

December 8, 2020

Steve Elsoe  
Sea Run Investments, LLC

Site: 15515 NE 60<sup>th</sup> St  
Redmond, WA 98052  
Parcel number: TPN: 2182500061  
Site area: 21,965 sq. ft. = .5 acre

Dear Steve:

Thank you for requesting my services. On October 17, 2020, I was asked to perform a Level 2 Visual Tree Assessment (VTA) for all Significant\* and Landmark\* trees growing on the .5 - acre site located on the corner of NE 104<sup>th</sup> St. and 136<sup>th</sup> Ave NE in Redmond. The information gathered and included in this report is a necessary part of the City of Redmond's requirement for a Tree Preservation Plan to be included in the submittal for proposed site development.

In summary:

Tree Density Calculation	
Total number of trees	12
Total number of viable trees	7
Total number of non-viable trees	5
Total number of impacted trees	0
Total number of retained trees proposed	5
Required tree density 35%: (9 X 35%)	3
Required mitigation	2

I have included a detailed report of my findings, if you have any questions please contact me. I can be reached on my cell phone: 425.890.3808 or by email: [sprince202@aol.com](mailto:sprince202@aol.com).

Warm regards,



Susan Prince  
Creative Landscape Solutions  
ISA Certified Arborist #1481  
TRAQ Certified Arborist #481  
Landscape Designer  
425.890.3808

\*Significant tree is any tree with a DBH between 6"-29"; a Landmark tree is any tree with a DBH>30" Significant Tree; Any healthy tree six inches in diameter at breast height DBH or any tree four inches in diameter at breast height (DBH) that, after considering its age, height, value or function the tree or tree stand is determined to be significant (SMP). This term also applies Citywide. Landmark Tree. Any healthy tree over thirty inches in diameter RZC: 21.78

### **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 worked in the field of arboriculture since 1995, have been ISA Certified since 1999, and have been TRACE/TRAQ certified since 2009.

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, quantity 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). A defective tree cannot be considered hazardous without the presence of a target.

All trees have a finite lifespan 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 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 tend 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 current tree risk evaluation rating system accepted as the standard by the ISA was developed by the ISA in conjunction with Julian Dunster<sup>3</sup> and recognizes this variation in species failure and includes a species component as part of the overall risk evaluation.

### Site Observations:

The parcel is located east of 520 and immediately south of NE 60<sup>th</sup> St in Redmond, WA. It is north of the Microsoft campus. The topography is relatively flat accessed by a crushed gravel driveway lined with non-viable fruit trees and locust trees. The perimeter is planted with a mix of screening trees

### 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 the trees on site were examined using the Matheny and Clark<sup>1</sup> 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 Dunster<sup>2</sup>. Tree diameters were measured using a logger's tape, and tree driplines were measured by a Nikon Forestry PRO Laser Rangefinder<sup>TM</sup>.

### ABBREVIATED LEGEND- SEE REPORT FOR GREATER DETAIL

1. Numerical ordering
2. Tree tag #: numbered aluminum tags attached to the trees in the field
3. Tree species ID: common and botanical names
  - 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 deltoides*
  - 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 glyptostroboides*
  - White pine: *Pinus strobus*
4. DBH: diameter of the tree measured in inches at 4.5' above grade RZC 21.78 The diameter of any tree trunk, measured at four and one-half feet above average grade. For species of trees whose normal growth habit is characterized by multiple stems (e.g. hazelnut, vine maple), diameter shall mean the average diameter of all stems of the tree, measured at a point six inches from the point where the stems digress from the main trunk. In no case shall a branch more than six inches above average grade be considered a stem (SMP)
5. Adj. DBH: multiple trunk tree DBH in inches calculated per municipality directives
6. Dripline Radius: measurement in feet of the tree canopy from tree trunk to outermost branch tip via laser rangefinder
7. Windfirm/OK in grove: if a viable tree is determined to be in unstable or wet soil, it is presumed to be susceptible to windthrow. If there is no comment in the column the tree is presumed to be windfirm. If a standalone tree is structurally too weak to be retained, it can sometimes be retained, if its location is within a grove
8. Health: a measurement of overall tree vigor and vitality rated as excellent, good, OK, 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 may have some minimal structural or situational defects
  - OK: The tree may have an average amount of structural issues, and/or some insect or disease issues, and/or some environmental issues, however, considering the species, the trees will withstand the stress of construction and/or the change in environmental conditions without an increased risk of failure
  - Fair: Tree has structural or health issues that predispose it to failure if further stressed, this tree may be unsuitable for retention as a single tree, however depending on the species, it may be suitable for retention if it is retained within a grove
  - Poor: Tree has significant structural and/or health issues. It is dead or dying and is generally exempt from total tree count
9. 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.
10. Proposed action:
- Retain
  - Impacted
  - Remove due to viability
  - Remove due to planned development (tree is otherwise healthy)
11. 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
12. A tree <6" <30" is considered to be "Significant"; a tree < 30" is considered to be a "Landmark" tree" Significant Tree; Any healthy tree six inches in diameter at breast height DBH or any tree four inches in diameter at breast height (DBH) that, after considering its age, height, value or function the tree or tree stand is determined to be significant (SMP). This term also applies Citywide. Landmark Tree. Any healthy tree over thirty inches in diameter RZC: 21.78
13. Measure of tree "value" may be determined by municipality formula or a direct measure of the trunk diameter to determine significance, or count

