

August 10, 2015

Corey Watson
Manager of Land Development
Quadrant Homes
14725 SE 36th, Ste. 200
Bellevue, WA 98006
425.646.4139

Site: TPN #0325059100
13400 NE 100th St (approx.)
Kirkland, WA98033

Dear Corey:

At your request I performed a Visual Risk Assessment (VRA) of the Kirkland site noted above on March 4th and 7th, 2014. The VRA is a systematic process that reviews risk factors and ranks them into risk categories. It is a standard used by the International Society of Arboriculture (ISA) to ascertain tree health.

I identified the species of each tree on site, measured its diameter and dripline and performed a VRA to identify the health of individual trees. The information gathered was used to make recommendations about which trees are healthy and likely to survive construction and to locate potential very significant trees and potential "groves" of tree stands.

The information is the basis used to compile a report required by the City of Kirkland regarding tree health status to be included with a submittal to plat. Included in this report are Tree Protection Specifications and Fencing detail necessary for submission.

If it is necessary to encroach into the dripline of retained trees, I have provided details about how the work is to proceed. This information should be included on proposed site development plans.

In summary:

- This site has a total of 67 significant trees
- There are 48 non-viable (unhealthy) trees
- There are 19 viable (healthy) trees
- 8 trees are proposed for removal
- 3 trees are impacted
- Proposed retention: 8 Trees
- City requires a 30% retention $19 \times 30\% = 6$ trees

I have included a detailed report of my findings. If you have any questions please contact me; I can be reached at 425.890.3808 or by email: sprince202@aol.com.

Warm regards,



Susan Prince
Creative Landscape Solutions
ISA Certified Arborist: PNW: 1481-A
TRAQ/TRACE Certified: #418
17518 NE 119th Way
Redmond, WA 98052

* Evergreen and deciduous trees with a Diameter Breast Height (DBH) of 8" or greater

Assignment:

I was contacted by Corey Watson; who requested I examine the trees on a site proposed to short plat and document my findings in a report required by the City of Kirkland to be included for submittal.

Personal qualifications, scope of work and methodology:

To evaluate the trees and prepare the report, I drew on my formal college education in botany and the preparation and training used to obtain my ISA certification. In addition to my education and certification, I relied heavily on my training to obtain my certification as a Tree Risk Assessor. I have been an ISA Certified Arborist for over fifteen years and have been TRACE/TRAQ certified for four years.

I followed protocol delineated by the International Society of Arboriculture (ISA) for Visual Risk Assessment (VRA). By doing so, I am examining each tree independently as well as collectively as groups or stands of trees provide stability and can lower risk of independent tree failure. This scientific process examines tree health (e.g. size, vigor, and insect and disease process) as well as site conditions (soil moisture and composition, amount of impervious surfaces surrounding the tree etc.)

Introduction:

Identifying and managing the risks associated with trees is still largely a subjective process. Since the exact nature of tree failures remains largely unknown, our ability as scientists and arborists to predict which trees will fail and in what fashion remains limited. As currently practiced, the science of hazard tree evaluation involves examining a tree for structural defects, including genetic problems, those caused by the local environmental that the tree grows in and those attributed to man (pruning etc.).

The assessment process involves evaluating three components: 1) a tree with the potential to fail, 2) an environment that may contribute to that failure, and 3) a person or object that would be injured or damaged (the target). By definition a defective tree cannot be considered hazardous without the presence of a target.

All trees have a finite life-span though it is not pre-programmed internally in the same manner as annual plantings. As trees age they are less able to compartmentalize structural damage following injury from insects, disease or pruning. Trees in urban settings have a shorter life span than trees grown in an undisturbed habitat.

Different species of trees grow differently. Evergreen trees have a “reputation” of growing slowly and defensively. These trees allocate a high proportion of their resources to defending themselves from pathogens, parasites and wounds. As a rule, trees with this type of growth tend to be long lived. Though like all other living things, they have a fairly predictable life span. Examples of this type of tree include the northwest *Pseudotsuga menziesii* - Douglas fir, and *Thuja plicata* - Western red cedar.

Deciduous trees are trees that annually shed leaves or needles. These trees have a tendency to grow quickly and try to “outgrow” problems associated with insects, disease and wounds. They allocate a relatively small portion of their internal resources to defense and rely instead upon an ability to grow more quickly than the pathogens which infect them. However, as these trees age, their growth rate declines and the normal problems associated with decay begins to catch up and compromise the tree’s structural integrity. Examples of this type of tree include *Salix*, *Populus* and *Alnus*.

Knowledge of the growth and failure patterns of individual tree species is critical to effective hazard analysis. Species vary widely in their rates of failure. The hazard tree evaluation rating system used by most arborists was developed by the Colorado Urban Forest Council and recognizes this variation in species failure and includes a species component as part of the overall hazard evaluation.

Site Observations:

The site is a 66,481 square foot unimproved lot located between I405 and Redmond. The homes in the area appear to have been built in the 1950's. I examined the trees on a rainy day, and much of the soil with saturated with water. The east side of the property is bordered by a small creek (which may be seasonal). The lot appears to have been cleared many years ago, and is primarily grasses, weeds and in places, Himalayan blackberries. There are several clusters of evergreen species trees, but most of the trees on site are deciduous.

Offsite trees Potentially Impacted by Development:

The canopies of offsite trees hang over the lot on the east, south and west side of the property and are identified in a separate table.

Method's used to determine tree location and tree health:

Trees were identified previously by numbered aluminum tags attached to the western side of the tree. All of the trees on site were examined using the Matheny and Clark¹ criteria for determining the potential hazard of trees in an urban environment as well as the Tree Risk Assessment in Urban Areas and The Urban/Rural Interface by Julian Dunster².

The tree diameter was measured using an aluminum "diameter tape measure." Tree canopy was measured from longest branch to longest branch with a cloth tape measure secured by a stake.

Spreadsheet Legend:

Tree tag #: Numbered aluminum tags attached to the trees in the field

Survey #: Numbers assigned to trees on the survey map by Survey company

DBH: Diameter of the tree measured at 42" above grade

Dripline Radius: Measurement in feet of the tree canopy from tree trunk to outermost branch tip

Health: A measurement of overall tree vigor and vitality rated as excellent, good, and fair or poor based on an assessment of crown density, leaf color and size, active callusing, shoot growth rate, extent of crown dieback, cambium layer health, and tree age

- Excellent: Tree is an ideal specimen for the species with no obvious flaws
- Good: Tree has minimal structural or situational defects
- OK: Minimal structural issues with poor
- Fair: Tree has structural or health issues that predispose it to failure if further stressed
- Poor: Tree has significant structural and/or health issues. It is exempt from total tree count.

Defects/Concerns: A measure of the tree's structural stability and failure potential based on assessment of specific structural features, e.g., decay, conks, co-dominant trunks, included bark, abnormal lean, one-sided canopy, history of failure, prior construction impact, pruning history, etc.

¹ Matheny, N., and Clark, J. 1994. *Evaluation of Hazard Trees in Urban Areas*. 2nd Edition. Champaign, Illinois: International Society of Arboriculture.

² Dunster, J.A. 2009. *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface: Course Manual*. Silverton, Oregon: Pacific Northwest Chapter, International Society of Arboriculture.

