	W. red cedar	10”	dead			dead	
4	W. red cedar	18”	Fair	10		Fair	supp. b.o.top 35’
3	W. red cedar	16”	Good	55		Poor	dbl top 30’
2	Bigleaf maple	9”,9”	Fair	0		Fair	chain link btwn dbl trunks
1	Bitter cherry	12”	Poor	50		Poor	hvy gumosis
23	Bigleaf maple	40”	Fair-Good		15	Good	dead crown ptns.
22	Douglas fir	26”	Good	50		Poor	kink @ 15’
21	Douglas fir	14”	Poor	50		Poor	b.o. top 25’
46	Douglas fir	18”	Fair-Good	20		Fair-Good	hard buttsweep
172	Douglas fir	24”	Poor	80		Poor	sparse crown

Tree	Species	Dbh	Condition	%CRZ impacted	Likelihood of Survival	Comments
176	Douglas fir	30”	Fair	15	Fair	sparse crown
177	Douglas fir	22”	Fair	20	Fair	pitted bark
421	W. red cedar	14”	dead		dead	
402	Douglas fir	36”	Fair-Good	80	Poor	resin flow
401	Douglas fir	24”	Fair-Good	70	Poor	resin flow
395	W. red cedar	16”	Good	90	Poor	
394	Douglas fir	20”	Fair-Good	90	Poor	narrow crown
393	Douglas fir	40”	Good	80	Poor	heavy ivy
345	Douglas fir	24”	Good	70	Poor	resin flow
239	Douglas fir	28”	Fair-Good	50	Poor	pitted bark
336	Douglas fir	36”	Good	40	Fair-Poor	
235	Douglas fir	10”	Poor	0	Poor	wk crwn, poor H:D
385	Douglas fir	30”	Good	90	Poor	resin flow

N=91

Tree Protection

A tree protection plan is warranted when conducting significant construction activities around trees that are to be retained. Aside from the above ground portions of a tree (trunk and crown) the most important area to be protected is the CRZ. See attached Exhibit A.

Clearing and filling for site development should avoid activities within the CRZ of trees to be retained to the maximum extent possible. Protective practices to be followed are listed in the Tree Protection provisions below. This Tree Protection Plan will likely be further refined to adjust to any revisions to site construction design and as field marking of proposed activity/improvements relative to existing tree locations is implemented.

Recommendations

The following are recommendations for construction of the necessary infrastructure intended to preserve the long-term safety of any trees adjacent to construction activity in the context of the proposed work.

Recommendation 1

Avoid any grade changes, placement of fill, vehicle parking, heavy equipment traffic, or underground utility work within the CRZ of each tree to minimize root disturbance and soil compaction. Efforts should be made to go over or under with utility lines when roots larger than 2” diameter are encountered in the utility trench. Hand excavation is recommended around larger roots. Where roots must be cut they should be severed cleanly using sharp tools at right angles to the root length to minimize surface area damage/tearing and exposure and to facilitate compartmentalization of the wound. Do not cut any roots larger than 3” in diameter.

Recommendation 2
Avoid any above ground tree contact (trunk or limbs) by equipment booms, delivery trucks, or other contact.

Recommendation 3
Avoid any changes in drainage patterns from excavation, irrigation or otherwise within the root zone.

Recommendation 4
Apply 6" depth of organic mulch to CRZ areas adjacent to soil disturbance for root protection and soil moisture retention.

Recommendation 5
Provide additional watering to any compromised tree for the first three years following construction during the dryer summer months that is the equivalent to 1" water per week. A slower but deep soaking is more beneficial than a quick and heavy application of water.

Recommendation 6
Prohibit concrete washout, herbicides/pesticides application, heat sources within the root zone.

Recommendation 7
Monitor any compromised trees for 3 years for signs of decline and consideration of remediation steps if necessary.

These recommendations are in no way a guarantee of tree health and survival in the future due to potential unforeseen circumstances, force majeure, and acts of God. However, they do represent responsible steps in promoting the continued viability of the retention trees.

Respectfully,

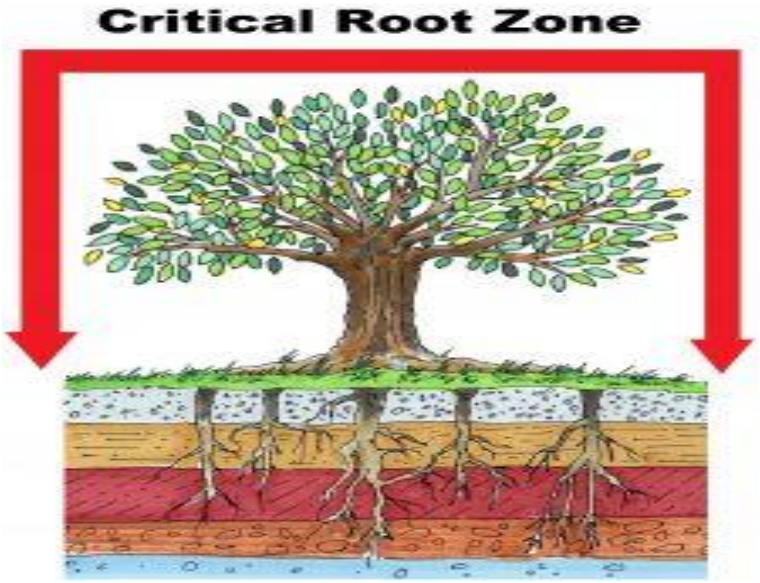
Aubrey Stargell
Forester, Certified Arborist PN 6860A

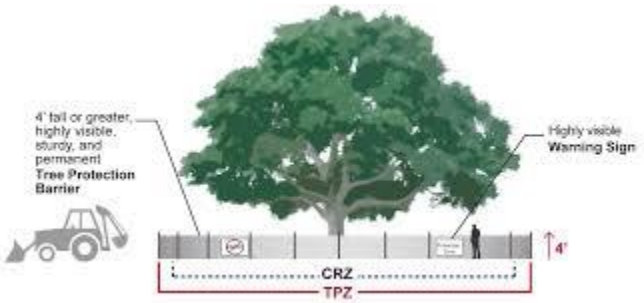
References:

Pacific Northwest ISA Tree Protection Measures

Tree Protection on Construction and Development Sites, Oregon State University, December 2009.

Exhibit A


Critical Root Zone


4' tall or greater, highly visible, sturdy, and permanent
Tree Protection Barrier
Highly visible
Warning Sign
4'
CRZ
TPZ