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

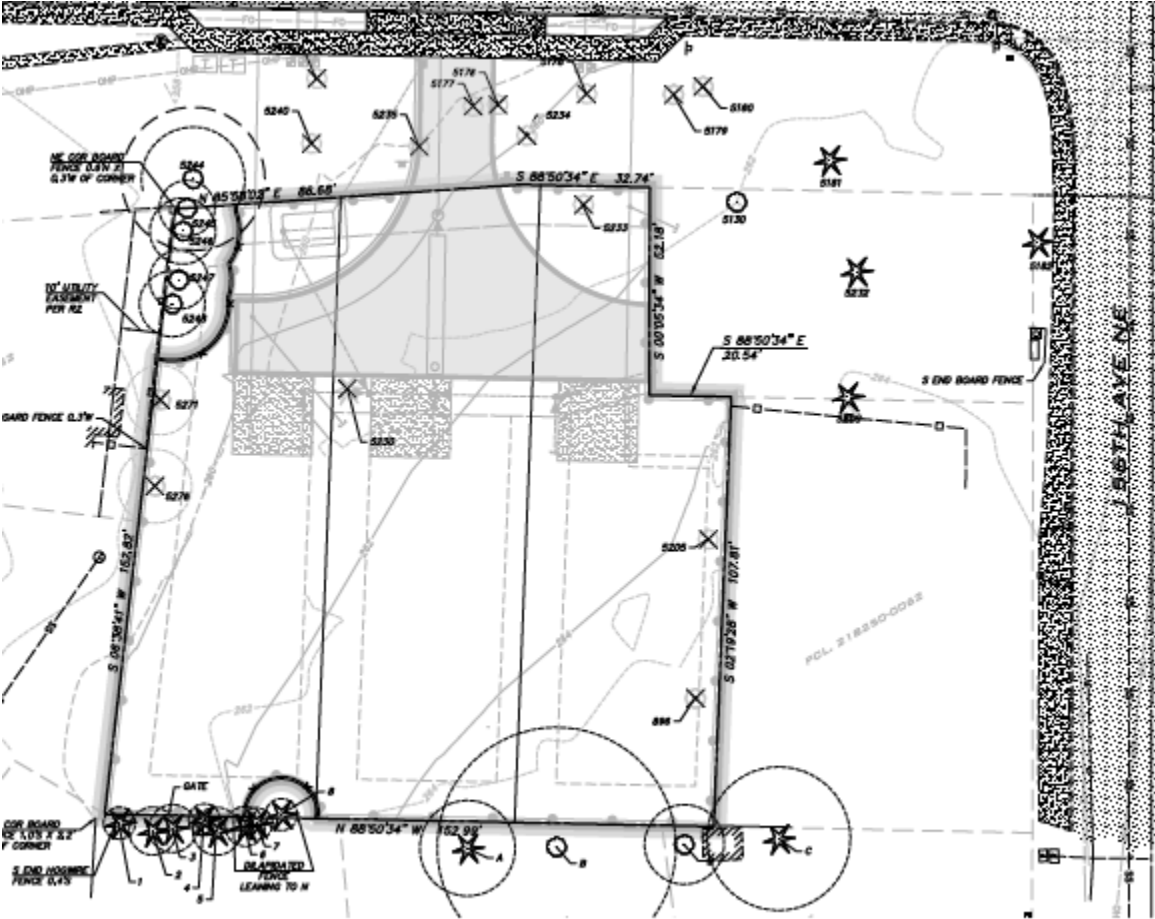
<sup>2</sup> Dunster, J.A. 2009. *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface: Course Manual*. Silverton, Oregon: Pacific Northwest Chapter, International Society of Arboriculture.

<sup>3</sup> Dunster, Julian A., E. Thomas Smiley, Nelda Matheny and Sharon Lilly. *Tree Risk Assessment Manual*. Champaign, Illinois: International Society of Arboriculture, 2013.

Aerial View of Site:



Proposed improvements (see accompanying civil engineering plans):



if the tree is considered "fair" can you further explain why it is also considered "nonviable"?

if the trees are non-viable are they not considered "significant" per the RZC definition?