Proposed action:

- Retain
- Remove due to viability
- Remove due to planned development (tree is otherwise healthy)

Limits of disturbance/Tree protection zone: The area surrounding the tree that defines the area that surrounds the trunk that cannot be encroached upon during construction. This may be a multiple of the trunk diameter (1 -1.5 times the trunk diameter converted to feet) or it may be related to the width of the canopy. It is always determined by tree species and environment and is up to the discretion of the ISA Certified Arborist to determine

Species ID: Spreadsheet contains common names of trees which correspond to scientific names as follows:

- Apple: *Malus sp.*
- American sycamore: *Plantanus occidentalis*
- Austrian pine: *Pinus nigra*
- Bigleaf maple: *Acer macrophyllum*
- Birch: *Betula nigra*
- Bitter Cherry: *Prunus emarginata*
- Blue atlas cedar: *Cedrus atlantica 'Glauca'*
- Cedar: *Thuja plicata*
- Cherry: *Prunus sp.*
- Dawn redwood: *Chamaecyparis nootkatensis*
- Deodora cedar: *Cedrus deodara*
- Colorado blue spruce: *Picea pungens*
- Cottonwood: *Populus trichocarpa*
- Dogwood: *Cornus nuttallii*
- Douglas fir: *Pseudotsuga menziesii*
- English laurel: *Prunus laurocerasus*
- Filbert: *Corylus avellana var.*
- Grand fir: *Abies grandis*
- Hemlock: *Tsuga heterophylla*
- Holly: *Ilex aquifolium*
- Japanese maple: *Acer palmatum*
- Leylandii cypress: *Cupressocyparis leylandii*
- Lodgepole pine: *Pinus contorta*
- Mountain ash: *Sorbus americana*
- Mountain hemlock: *Tsuga mertensiana*
- Pear: *Pyrus sp.*
- Plum: *Prunus*
- Red Alder: *Alnus rubra*
- Red maple: *Acer rubrum*
- Walnut: *Juglans sp.*
- Western red cedar: *Thuja plicata*
- Weeping Alaska cedar: *Metasequoia glyptostrobides*
- White pine: *Pinus strobus*

Specific Tree Observations:

ABBREVIATED LEGEND- SEE REPORT FOR GREATER DETAIL

- #1: Graph number
- #2: Filed tag unique to each tree
- #3: Tree species
- #4: Trunk diameter measured 4.5 above ground
- #5: Adjusted DBH is the measure of trunk totals or a multiple of the tree diameter (.5 in some municipalities for cottonwood or alder)
- #6: Measure of branch length
- #7: Current health rated Excellent, Good, OK, Fair, Poor or Dead
- #8: More specific health observations about the tree

- #9: Proposed action as a consequence tree health and location -viability: the determination that a specific significant tree is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or as part of a grove.
- #10: Critical root zone/ Tree protection zone/Limits of disturbance in each direction
- #11: Measure of tree “value” may be determined by municipality formula or a direct measure of the trunk diameter

1	2	3	4	5	6	7	8	9						10				11	
								Proposed Action						CRZ/TPZ/LOD					
								Viable Retained	Viable removed	Viable Impacted	Non-viable Remove	Non-viable Impacted	Non-viable retained	N	W	E	S		Tree Value
DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments															
1	1515	Black cottonwood	35	35	-	Poor	Butt swell, decay, carpenter ant, dead wood, lean				1								Not significant Landmark
2	1520	Douglas fir	22	22	-	Poor	Wound on south side, abnormal bark, lost top, sloughing bark, red ring rot canker				1								Not significant
3	1521	Red alder	9	9	10	Good	typical of species.		1										Significant
4	1522	Douglas fir	24	24	20	OK	Self-corrected lean, sloughing bark, dead branches, thin canopy		1										Significant
5	1523	Western red cedar	28	28	-	Fair	Suppressed canopy tree, with open wound with w 50% of trunk decay, carpenter ant frass				1								Not significant
6	1524	Douglas fir	19	19	-	Fair	Growing on a nurse log, free running sap, abnormal bark,				1								Not significant

1	2	3	4	5	6	7	8	9						10				11	
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments	Proposed Action						CRZ/TPZ/LOD				Tree Value	
														Radius in feet					
								Viable Retained	Viable removed	Viable Impacted	Non-viable Remove	Non-viable Impacted	Non-viable retained	N	W	E	S		
							epicormic root												
7	1525	Western red cedar	24	24	-	Poor	Little taper, decay at root crown, trunk rot, thin canopy, open wound, carpenter ants					1							Not significant
8	1526	Bigleaf maple	29, 26, 22, 19	24	-	Fair	Dead branches, decay in roots and trunk typical of species.						1						Not significant
9	1527	Douglas fir	12	12	12	Fair	Dead wood, few branches, crack, canker - red ring rot						1						Not significant
10	1528	Bigleaf maple	26	26	20	OK	typical of species.				1				20	20	20	20	Significant
11	1529	Douglas fir	24	24	-	Fair	Abnormal bark, butt swell, self-corrected lean at 20'					1							Not significant
12	1530	Bigleaf maple	18,7,20,18	16	-	Poor	Mostly hollow					1							Not significant
13	1531	Bigleaf maple	40	40	-	Poor	Nurse tree, large column of decay in scaffold					1							Not significant Landmark
14	1532	Bigleaf maple	15, 13, 10	13	-	Poor	Nurse tree, large amount of decay					1							Not significant
15	1533	Bigleaf maple	12	12	-	Poor	12' long crack from base, nurse tree, carpenter ant, woodpecker					1							Not significant
16	1534	Bigleaf maple	12	12	-	Poor	Large wound, carpenter ants, woodpecker					1							Not significant

1	2	3	4	5	6	7	8	9						10				11	
								Proposed Action						CRZ/TPZ/LOD					
								Viable Retained	Viable removed	Viable Impacted	Non-viable Remove	Non-viable Impacted	Non-viable retained	Radius in feet					
N	W	E	S																
17	1535	<i>Bigleaf maple</i>	15, 19	17	-	Poor	Mostly dead				1								Not significant
18	1536	<i>Bigleaf maple</i>	10,12,8,8,12	10	-	Poor	Buttress root rot, decay in trunk, dead branches, open wound, armillaria mycelia visible , carpenter ants				1								Not significant
19	1537	<i>Bigleaf maple</i>	16	16	-	Poor	Buttress root rot, trunk rot, dead branches, carpenter ants				1								Not significant
20	1538	<i>Bigleaf maple</i>	10, 10, 10, 10	10	-	Poor	Root rot, trunk decay, dead wood, carpenter ant, woodpecker				1								Not significant
21	1539	<i>Bigleaf maple</i>	20	20	-	Poor	Root rot, trunk decay, carpenter ant, woodpecker				1								Not significant
22	1540	<i>Bigleaf maple</i>	10, 12, 5	12	-	Poor	Root rot, trunk rot, carpenter ant, one leader dead				1								Not significant
23	1541	<i>Bigleaf maple</i>	17	17	-	Poor	Nurse tree, lean, dead branches, trunk decay				1								Not significant
24	1542	<i>Bigleaf maple</i>	34	34	-	Poor	Abnormal bark, trunk decay, dead branches, Hypoxylon canker				1								Not significant
25	1543	<i>Bigleaf maple</i>	12, 9, 9, 23	13	-	Poor	Decay at root collar, decay in trunk, dead branches, 2 leaders are dead				1								Not significant Landmark
26	1544	<i>Western red cedar</i>	20	20	22	OK	Growing on a nurse log, Low live crown ratio		1										Significant