Onsite Tree Observations:

1 #	2 Tree Tag #	3 Species ID	4 DBH (in)	5 Adj. DBH (in)	6 Drip-line radius (ft)	7		8 Health	9 Defects/Comments	10 Proposed Action				11 CRZ/TPZ/LOD Radius in feet plus 5' buffer				12 Significant/ Landmark	13			
						Wind-firm	OK in grove			Retain		Remove		N	W	E	S		Value of all trees	Value of viable trees	Value of retained trees	
										Viable	Impacted	Non-viable	Remove									
1	8	Leylandii	8	8	4 over fence			OK	Typical of species, south end of property	1					9	9	9	9	1	1	1	S
2	896	Locust	30, 22, 15	40	18			Fair	Co-dominant leaders with included bark x3 @ root crown, decay in root crown, debris over crown			1			23	23	23	23	1			L
3	5205	Mountain Ash	26	26	13			Poor	Mostly dead			1			18	18	18	18	1			S
4	5230	Western red cedar	51	51	16			Fair	Thin canopy, previous top loss @ 70'			1			21	21	21	21	1			L
5	5231	Locust	9,7	11	15			Poor	co-dominant leader with included bark X 2 @ 1', cavity of decay at root crown to 2'			1			20	20	20	20	1			S
6	5233	Apple	8	8	10			Poor	Falling towards west			1			15	15	15	15	1			S
7	5245	Poplar	10, 4	11	7		Y	Fair	Co-dominant leaders with included bark x2 @ root crown, previous scaffold failure	1					12	12	12	12	1	1	1	S
8	5246	Poplar	18, 6	19	9		Y	Fair	Co-dominant leaders with included bark x2 @ 4', moss and lichen	1					14	14	14	14	1	1	1	S
9	5247	Poplar	20	20	8		Y	Fair	Dead wood, broken branches, typical of species	1					13	13	13	13	1	1	1	S

1 #	2 Tree Tag #	3 Species ID	4 DBH (in)	5 Adj. DBH (in)	6 Drip-line radius (ft)	7		8 Health	9 Defects/Comments	10 Proposed Action				11 CRZ/TPZ/LOD Radius in feet plus 5' buffer				12 Significant/ Landmark	13		
						Wind-firm	OK in grove			Retain		Remove		N	W	E	S		Value of all trees	Value of viable trees	Value of retained trees
										Viable	Impacted	Non-viable	Remove								
10	5248	Poplar	15	15	9		Y	Fair	Dead wood, broken branches, typical of species	1				14	14	14	14	1	1	1	S
11	5271	Poplar	17	17	9		Y	Fair	Moss and lichen, dead wood, broken branches, typical of species				1	14	14	14	14	1	1		S
12	5276	Poplar	12, 12, 9, 6	20	10		Y	Fair	Co-dominant leaders with included bark x4 @ root crown, dead wood, broken branches, moss and lichen, hanger, typical of species				1	15	15	15	15	1	1		S
										5	0	5	2					12	7	5	

RZC 21.72.060 C.3

\* Trees impacted by utilities

\*\*Reduced dripline in direction of utilities

Significant: 12 trees  
Removed significant trees : 7 (58%)  
Retained significant trees: 5 (42%)

Offsite Trees:

1 #	2 Tree Tag #	3 Species ID	4 DBH (in)	5 Adj. DBH (in)	6 Drip-line radius (ft)	7		8 Health	9 Defects/Comments	10 Proposed Action			11 CRZ/TPZ/LOD Radius + 5'			
						Wind-firm	OK in grove			Ret		Remove	N	W	E	S
										Viable	Non-viable					
1	1	Leylandii	8	8	4 over fence			OK	Typical of species, south end of property	1			9	9	9	9



1	2	3	4	5	6	7		8	9	10			11			
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD			
										Ret	Remove		Radius + 5'			
										Viable	Non-viable	Remove	N	W	E	S
2	2	Leylandii	8	8	4 over fence			OK	Typical of species, south end of property	1			9	9	9	9
3	3	Leylandii	8	8	4 over fence			OK	Typical of species, south end of property	1			9	9	9	9
4	4	Leylandii	8	8	4 over fence			OK	Typical of species, south end of property	1			9	9	9	9
5	5	Leylandii	8	8	4 over fence			OK	Typical of species, south end of property	1			9	9	9	9
6	6	Leylandii	8	8	4 over fence			OK	Typical of species, south end of property	1			9	9	9	9
7	7	Leylandii	8	8	4 over fence			OK	Typical of species, south end of property	1			9	9	9	9
8	5130	Locust	9,9	13	14			Poor	Co-dominant leader with included bark x 2 @ 1', cavity @ root crown to 1'		1		19	19	19	19
9	5175	Mountain Ash	20	20	16			Poor	Mostly dead		1		21	21	21	21
10	5176	Locust	12	12	13			Fair	Twisted trunks, moss and lichen, typical of species		1		18	18	18	18
11	5177	Locust	12, 10	15.5	18			Poor	Co-dominant leaders with included bark x2 @ root crown, large cavity @ 15' up to 25' towards north		1		23	23	23	23

1	2	3	4	5	6	7		8	9	10			11			
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD			
										Ret	Remove		Radius + 5'			
										Viable	Non-viable	Remove	N	W	E	S
12	5178	Locust	11,9	14	18			Fair	Co-dominant leader with included bark X2 @ root crown, asymmetric canopy north, dead wood, broken branches, moss and lichen		1		23	23	23	23
13	5179	Locust	9,9	13	18			Fair	co-dominant leader with included bark X2 @ root crown		1		23	23	23	23
14	5180	Locust	10,9,6	15	18			Fair	co-dominant leader with included bark X3 @ 1', moss and lichen, decay ar root crown		1		23	23	23	23
15	5181	Western red cedar	33	33	15			Poor	<b>Large column of decay @ root crown to 25', carpenter ants, woodpecker activity, flagging</b>		1		20	20	20	20
16	5182	Western red cedar	44	44	13			Fair	<b>Thin canopy, previous top loss, co-dominant leader with included bark X 2 @70'. Elongated branch's</b>		1		18	18	18	18
17	5200	Douglas fir	29	29	16			Fair	Popping bark, abnormal bark, shedding bark, free flowing sap, previous top loss@ 70'		1		21	21	21	21

1	2	3	4	5	6	7		8	9	10			11			
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD			
										Ret	Remove		Radius + 5'			
										Viable	Non-viable	Remove	N	W	E	S
18	5232	Douglas fir	18	18	16			Fair	Woodpecker activity, carpenter ants, abnormal bark, shedding bark, popping bark, thin canopy, previous top loss		1		21	21	21	21
19	5234	Cherry	4,9	10	12			Fair	Co-dominant leader with included bark X2 @ 4', gumosis, decay @ 4', moss and lichen, typical of species		1		17	17	17	17
20	5235	Locust	13, 12	17.5	20			Poor	Co-dominant leaders with included bark x2 @ root crown, large scaffold failure @ 6' up to 15'		1		25	25	25	25
21	5240	Mountain Ash	29	29	16			Poor	Mostly dead		1		21	21	21	21
22	5244	Poplar	28	28	13		Y	Fair	Dead wood, broken branches, typical of species	1			18	18	18	18
23	5244	Poplar	28	28	13		Y	Fair	Dead wood, broken branches, typical of species	1			18	18	18	18
24	A	Douglas fir	16	16	12 over fence			OK	Previous top loss, elongated branches, dead wood, broken branches, dead twigs, typical of species	1			17	17	17	17

1	2	3	4	5	6	7		8	9	10			11			
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD			
										Ret	Remove		Radius + 5'			
										Viable	Non-viable	Remove	N	W	E	S
25	B	Locust	10, 10, 10, 10	20	30 over fence			Fair	Co-dominant leaders with included bark x4 @ root crown, scaffold failures, ivy @ root crown up to 30'		1		35	35	35	35
26	C	Deodora	18	18	18		Y	Fair	Co-dominant leaders with included bark x3 @ 40', weak laterals, thin canopy	1			23	23	23	23
27	D	Red alder	8, 6, 10	14	10			Fair	Co-dominant leaders with included bark x3 @ root crown, previous top loss, asymmetric canopy towards north		1		15	15	15	15

11 16 0

Modify as necessary  
with reporting  
modifications

Tree Matrix Calculations:

Tree Retention Matrix				
Tree type	Removed	Impacted	Retained	Total
Landmark (>30" DBH)	Number of removed landmark trees	Number of impacted landmark trees	Number of retained landmark trees	Total Landmark Trees
	0	0	0	0
	% of Removed Landmark Trees of All Landmark Trees	% of impacted Landmark Trees of all Trees	% of Retained Landmark Trees of All Landmark Trees	% Landmark Trees of All Trees
	0%	0%	0%	0%
Significant (6" - 30")	Number of removed significant trees	Number of impacted significant trees	Number of Retained Significant Trees	Total number of significant trees
	<del>7</del> 2	0	5	<del>7</del> 12
	% Significant removed of all significant trees	% impacted of all significant trees	% retained of all significant trees	% significant trees of all trees
	29%	0%	71%	100%
Totals	Number of Landmark + Significant removed trees	Number of Landmark + significant impacted	Number of Landmark + significant retained	Total Number of ALL Trees
	2	0	5	12
	% removed of all trees	% impacted of all Trees	% Retained of all Trees	
	29%	0%	71%	100%

Mitigation:

Replacement Trees			
Replacement Quota	Number of trees	Number of replacement trees	Total number of replacement trees
Removed Landmark (3:1)	0	0	0
Impacted Landmark (3:1)	0	0	0
Removed Significant (1:1)	2	2	2
Impacted Significant 1:1)	0	0	0
Total # of Replacement trees			2

Per the RZC 21.72 all Landmark Trees (DBH > 30") are to be replaced at a 3:1 ratio; all Significant trees removed are to be replaced at a 1:1 ratio.