1	2	3	4	5	6	7	8	9						10				11	
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments	Proposed Action						CRZ/TPZ/LOD				Tree Value	
														Radius in feet					
								Viable Retained	Viable removed	Viable Impacted	Non-viable Remove	Non-viable Impacted	Non-viable retained	N	W	E	S		
27	1545	<i>Western red cedar</i>	36	36	-	Poor	76" X 10" column of visible dead wood, carpenter ant, pileated woodpecker				1								Not significant
28	1546	<i>Douglas fir</i>	20	20	-	Fair	Exposed roots, growing from nurse stump, abnormal bark, previous top failure, asymmetric canopy to south				1								Not significant
29	1547	<i>Western red cedar</i>	19	19	-	Poor	Conjoined base, exposed roots, 6' column of dead wood, carpenter ants,				1								Not significant
30	1548	<i>Western red cedar</i>	42	42	25	Good	Two leaders fused together, with included bark, exposed roots, thin canopy, slight lean to north		1										Significant Landmark
31	1549	<i>Douglas fir</i>	32	32	-	Poor	Free running sap, canker, consistent with red ring rot				1								Not significant
32	1550	<i>Western red cedar</i>	33	33	-	Fair	Large column of dead wood				1								Not significant Landmark
33	1551	<i>Douglas fir</i>	52	52	-	Poor	Decay, non-self-corrected lean, falling HAZARDOUS				1								Not significant Landmark
34	1552	<i>Western red cedar</i>	33	33	-	Fair	Decay in buttress roots, shedding bark				1								Not significant Landmark

1	2	3	4	5	6	7	8	9						10				11	
								Proposed Action						CRZ/TPZ/LOD					
								Viable Retained	Viable removed	Viable Impacted	Non-viable Remove	Non-viable Impacted	Non-viable retained	Radius in feet					
N	W	E	S																
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments												Tree Value
35	1553	Douglas fir	36	36	33	Fair	Slight bulge at root crown, canker at 20' , self-corrected lean, dead branches, lean, free flowing sap	1							33	33	33	33	Significant Landmark
36	1554	Western red cedar	54	54	36	Fair	Decay in Buttress roots, thin crown,	1							36	36	36	36	Significant Landmark
37	1555	Western red cedar	33	33	-	Dying	Very little live canopy, decay in buttress roots, carpenter ants						1						Not significant Landmark
38	1556	Western red cedar	30	30	16	Dying	Dead branches, thin canopy, low live crown ratio						1	16	16	16	16	Not significant Landmark	
39	1557	Western red cedar	12	12	8	Dying	Dead branches, thin canopy, low live crown ratio						1	8	8	8	8	Not significant Landmark	
40	1558	Bigleaf maple	21, 18, 16, 14, 14, 10	16	20	OK	Dead wood, moss	1							20	20	20	20	Significant
41	1559	Bigleaf maple	11	11	12	Fair	Large amount of decay at basal root flare	1							12	12	12	12	Significant
42	1560	Bigleaf maple	11	11	15	OK	Dead scaffold, branches, typical of species	1							15	15	15	15	Significant
43	1561	Bigleaf maple	13,13,16,15	14	20	OK	Trunks and scaffold decay typical of species	1							20	20	20	20	Significant
44	1562	Bigleaf maple	25, 12, 17	18	20	OK	Multiple leaders with included bark, decay typical of species.		1						20	20	20	20	Significant

1	2	3	4	5	6	7	8	9						10				11		
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments	Proposed Action						CRZ/TPZ/LOD				Tree Value		
								Viable Retained	Viable removed	Viable Impacted	Non-viable Remove	Non-viable Impacted	Non-viable retained	Radius in feet						
														N	W	E	S			
45	1563	Western red cedar	14	14	12	Poor	Growing on a nurse log, column of decay > 50%						1			12	12	12	12	Not significant
46	1564	Western red cedar	16	16	12	Poor	Girdled by barbed wire, growing on nurse log, decay									12	12	12	12	Not significant
47	1565	Bigleaf maple	17	17	12	Fair	No taper, large cavity of decay, dead wood									12	12	12	12	Not significant
48	1566	Bigleaf maple	22	22	16	Fair	2 large cavities of decay at trunk flare and 20'	1								16	16	16	16	Significant
49	1568	Bigleaf maple	7, 21, 16, 19	16	25	Fair	Decay typical of species could be pruned		1											Significant
50	1569	Bigleaf maple	17	17	12	OK	Low live crown ratio			1						12	12	12	12	Significant
51	1570	Bigleaf maple	12, 14, 10, 12	12	-	Poor	2 trunks dead						1							Not significant
52	1571	Bigleaf maple	9	9	-	Poor	Fell, Dead						1							Not significant
53	1572	Western red cedar	23	23	21	Good	Dead spur, exposed roots, thinning canopy			1						23	23	23	23	Significant
54	1573	Western red cedar	11	11	9	Fair	Large column of dead wood in trunk	1								9	9	9	9	Significant
55	1574	Bigleaf maple	14, 30, 16, 18, 23	20	-	Poor	typical of species. but worse							1						Not significant
56	1575	Bigleaf maple	24, 23	24	-	Poor	Nurse tree, decay in trunk, roots, carpenter ants, dead wood													Not significant

1	2	3	4	5	6	7	8	9						10				11	
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments	Proposed Action						CRZ/TPZ/LOD				Tree Value	
								Viable Retained	Viable removed	Viable Impacted	Non-viable Remove	Non-viable Impacted	Non-viable retained	Radius in feet					
														N	W	E	S		
57	1576	<i>Bigleaf maple</i>	22	22	-	Fair	Decay in buttress roots, ivy, co-dominant leaders with included bark				1								Not significant
58	1577	<i>Bigleaf maple</i>	34	34	-	Poor	No taper, no roots, included bark in leaders, split				1								Not significant
59	1578	<i>Bigleaf maple</i>	19, 7, 8, 19	13	-	Poor	Growing on a nurse log, log 2 of trunks are dead, self-corrected lean				1								Not significant
60	1579	<i>Bigleaf maple</i>	10,35,10,19,15,15,10,20,20	17	-	Poor	Growing as a nurse tree, too many leaders with included bark, dead wood in canopy				1								Not significant
61	1580	<i>Bigleaf maple</i>	23	23	-	Poor	Mostly dead, exposed roots, no taper, decay				1								Not significant
62	1581	<i>Bigleaf maple</i>	20, 11	16	-	Poor	Multiple failures, decay in trunk, dead wood				1								Not significant
63	1582	<i>Bigleaf maple</i>	12, 12	12	-	Poor	Exposed roots with decay, trunk decay, dead wood in canopy				1								Not significant
64	1583	<i>Bigleaf maple</i>	10	10	-	Fair	Not very much canopy, mostly trunk				1								Not significant
65	1584	<i>Bigleaf maple</i>	30, 26	28	14	Poor	Exposed roots with decay, trunk decay, dead wood					1		14	14	14	14	Not significant	
66	1589	<i>Black cottonwood</i>	18, 21	20	15	OK	Co-dominant leaders at 3' with included bark		1										Significant

1	2	3	4	5	6	7	8	9						10				11	
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments	Proposed Action						CRZ/TPZ/LOD				Tree Value	
														Radius in feet					
								Viable Retained	Viable removed	Viable Impacted	Non-viable Remove	Non-viable Impacted	Non-viable retained	N	W	E	S		
67	1590	<i>Black cottonwood</i>	21	21	18	Good	typical of species		1										Significant

Offsite Potentially Impacted trees:

1	2	3	4	5	6	7	8	9			10			
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD			
								Retained	Impacted	Non-viable	Radius in feet			
N	W	E	S											
2	1495	<i>Bigleaf maple</i>	16, 16, 16, 16	16	18	Good	Split, some dead wood, Typical of species	X			18			
3	1496	<i>Western red cedar</i>	8	8	16	Good	Typical of species	X			10			
4	1497	<i>Western red cedar</i>	10	10	12	Good	Typical of species	x			14			
5	1498	<i>Bigleaf maple</i>	19, 20	20	15	Poor	Lost ½ of canopy		x		15			
6	1499	<i>Douglas fir</i>	Est. 20	20	15	Poor	Abnormal bark, few branches, trunk decay, sap Red ring rot		x		15			
7	1500	<i>Douglas fir</i>	Est. 24	24	20	Poor	Low live canopy ratio, dead branches, canker, sap, red ring rot		x		20			
8	1501	<i>Bigleaf maple</i>	21	21	15	Fair	Typical of species	x			21			
9	1502	<i>Bigleaf maple</i>	15	15	15	Poor	Root rot has destroyed nearly all the roots		x		15			
10	1503	<i>Douglas fir</i>	Est. 14	14	10	Poor	Suppressed canopy, butt, rot, abnormal bar, thin canopy		x		14			
11	1504	<i>Western red cedar</i>	22	22	20	Fair	Abnormal bark, base swell, wound, thin canopy		x		22			
12	1505	<i>Western red cedar</i>	Est. 12	12	12	Good	Remove dying spur	x			12			
13	1506	<i>Douglas fir</i>	26	26	18	Fair	Typical of species		x		18			
14	1507	<i>Douglas fir</i>	13"	13	-	Poor	Tree broken off at base and fallen onto 1506		x		-			

1	2	3	4	5	6	7	8	9			10				
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				
								Retained	Impacted	Non-viable	Radius in feet				
											N	W	E	S	
15	1508	<i>Douglas fir</i>	30	30	21	Fair	Butt swell, , bark beings to slough at base of tree, beetle damage in one buttress root, probable early root rot	x			21				
16	1509	<i>Western red cedar</i>	9, 14	12	15	Poor	Co-dominant leaders join at 3' with included bark		x		15				
17	1510	<i>Douglas fir</i>	22	22	15	Poor	Abnormal bark, lean to north, Laminated root rot		x		15				
18	1511	<i>Bigleaf maple</i>	12, 10, 6, 9	9	16	Poor	Hypoxylon infected		x		16				
19	1512	<i>Douglas fir</i>	35	35	18	Poor	Butt swell, crack, shedding bark, probable Laminated root rot		x		18				
20	1513	<i>Douglas fir</i>	14	14	18	Poor	Shedding popping bark, falling to north, large wound, dead wood, probable laminated root rot		x		18				
21	1514	<i>Western red cedar</i>	12	12	16	Poor	Large wound, swollen butt, self-correct lean		x		16				
22	1516	<i>Black cottonwood</i>	18	18	20	Poor	Trunk broken off at 30'		x		20				
23	1517	<i>Black cottonwood</i>	11, 11	11	15	Poor	Dead wood in canopy, co-dominant leaders, free flowing sap, leans toward site but canopy does not protrude over site		x		15				
24	1518	<i>Black cottonwood</i>	24	24	No canopy over this site	OK	Leans toward property slightly, dead wood in canopy,	x						-	
25	1519	<i>Black cottonwood</i>	36	36	-	Poor	Self-corrected lean, crack with decay, dead wood, woodpecker		x					-	
26	1567	<i>Western red cedar</i>	16	16	12	Fair	Nurse tree	x						15	
27	1585	<i>Douglas fir</i>	Est. 16	16	-	Poor	Lost top, bulge at base, early signs of laminated root rot		x						

1	2	3	4	5	6	7	8	9			10				
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line Radius feet	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				
								Retained	Impacted	Non-viable	Radius in feet				
											N	W	E	S	
28	1586	<i>Bigleaf maple</i>	Est.18	18	18	Good	Typical of species	x						18	
29	1587	<i>Black cottonwood</i>	Est. 16	16	15	Good	Typical of species	x						15	
30	A	<i>Bigleaf maple</i>	36 est.	36	-	Falling	Wet soil, causing tree to fall onto property		x						

Proposed Action and Definition:

Proposed Action and Brief Definition				
Tree Type	Removal	Impacted	Retained	Total
Landmark (>30" DBH)	Number of removed landmark trees	Number of impacted landmark trees	Number of retained landmark	Total Landmark Trees
	1	0	2	3
	% of Removed Landmark Trees of All Landmark Trees	% of impacted Landmark Trees of all Landmark Trees	% of Retained Landmark Trees of All Landmark Trees	% Landmark Trees of All Landmark Trees
	1/3=33%	0%	2/3=66%	3/19=16%
Significant (6" - 30")	Number of removed significant trees	% Impacted of all significant trees	Number of Retained Significant Trees	Total Significant Trees
	7	3	6	16
	% Significant removed of all significant trees	% impacted of all significant	% retained of all significant	% significant trees of all Significant trees
	7/16=44%	3/16=19%	6/16=38%	16/19=82%
Totals	Number of Landmark + Significant removed trees	Number of Landmark + significant impacted	Number of Landmark + significant retained	Total Number of ALL Trees
	8	3	8	19
	% removed of all trees	% impacted of all Trees	% Retained of all Trees	
	8/19=42%	3/19=16%	8/19=42%	100%

Replacement Trees		
Removed Landmark (3:1)	1	3
Removed Significant (1:1)	7	7
Total # of Replacement trees		10

35% Tree Retention
RMC required 35% of significant trees be retained 19 X 35% = 6 trees
Proposed improvements retain 8 Trees

Photo documentation of site trees:



"A" Maple falling onto subject site



1553 Lean, decay in plane of lean, free running sap from crown



#1552 Decay in buttress roots, and trunk carpenter ants



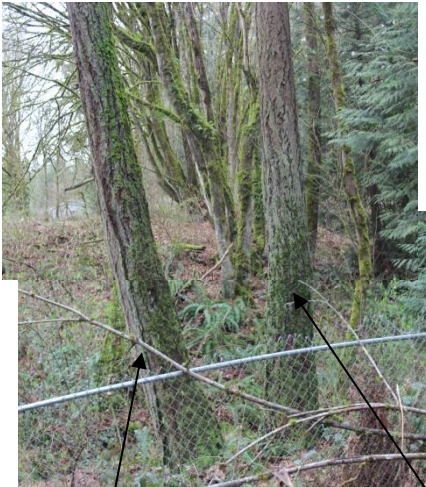
#1556 1557 Trunk and root crown decay



1529, lean, heaved soil, abnormal bark, decay in root and trunk



#1584 3 trunks one failed, co-dom leaders with included bark decay



#1499 split



1527, abnormal shedding bark, no taper, prob Laminated root rot

#1500 abnormal bark



1525: Cedar split with .70% trunk decay, carpenter ants



#1524 epicormic roots, decay at root crown and trunk



1497 1527 1496 All with laminated root rot



#1523 Roots decayed through



#1522 self-corrected lean on nurse log



#1520 previous large top failure



#1515 Dead top, dead branches



1589: Cottonwood with Co-dominant leader



#1549; red ring rot canker and conk

Sample of typical site maples, dead wood, decay, exposed roots, Hypoxylon canker



#1545 Large column of decay, with carpenter ants, woodpecker activity, sparse canopy



#1550 exposed roots with decay, large column of dead wood, carpenter ants and woodpecker

Offsite trees:



#1502 Maple with decay in buttress roots



#1503 abnormal bark, no taper, decay at root crown



1504: decay



#1505, OK, remove dead spur



#1506 abnormal bark #1507 (Fallen) #1508



#1506, abnormal bark, popping and shedding



#1509 Cedar, co-dom leaders w split

Discussion and Conclusion:

Most of the trees on this site are in very poor health. It appears that the health issues have revolved around the wet heavy soil on the site. There is a small creek on the eastern side of the property that has a number of trees along its bank on either side. Several of the trees on the west side of the creek are in poor health however they are proposed to be retained as they are included in a wetland area.