35% Tree Retention*
35% of significant trees be retained 7 * 35% = 2.45 = 3 Trees
Proposed improvements impacts 0 trees
Proposed improvements retains 5 Trees
Mitigation 2 Trees

\*Per RZC 21.72.060

RZC 21.72 code specifies that the replacement trees meet or exceed the American Nursery and Landscape Standard and that the minimum sizes for replacement be:

- 2.5" caliper at breast height for a deciduous tree
- 6-8' tall for an evergreen replacement

**Replanting plan (see Landscape Architect Re-planting Plan with civil engineering submittal**

**Onsite Removed Tree Matrix:**

Onsite Removed Tree Matrix											
#	Tree Tag #	D= Evergreen Deciduous	Species ID	DBH (in)	Healthy	Fair	Dead or Dying	Photo #	Significant Tree > 6" < 30"	Landscape Tree > 30"	Notes
					If greater than 6" DBH considered Significant tree			# if photo of tree is provided			
1	896	D	Locust	40			1			L	Co-dominant leaders with included bark x3 @ root crown, decay in root crown, debris over crown
2	5205	D	Mountain Ash	26			1		S		Mostly dead
3	5230	E	Western red cedar	51			1			L	Thin canopy, previous top loss @ 70'
4	5231	D	Locust	11			1		S		co-dominant leader with included bark X 2 @ 1', cavity of decay at root crown to 2'
5	5233	D	Apple	8			1		S		Failing towards west
6	5271	D	Poplar	17		1			S		Moss and lichen, dead wood, broken branches, typical of species
7	5276	D	Poplar	20		1			S		Co-dominant leaders with included bark x4 @ root crown, dead wood, broken branches, moss and lichen, hanger, typical of species

2 5

Total Removals Requested	7
Total Onsite Significant Trees (6"-29")	5
Total Onsite Landmark Trees (30"+)	2

dead/ dying trees are not considered significant.  
see RZC definition

**Onsite Retained Matrix:**

Onsite Retained Matrix											
#	Tree Tag #	D = Evergreen Deciduous	Species ID	DBH (in)	Healthy	Fair	Dead or Dying	Photo #	Significant Tree > 6" < 30"	Landscape Tree > 30"	Notes
					If greater than 6" DBH considered Significant tree			# if photo of tree is provided			
1	8	E	Leylandii	8	1				S		Typical of species, south end of property
2	5245	D	Poplar	11		1			S		Co-dominant leaders with included bark x2 @ root crown, previous scaffold failure
3	5246	D	Poplar	19		1			S		Co-dominant leaders with included bark x2 @ 4', moss and lichen
4	5247	D	Poplar	20		1			S		Dead wood, broken branches, typical of species
5	5248	D	Poplar	15		1			S		Dead wood, broken branches, typical of species
					1	4	0	0			

Total Proposed for Retention	5
Total Onsite Significant Trees Proposed to be Retained	5
Total Onsite Landmark Trees Proposed to be Retained	0

**Offsite Tree Health Matrix:**

Offsite Tree Health Matrix											
#	Tree Tag #	D = Evergreen Deciduous	Species ID	DBH (in)	Healthy	Fair	Dead or Dying	Photo #	Significant Tree > 6" < 30"	Landscape Tree > 30"	Notes
					If greater than 6" DBH considered Significant tree			# if photo of tree is provided			
1	1	E	Leylandii	8	1				S		Typical of species, south end of property
2	2	E	Leylandii	8	1				S		Typical of species, south end of property
3	3	E	Leylandii	8	1				S		Typical of species, south end of property
4	4	E	Leylandii	8	1				S		Typical of species, south end of property
5	5	E	Leylandii	8	1				S		Typical of species, south end of property
6	6	E	Leylandii	8	1				S		Typical of species, south end of property
7	7	E	Leylandii	8	1				S		Typical of species, south end of property