A retaining wall on the west side of the creek will impact several trees and necessitate the removal of others. The removal of the Landmark tree is necessary for the road access.

Impacted trees: tree numbers 1528, 1569, and 1563 are all Bigleaf maples. The measurements of their DBH's respectively are: 14", 26", and 18". They will be impacted in the dripline by the proposed retaining wall. Bigleaf maples as a species tolerate root damage and pruning well.¹

The retained trees are located along the creek, the majority are not in good health, however they are suitable for retention in the creek area.

Offsite impacted trees:

Many of the trees located offsite are in poor health, I recommend that the owners be notified of those trees and that they can be snagged.

Landmark trees:

There are 3 Landmark trees onsite. Number 1548 will need to be removed for access to the site.

Tree Protection Fencing:

First, protect roots that lie in the path of construction. Approximately 90 to 95 percent of a tree's root system is in the top three feet of soil, and more than half is in the top one foot. Construction activities should be avoided in this area. Protect as much of the area beyond the tree's dripline as possible. Some healthy trees survive after losing half of their roots. However, other species are extremely sensitive to root damage even outside the dripline.

Do not disturb the Critical Root Zone (CRZ). The CRZ is defined by its "critical root radius." It is more accurate than the dripline for determining the CRZ of trees growing in forests or that have narrow growth habits. To calculate critical root radius, measure the tree's diameter (DBH) in inches, 4.5 feet above the ground. For each inch, allow for 1 to 1.5 feet of critical root radius. If a tree's DBH is ten inches, its critical root radius is 10 to 15 feet.

In addition to the CRZ, it is important to determine the Limits of Disturbance (LOD) for preserved trees. Generally this approximates the CRZ however in previously excavated areas around the dripline the LOD may be smaller, or in the case of a tree situated on a slope the LOD may be larger. The determination of LOD is also subject to the particular tree species. Some tree species do better than others after root disturbance.

Tree protection is advised throughout the duration of any construction activities whenever the critical root zone or leaf canopy may be encroached upon by such activities.

The Critical Root Zone (CRZ) or LOD should be protected with fencing adequate to hinder access to people vehicles and equipment. Fencing detail is provided. It should consist of continuous 4 ft high temporary chain-link fencing with posts set at 10' on center or polyethylene laminar safety fencing or similar. The fencing must contain fencing signage detailing that the tree protection area cannot be trespassed on.

Soil compaction is one of the most common killers of urban trees. Stockpiled materials, heavy machinery and excessive foot traffic damage soil structure and reduce soil pore space. The effected tree roots suffocate. When construction takes place close to the protected CRZ, cover the site with 4 inches of bark to reduce soil compaction

Tree Protection fencing must be erected prior to soil excavation, boring, grading or fill operations. It is erected at the LOD. If it is necessary to run utilities within the LOD, the utilities should be combined into one cut, as practical. Trenching is not allowed in the LOD. In these areas boring or tunneling techniques should be used. In the event that roots greater than 1"

diameter near the LOD are damaged or torn, it is necessary to hand trim them to a clean cut. Any roots that are exposed during construction should be covered with soil as soon as possible.

During drought conditions, trees must be adequately watered. Site should be visited regularly by a qualified ISA Certified Arborist to ensure the health of the trees. Tree protection fencing is the last item to be removed from the site after construction is completed.

After construction has been completed, evaluate the remaining trees. Look for signs and symptoms of damage or stress. It may take several years for severe problems to appear.

In the event that fencing around portions of the CRZ of a tree to be retained are not practical to erect due to construction or obstacles, tree protection fencing should be placed three feet laterally from the obstruction (ex. three feet back of a curb, building, or other existing or planned permanent infrastructure).

Tree trunk protection is required where CRZ fencing is not practical. Tree trunks should be wrapped in pine 2X4's and accessible critical structural root zones covered with wooden pallets.

¹Mathney and Clark. 1998 *Trees and Development, A Technical Guide to Preservation of Trees during Land Development*. Champaign, IL International Society of Arboriculture

Assumptions and Limiting Conditions

1. Any legal description provided to the consultant/appraiser is assumed to be correct. Any titles and ownerships 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 thou 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.
3. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.
4. The consultant/appraiser shall not be required to give testimony or to attend court by reason of the 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 invalidates 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 the consultant/appraiser.
7. Neither all nor any part of the contents of the 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 the consultant/appraiser – particularly as to value conclusions, identity of the consultant/appraiser, or any reference to any professional society or instate or to any initialed designation conferred upon the consultant/appraiser as stated in her qualification.
8. The report and any values expressed herein represent the opinion of the consultant/appraiser, and the consultant's/appraiser's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs and photographs in this report, being intended as visual aid, are not necessarily to scale and should not be construed as engineering or architectural reports or survey.
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 not warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

Addendum #1

Definitions:

Critical Root Zone (CRZ) - The circular area around the base of a tree calculated as the distance to the furthest extent to the tree's dripline.

Development Project - Any construction activity including demolition, grading, drainage improvements, new construction of main house or accessory structures, added square footage to existing main house or accessory structures, site preparation and landscaping.

Diameter at Breast Height (DBH) - The diameter of the tree trunk at four and one-half feet (or 54 inches) above natural grade level. The diameter may be calculated by using the following formula: $DBH = \text{circumference at 4.5-feet} \times 3.14$. To determine the DBH of multi-trunk trees or measuring trees on slopes, consult the current Guide for Plant Appraisal, published by the Council of Tree and Landscape Appraisers.

Drip line - The circular area around the base of a tree measured by the furthest lateral extent of the foliage.

Project Arborist - A qualified professional who is qualified to evaluate trees such as a Certified Arborist, a Registered Consulting Arborist, a Licensed Landscape Architect or a Certified Forester. The project arborist is responsible for decisions related to vegetation on site before, during and after construction

Significant Tree - A healthy evergreen or deciduous tree, eight inches in diameter or greater at four feet above existing grade. (Land Use Code 20.50.046)

Street Tree - means any tree growing within the street right-of-way, outside of private property.

Tree Appraisal - means a method of determining the monetary value of a tree as it relates to the real estate value of the property, neighborhood, or community.

Tree Protection Plan (TPP) - A plan prepared by a certified arborist that outlines measures to protect and preserve trees.

Tree Protection Zone (TPZ) - The circular area around a tree calculated as one foot of radius for every inch of DBH, or at least 6 feet, whichever is greater that is required to be protected with a fenced enclosure.

Tree Protection Fencing - A temporary enclosure erected around a tree to be protected at the boundary of the tree protection zone. Tree protection fencing should consist of six 6 foot high chain link fence, mounted on two inch diameter metal posts, driven into the ground to a depth of at least 2-feet at no more than 10-foot spacing.