Offsite Tree Health Matrix											
#	Tree Tag #	E=Evergreen D=Deciduous	Species ID	DBH (in)	Healthy	Fair	Dead or Dying	Photo #	Significant Tree >6" <30"	Landscape Tree >30"	Notes
					If greater than 6" DBH considered Significant tree			# if photo of tree is provided			
8	5130	D	Locust	13			1		S		Co-dominant leader with included bark x 2 @ 1', cavity @ root crown to 1'
9	5175	D	Mountain Ash	20			1		S		Mostly dead
10	5176	D	Locust	12			1		S		Twisted trunks, moss, and lichen, typical of species
11	5177	D	Locust	15.5			1		S		Co-dominant leaders with included bark x2 @ root crown, large cavity @ 15' up to 25' towards north
12	5178	D	Locust	14			1		S		Co-dominant leader with included bark X2 @ root crown, asymmetric canopy north, dead wood, broken branches, moss, and lichen
13	5179	D	Locust	13			1		S		co-dominant leader with included bark X2 @ root crown
14	5180	D	Locust	15			1		S		co-dominant leader with included bark X3 @ 1', moss and lichen, decay at root crown
15	5181	E	Western red cedar	33			1			L	<b>Large column of decay @ root crown to 25', carpenter ants, woodpecker activity, flagging</b>
16	5182	E	Western red cedar	44			1			L	<b>Thin canopy, previous top loss, co-dominant leader with included bark X 2 @70'. Elongated branch's</b>
17	5200	E	Douglas fir	29			1		S		Popping bark, abnormal bark, shedding bark, free flowing sap, previous top loss@ 70'
18	5232	E	Douglas fir	18			1		S		Woodpecker activity, carpenter ants, abnormal bark, shedding bark, popping bark, thin canopy, previous top loss
19	5234	D	Cherry	10			1		S		Co-dominant leader with included bark X2 @ 4', gumosis, decay @ 4', moss and lichen, typical of species



Offsite Tree Health Matrix											
#	Tree Tag #	E=Evergreen D=Deciduous	Species ID	DBH (in)	Healthy	Fair	Dead or Dying	Photo #	Significant Tree >6" <30"	Landscape Tree >30"	Notes
					If greater than 6" DBH considered Significant tree			# if photo of tree is provided			
20	5235	D	Locust	17.5			1		S		Co-dominant leaders with included bark x2 @ root crown, large scaffold failure @ 6' up to 15'
21	5240	D	Mountain Ash	29			1		S		Mostly dead
22	5244	D	Poplar	28		1			S		Dead wood, broken branches, typical of species
23	5244	D	Poplar	28		1			S		Dead wood, broken branches, typical of species
24	A	E	Douglas fir	16	1				S		Previous top loss, elongated branches, dead wood, broken branches, dead twigs, typical of species
25	B	D	Locust	20			1		S		Co-dominant leaders with included bark x4 @ root crown, scaffold failures, ivy @ root crown up to 30'
26	C	E	Deodora	18	1				S		Co-dominant leaders with included bark x3 @ 40', weak laterals, thin canopy
27	D	D	Red alder	14			1		S		Co-dominant leaders with included bark x3 @ root crown, previous top loss, asymmetric canopy towards north
					9	2	16	0			

**Onsite Tree Health Matrix:**

Onsite Tree Health Matrix											
#	Tree Tag #	E=Evergreen D=Deciduous	Species ID	DBH (in)	Healthy	Fair	Dead or Dying	Photo #	Significant Tree >6" <30"	Landscape Tree >30"	Notes
					If greater than 6" DBH considered Significant tree			# if photo of tree is provided			
1	8	E	Leylandii	8	1				S		Typical of species, south end of property
2	<b>896</b>	D	<b>Locust</b>	<b>40</b>			<b>1</b>			L	<b>Co-dominant leaders with included bark x3 @ root crown, decay in root crown, debris over crown</b>

Onsite Tree Health Matrix											
#	Tree Tag #	E=Evergreen D=Deciduous	Species ID	DBH (in)	Healthy	Fair	Dead or Dying	Photo #	Significant Tree >6" <30"	Landscape Tree >30"	Notes
					If greater than 6" DBH considered Significant tree			# if photo of tree is provided			
3	5205	D	Mountain Ash	26			1		S		Mostly dead
4	<b>5230</b>	E	<b>Western red cedar</b>	<b>51</b>			<b>1</b>			L	<b>Thin canopy, previous top loss @ 70'</b>
5	5231	D	Locust	11			1		S		co-dominant leader with included bark X 2 @ 1', cavity of decay at root crown to 2'
6	5233	D	Apple	8			1		S		Failing towards west
7	5245	D	Poplar	11		1			S		Co-dominant leaders with included bark x2 @ root crown, previous scaffold failure
8	5246	D	Poplar	19		1			S		Co-dominant leaders with included bark x2 @ 4', moss and lichen
9	5247	D	Poplar	20		1			S		Dead wood, broken branches, typical of species
10	5248	D	Poplar	15		1			S		Dead wood, broken branches, typical of species
11	5271	D	Poplar	17		1			S		Moss and lichen, dead wood, broken branches, typical of species
12	5276	D	Poplar	20		1			S		Co-dominant leaders with included bark x4 @ root crown, dead wood, broken branches, moss and lichen, hanger, typical of species