Warning Sign - A warning sign shall be prominently displayed on each fence. The sign shall be a minimum of 8.5 x 11-inches and clearly state: "WARNING – Tree Protection Zone - This fence shall not be removed and any injury to this or these trees is subject to penalty." Conditions of Use Trees and vegetation can be impacted during construction in many ways and often times the damage is not seen for several months or even years after the construction is completed. Proper tree protection can benefit not only the tree by reducing stress during construction but also the developer and property owner by reducing long term costs associated with future maintenance. The cost of removing a tree killed by construction after development is usually greater than the cost of protecting the tree during construction.

Common types of tree injuries that occur during construction may include:

- Mechanical injury to roots, trunk or branches
- Compaction of soil by storing of materials or equipment, which degrades the functioning of roots, inhibits the development of new roots and restricts drainage. Changes in existing grade which can cut or suffocate roots
- Alteration of the water table - either raising or lowering
- Changes in drainage patterns that promotes erosion or excessive accumulation of runoff
- Sterile soil conditions associated with stripping off topsoil
- Damage to roots from dumping of liquids or rinsing of construction equipment

Not all damage occurs to trees and vegetation during the actual construction of buildings or structures. Trees are often damage during the landscaping phase after the heavy equipment and workers have left. Installing irrigation, applying topsoil and turf installation also causes damage to trees. All construction-related impacts can produce long-term maintenance problems that can be avoided by following the BMPs set forth in the remainder of this chapter.

Planning & Permitting Phase

1. Inventory and evaluate all existing trees on the site and trees immediately adjacent with driplines or expected root zones extending onto the project site. The inventory and evaluation shall include, but not be limited to the following information:
 - A. Tree species
 - B. Tree size in DBH and canopy spread
 - C. Tree condition or observed defects
 - D. Tree numbers that are included in an inventory table. A calculation of the total diameter inches of significant trees on the site along with an indication of the interior or perimeter location of the tree, if applicable to the proposed development type and tree retention. Tree map showing the location of the existing significant trees on the site with numbers corresponding to the tree inventory table.
2. **Submit a Tree Protection Plan (TPP)** prepared by a Project Arborist that includes the following information:
3. Location of and description all significant trees that will remain on the project site per LUC 20.20.900
 - A. Illustration of the Tree Protection Zone (TPZ) for each tree is a radius of 1.5 feet for every inch of DBH or a minimum of 6 feet, whichever is greater.
 - B. The TPZ will regularly exceed the Critical Root Zone (CRZ), which is the outer edge of the tree's canopy, or drip line. The reduction of TPZ closer to the CRZ must be accompanied by mitigating measures and be approved in writing by the City of Bellevue. The TPZ may not be smaller than the CRZ.
 - C. Description of expected tree protection techniques that will be used on the project as per the Land Use Code and the Clearing and Grading Code All tree removal and pruning needed to make room for future structures and construction equipment should also be drawn on the base map A timetable for project meetings with the Project Team including a preconstruction meeting and the schedule for the Project Arborist monitoring. Calculation of appraisal amounts to be collected by the City as an assurance device in the form of a deposit equal to the tree appraisal value of all protected trees as determined under the methods described in the Guide for Establishing Value of Trees and Other Plants, published by the International Society of Arboriculture.

Pre-Construction Site Preparation Phase:

- Stage equipment away from trees and vegetation to be retained so that existing plants and their roots are protected.
- Fence off with chain link or construction fencing all entry and exit routes. When planning routes, avoid utility access corridors.
- Protect irrigation and drainage systems shall from damage unless plans call for renovation of such systems.
- Stake and/or flag clearing limits and tree protection to be verified and approved by the City's clearing and grading inspector at the required preconstruction meeting.
- Project Arborist will supervise and verify the following tree protection measures are in place and comply with the approved TPP:
 - A. A 6" layer of coarse mulch or woodchips is to be placed beneath the Tree Protection Zone (TPZ) of the protected trees. Mulch is to be kept 12" from the trunk. Trees that have been identified in the site inventory as posing a health or safety risk may be removed or pruned by no more than one-third, subject to approval of the required permit by the City of Bellevue. Pruning of existing limbs and roots shall occur under the direction of the Project Arborist.
 - B. Tree Protection Fencing of 6' chain link fencing shall be installed around the TPZ of protected tree(s). The fencing can be moved within the TPZ if authorized by the Clearing and Grading Inspector and the Project Arborist but not closer than 2' from the trunk of any tree. Fence posts shall be 1.5" in diameter and are to be driven 2' into the ground. The distance between posts shall not be more than 10'.

- C. Tree protection fencing shall have a warning signs prominently installed on each fence at 20-foot intervals. The sign shall be a minimum 8.5-inches x 11-inches and clearly state: "WARNING - Tree Protection Zone"
- D. Movable barriers of chain link fencing secured to cement blocks may be substituted for "fixed" fencing if the Project Arborist and City Staff agree that the fencing will have to be moved to accommodate certain phases of construction. The builder may not move the fence without authorization from the Project Arborist and City Staff. Should temporary access into the TPZ be approved, an additional 3" layer of gravel and 3/4" plywood shall be placed over the CRZ.

Construction Phase:

During the Construction phase, ensure the TPP is being followed and report any conflicts or deviations to the City of Bellevue Clearing and Grading Inspector. Monitor construction activities that require encroachment within the TPZ, such as grading or trenching.

Avoid the following conditions:

- 1. Allowing run off or spillage of damaging materials into the approved TPZ.
- 2. Storing construction materials or portable toilets, stockpiling of soil, or parking or driving vehicles within the TPZ.
- 3. Cutting, breaking, skinning, or bruising roots, branches, or trunks without first obtaining authorization from the Project Arborist.
- 4. Discharging exhaust into foliage.
- 5. Securing cable, chain, or rope to trees or shrubs.
- 6. Trenching, digging, tunneling or otherwise excavating within the CRZ or TPZ of the tree(s) without first obtaining authorization from the Project Arborist. Periodically inspect during construction - at four-week intervals - to assess and monitor the effectiveness of the TPP and provide recommendations for any additional care or treatment. More frequent may be required based on the TPP.

The following activities should be observed and inspected by the project arborist during the construction phase to ensure compliance with the approved TPP:

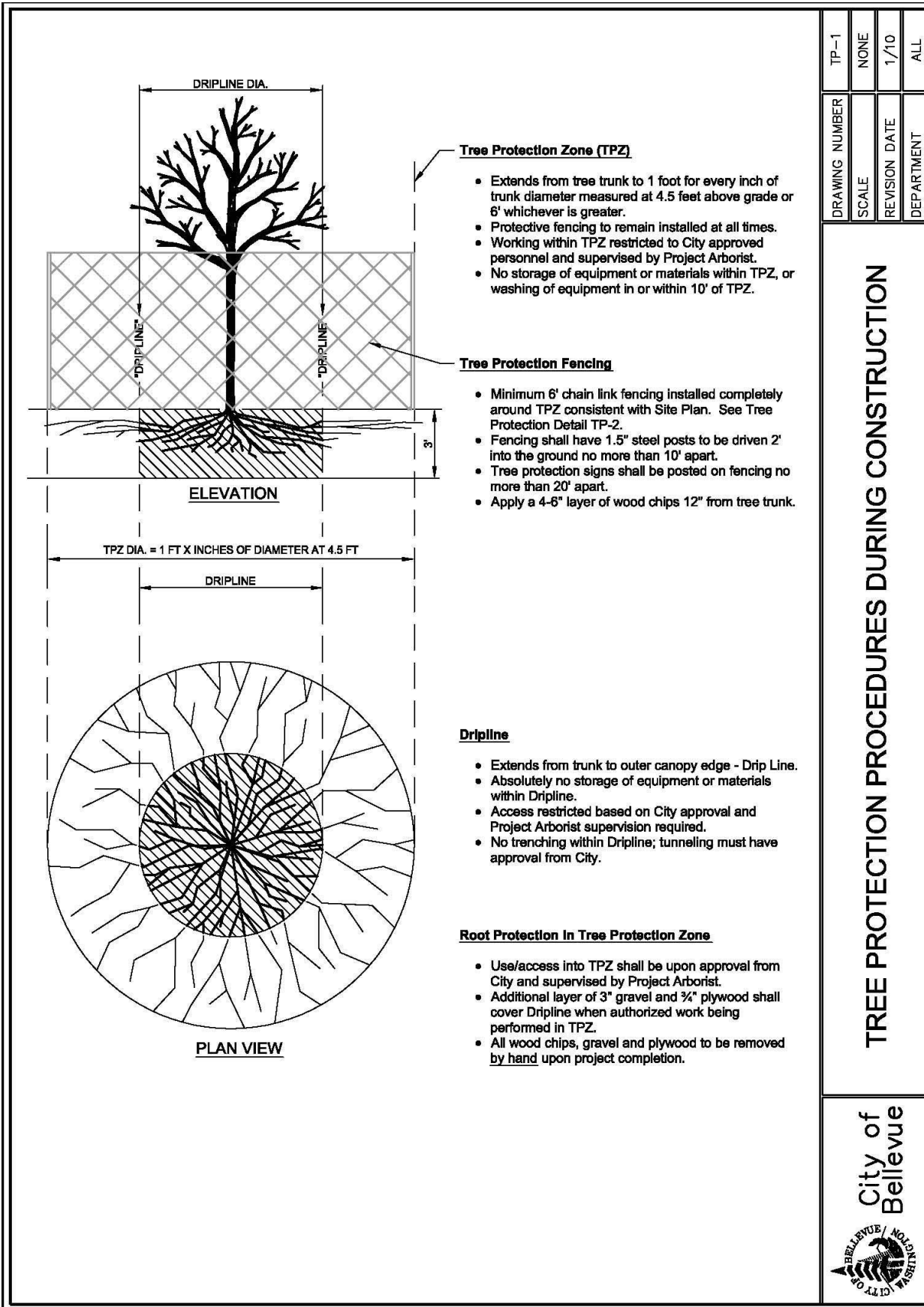
- 1. Only excavation by hand or compressed air shall be allowed within the TPZ of trees. Machine trenching shall not be allowed.
- 2. In order to avoid injury to tree roots, when a trenching machine is being used outside of the TPZ of trees, and roots are encountered smaller than 2", the wall of the trench adjacent to the trees shall be hand trimmed, making clear, clean cuts through the roots. All damaged, torn and cut roots shall be given a clean cut to remove ragged edges, which promote decay. Trenches shall be filled within 24 hours, but where this is not possible, the side of the trench adjacent to the trees shall be kept shaded with four layers of dampened, untreated burlap, wetted as frequently as necessary to keep the burlap wet. Roots 2" or larger, when encountered, shall be reported immediately to the Project Arborist, who will decide whether the Contractor may cut the root as mentioned above or shall excavate by hand or with compressed air under the root. All exposed roots are to be protected with dampened burlap.
- 3. Route pipes outside of the TPZ of a protected tree to avoid conflict with roots. Where it is not possible to reroute pipes or trenches, bore or tunnel beneath the TPZ of the tree, the boring shall take place not less than 3' below the surface of the soil in order to avoid encountering "feeder" roots. All boring equipment must be staged outside of the TPZ.
- 4. All grade changes adjacent to the TPZ of a significant tree shall be supervised by the Project Arborist. Cuts or Fills of soil that are adjacent to the TPZ will have a retaining wall system designed in consultation with the Project Arborist and approved in writing by City Staff.

5. Any damage due to construction activities shall be reported to the Project Arborist and City Staff within six hours so that remedial action can be taken.
6. The Project Arborist shall be responsible for the preservation of the designated trees. Should the builder fail to follow the tree protection specifications, it shall be the responsibility of the Project Arborist to report the matter to City Staff as an issue of non-compliance.

Post-Construction:

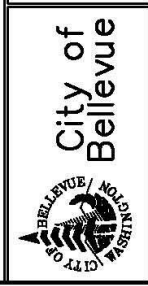
The Post-Construction Phase begins when the equipment leaves and the new tenants move in. Important follow-up monitoring of the protected trees will help ensure their survival and identify signs of early stress. The applicant shall arrange with the Project Arborist for the long-term care and monitoring of preserved trees by complying with the following conditions:

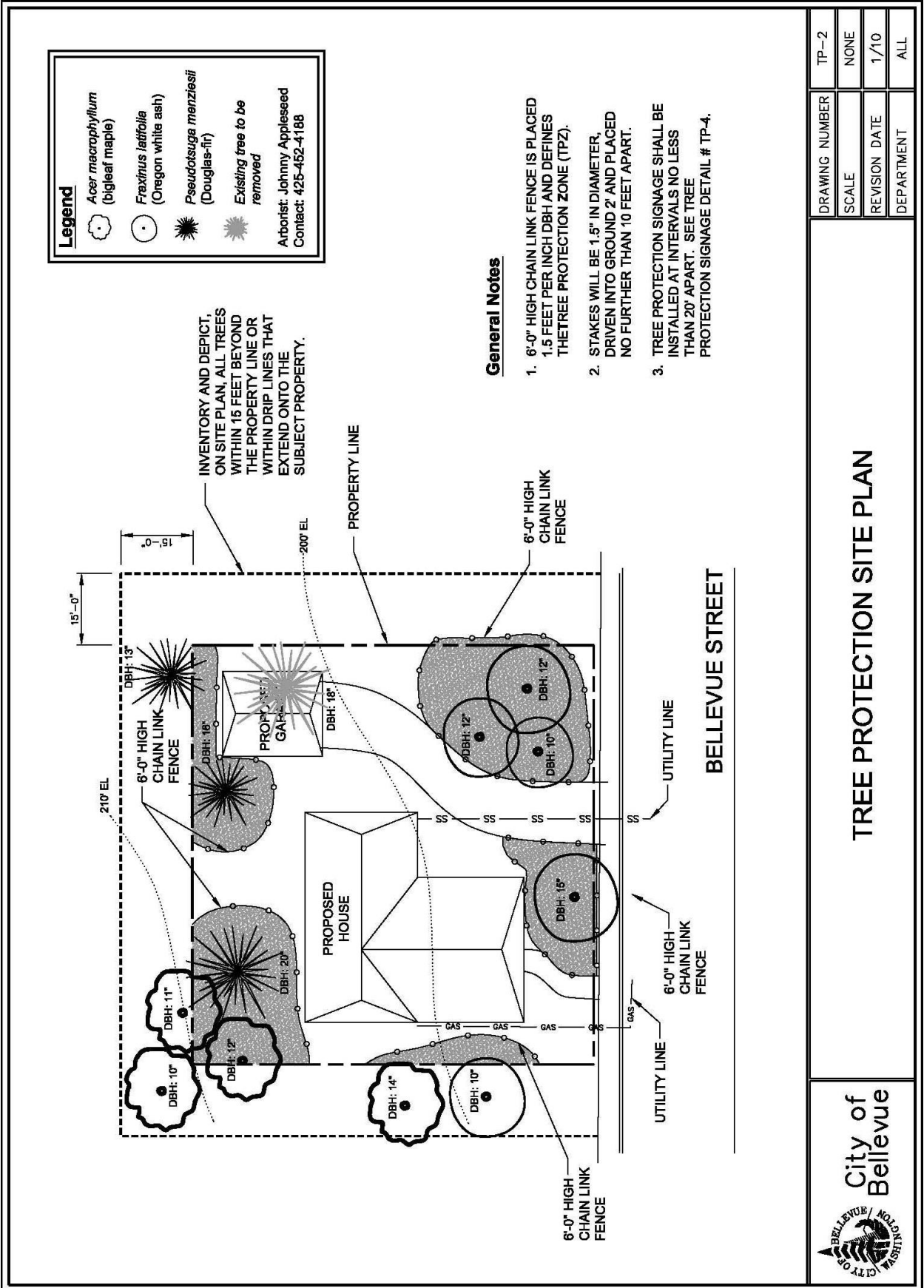
1. Complete post-construction tree maintenance, including pruning, mulching, and fertilization, irrigation, and soil aeration where necessary.
2. Remove, by hand, all soil and root protection material such as wood chips, gravel and plywood.
3. Provide for remediation of compacted soil by methods such as aeration or vertical mulching.
4. Apply at least 1 inch of water per week by deep watering in the absence of adequate rainfall.
5. Fertilize trees with slow released phosphorus, potassium, calcium, magnesium, and other macro- and micro-nutrients as indicated by a soil test, but wait at least one year to apply any nitrogen.
6. Fertilize lightly with slow release nitrogen after 1 year, and then make annual light nitrogen applications for the next 3 to 5 years.
7. Inspect trees annually for at least 3 and up to 5 years after construction to look for changes in condition and signs of insects or disease, and to determine maintenance needs.
8. Remove trees that are badly damaged or are in irreversible decline as determined by the Project Arborist and City Staff.
9. Continue to protect not only the large, established trees on the site but also those newly planted in the landscape.
10. Provide annual inspection reports to the City.