1 6 5

Total Onsite Trees Assessed	12
Total Onsite Significant Trees	10
Total Onsite Landmark Trees	2

**Discussion:**

Tree Density Calculation	
Total number of trees	12
Total number of viable trees	7
Total number of non-viable trees	5
Total number of impacted trees	0
Total number of retained trees proposed	5
Required tree density 35%: (9 X 35%)	3
Required mitigation	2

The information gathered and reported above is provided to satisfy the city of Redmond's requirements for a tree preservation plan (RZC 21.72) of the Redmond Community Development Guide. The trees were surveyed and tagged prior to my evaluation. Each tree was measured at approximately four and a half feet above grade. Each trunk of trees whose normal growth habit is characterized by multiple trunks as well as those trees whose structure arose out of co-dominant leaders were also measured at 4.5' above grade and the average of the leaders were taken to be the adjusted DBH sited on the matrix.

Healthy trees who's adjusted DBH were less than 6" (the diameter necessary to be considered significant) were recorded but not counted toward the total number of significant trees. Likewise, dead trees were eliminated from the overall tree count. Any trees that were dying, but still had living tissue were assessed as being in "fair" condition.

The dripline of each tree was measured using a laser recording device. One measurement was taken on each tree with a "normal" balanced canopy that was approximately equal in radius in all directions. Trees with asymmetric canopies are generally located on the outside edges of groves. The radius of their canopies can vary a great deal. When describing the radius of those canopies, measurements were taken of the canopy in the four directions (NESW) are recorded.

In some cases, driplines may have been revised to more adequately reflect the location of buttress roots located on the opposite side of an asymmetric canopy – so where there may not be a dripline present, one was prescribed.

Proposed site improvements require the removal of two (2) viable trees:

- 5271 a 17" DBH poplar
- 5276 a 20" DBH poplar

Mitigation for the removed trees is two (2) trees.

### **Tree Protection Fencing:**

First, protect the roots that lie in the path of construction. Approximately 90-95% of a tree's root systems lie in the top three feet of soil and more than ½ of them are in the top 1'. 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 ½ 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 the critical root radius, measure the tree's diameter (DBH) 4.5' above the ground. For each inch, allow for 1- 1.5' of critical root radius. If a tree's DBH is 10", its critical root radius is 10-15'.

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 the LOD is also subject to the 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 CRZ or LOD should be protected with fencing adequate to hinder access to people, vehicles and equipment. Fencing detail should be provided. It should consist of continuous 4' high temporary chain-link fencing with post sections @ 10' on center, polyethylene laminar safety fencing or similar materials. 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 by reducing pore space. The affected tree roots suffocate. When construction takes place close to the protected CRZ, cover the site with 4" 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 should not be done in the LOD. If 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, please contact an ISA Certified arborist to evaluate the remaining trees looking for signs and symptoms of damage or stress. It may take several years for severe problems to appear. If 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 3' laterally from the obstruction (ex. 3' back of a curb, building, or other existing or planned permanent infrastructure.)

**Glossary:**

ANSI A300: American National Standards Institute (ANSI) standards for tree care

Chlorotic: discoloration caused by lack of chlorophyll in the foliage

Conifer: A tree that bears cones and has evergreen needles or scales

Crown: the above ground portion of the tree comprised of branches and their foliage

Crown raise pruning: a pruning technique where the lower branches are removed, thus raising the overall height of the crown from the ground

DBH or DSH: diameter at breast or standard height; the diameter of the trunk measured 54 inches (4.5 feet) above grade

Deciduous: tree or other plant that loses its leaves annually and remains leafless generally during the cold season

Epicormic: arising from latent or adventitious buds

Evergreen: tree or plant that keeps its needles or leaves year-round; this means for more than one growing season

Increment: the amount of new wood fiber added to a tree in each period, normally one year.

ISA: International Society of Arboriculture

Landscape function: the environmental, aesthetic, or architectural functions that a plant can have

Lateral: secondary or subordinate branch

Limits of disturbance: The boundary of minimum protection around a tree, the area that cannot be encroached upon without possible permanent damage to the tree. It is a distance determined by a qualified professional and is based on the age of the tree, its health, the tree species tolerance to disruption and the type of disturbance. It also considers soil and environmental condition and previous impacts. It is unique to each tree in its location.

Limited visual assessment: a visual assessment from a specified perspective such as foot, vehicle, or aerial (airborne) patrol of an individual tree or a population of trees near specified targets to identify specified conditions or obvious defects (ISA2013)

Live crown ratio: the percentage of living tissue in the canopy versus the tree's height. It is a good indicator of overall tree health and the tree's growing conditions. Trees with less than a 30% crown ratio often lack the necessary quantity of photosynthetic material necessary to sustain the roots; consequently, the tree may exhibit low vigor and poor health.