DRAWING NUMBER	TP-1
SCALE	NONE
REVISION DATE	1/10
DEPARTMENT	ALL

TREE PROTECTION PROCEDURES DURING CONSTRUCTION





Legend

- Acer macrophyllum* (bigleaf maple)
- Fraxinus latifolia* (Oregon white ash)
- Pseudotsuga menziesii* (Douglas-fir)
- Existing tree to be removed

Arborist: Johnny Applesseed
 Contact: 425-452-4188

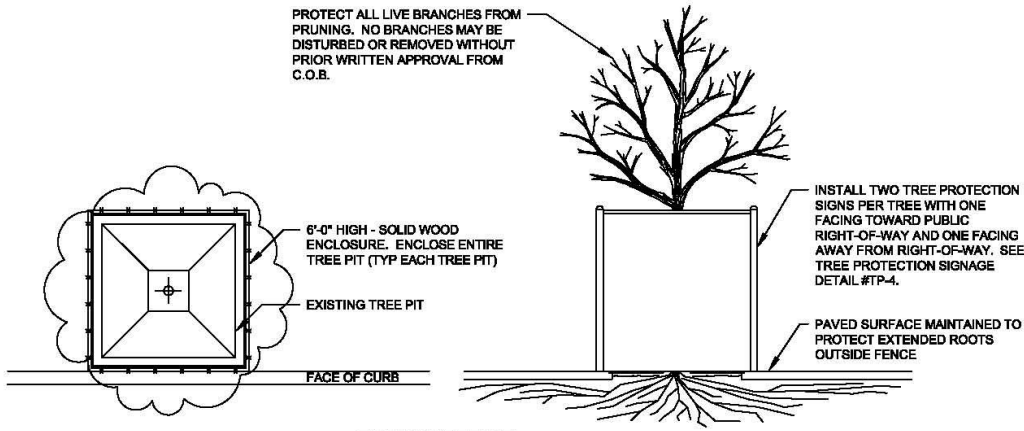
General Notes

1. 6'-0" HIGH CHAIN LINK FENCE IS PLACED 1.5 FEET PER INCH DBH AND DEFINES THE TREE PROTECTION ZONE (TPZ).
2. STAKES WILL BE 1.5" IN DIAMETER, DRIVEN INTO GROUND 2' AND PLACED NO FURTHER THAN 10 FEET APART.
3. TREE PROTECTION SIGNAGE SHALL BE INSTALLED AT INTERVALS NO LESS THAN 20' APART. SEE TREE PROTECTION SIGNAGE DETAIL # TP-4.

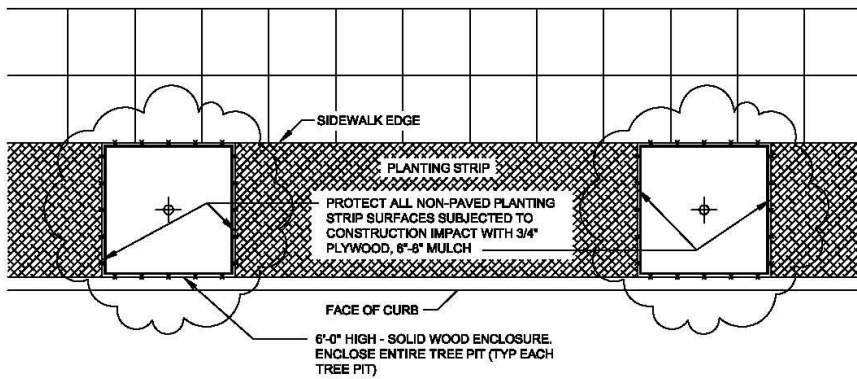
TREE PROTECTION SITE PLAN

DRAWING NUMBER	TP-2
SCALE	NONE
REVISION DATE	1/10
DEPARTMENT	ALL

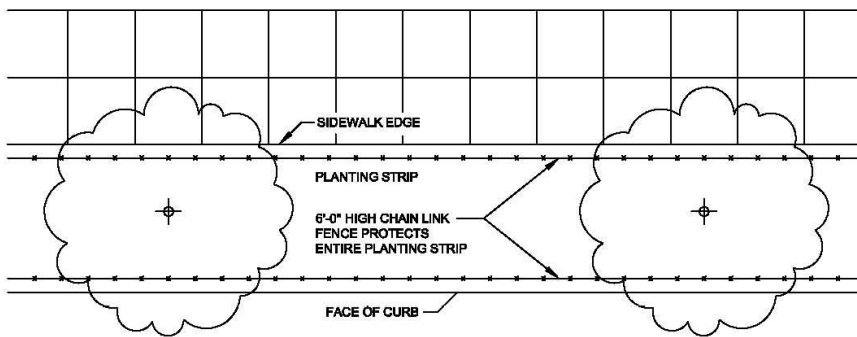




TREE IN TREE PIT



TREE IN PLANTING STRIP-OPTION 1



TREE IN PLANTING STRIP-OPTION 2

NOTE:
 DURING CURB REPLACEMENT, ROOTS WITHIN 8 INCHES OF DEPTH FROM
 BOTTOM OF CURB SHALL BE CUT WITH A CLEAN, SHARP SAW. ROOTS
 GREATER THAN 8 INCHES DEEP SHALL BE PRESERVED, UNLESS
 SPECIFICALLY DIRECTED BY C.O.B.

DRAWING NUMBER	TP-3
SCALE	NONE
REVISION DATE	1/10
DEPARTMENT	ALL

TREE PROTECTION STANDARD