Monitoring: keeping a close watch; performing regular checks or inspections

Owner/manager: the person or entity responsible for tree management or the controlling authority that regulates tree management

Pathogen: causal agent of disease

Phototropic growth: growth toward light source or stimulant

ROW: Right-of-way; generally referring to a tree that is located offsite on a city easement

Reaction wood: Specialized secondary xylem which develops in response to a lean or similar mechanical stress, it serves to help restore the stem to a vertical position

Self-corrected lean: a tree whose trunk is at an angle to the grade but whose trunk and canopy changes to become upright/vertical

Senescence: The condition or process of deterioration with age; loss of a cell's power of division and growth

**Significant tree:** a tree measuring a specific diameter determined by the municipality the tree grows in. Some municipalities deem that only healthy trees can be significant, other municipalities consider both healthy and unhealthy trees of a determined diameter to be significant

**Snag:** a tree left partially standing for the primary purpose of providing habitat for wildlife

**Soil structure:** the size of particles and their arrangement; considers the soil, water, and air space

**Sounding:** process of striking a tree with a mallet or other appropriate tool and listening for tones that indicate dead bark, a thin layer of wood outside a cavity, or cracks in wood

**Structural defects:** flaws, decay, or other faults in the trunk, branches, or root collar of a tree, which may lead to failure; may be genetic, or environmental

**Tree credit:** A number assigned to a tree by a municipality that may be equal to the diameter of the tree or a numerical count of the tree, or related to diameter by a factor conveyed in a table of the municipal code

**Trunk area:** the cross-sectional area of the trunk based upon measurement at 54 inches (4.5 ft.) above grade

**Visual Tree Assessment (VTA):** method of evaluating structural defects and stability in trees by noting the pattern of growth. Developed by Claus Mattheck (Harris, et al 1999) detailed visual inspection of a tree and surrounding site that may include the use of simple tools. It requires that a tree risk assessor walk completely around the tree trunk looking at the site, aboveground roots, trunk, and branches (ISA2013)

## References

- ANSI A300 (Pat 1) – 2008 American National Standards Institute. American National standard for Tree Care Operations: Tree, Shrub and Other Woody Plant Maintenance: Standard Practices (Pruning). New York: Tree Care Industry Association, 2008.
- Coder, Dr. Kim D. Construction Damage Assessments: Tree and Sites. University of Georgia. October 1996.
- Dirr, Michael A. Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses. Champaign: Stipes Publishing Company, 1990.
- Dunster & Associates Environmental Consultants Ltd. Assessing Trees in Urban Areas and the Urban- Rural Interface. US Release 1.0. Silverton: Pacific Northwest Chapter ISA, 2006.
- Dunster, J. A. 2003. Preliminary Species Profiles for Tree Failure Assessment. Bowen Island: Dunster & Associates Environmental Consultants Ltd.
- Dunster, Julian A., E. Thomas Smiley, Nelda Matheny and Sharon Lilly. Tree Risk Assessment Manual. Champaign, Illinois: International Society of Arboriculture, 2013.
- Harris, Richard W, James Clark, and Nelda Matheny. Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines. 4th ed. Upper Saddle River: Prentice Hall, 2004.
- Lilly, Sharon. Arborists' Certification Study Guide. Champaign, IL: The International Society of Arboriculture, 2001.
- Matheny, Nelda and Clark, James R. A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas. Second Edition. Champaign, IL: The International Society of Arboriculture, 1994.
- Matheny, Nelda and Clark, James R. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. Champaign, IL: The International Society of Arboriculture, 1998.
- Mattheck, Claus and Breloer, Helge. The Body Language of Trees: A Handbook for Failure Analysis. London: HMSO, 1994
- Schwarze, Francis W.M.R. Diagnosis and Prognosis of the Development of Wood Decay in Urban Trees. Australia: ENSPEC Pty Ltd. 2008
- Sinclair, Wayne A., Lyon, Howard H., and Johnson, Warren T. Diseases of Trees and Shrubs. Ithaca, New York: Cornell University Press, 1987.
- Smiley, E. Thomas, Nelda Matheny, and Sharon Lilly, Tree Risk Assessment Best Management Practices, ANSI A300 Part 9: Tree, Shrub, and Other Woody Plant Management—Standard Practices (Tree Risk Assessment: Tree Structure Assessment). The International Society of Arboriculture Press. Champaign. IL. 2011.
- Thies, Walter G. and Sturrock, Rona N. Laminated root rot in Western North America. United States Department of Agriculture. Pacific Northwest. Resource Bulletin PNW-GTR-349. April 1995.

### 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 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.
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.
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