



February 6, 2022

CLIENT

Saurabh Khandelwal/Veena Shankaram
8460 SE 83rd St.
Mercer Island, Wa. 98040

ASSIGNMENT

To travel to the above residential property to inspect two Douglas Fir trees and perform a Level 2 Visual Tree Health and Risk Assessment of the trees.

ARBORIST'S QUALIFICATIONS

M.S. in Urban Horticulture, University of Washington, 1987
Member of International Society of Arboriculture, (ISA), since 1984
ISA Certified Arborist, PN-0108A, since 1992
ISA Qualified Tree Risk Assessor, (TRAQ), since 2017
Founder and Owner of Seattle Tree Preservation, Inc., a tree care company, 1987-2018
Consulting Arborist and Principal of Seattle Arboriculture Associates, 2018-present

METHODS/OBSERVATIONS

A Level 2 Tree Health and Risk Assessment is based on what the arborist can observe and measure from the ground, and considers a tree's physiology, its structure, and what the targets it parts would likely strike if it were to fail in determining its risk level. Questions about a tree's physiology include the following: How well is the tree growing? Are the leaves or needles the normal color, size, and well-distributed throughout the canopy? Is the shoot growth normal? What is the percentage of dead wood within the canopy?

Questions about structure include the following: Is there evidence of root, trunk, or stem decay? If so, how extensive is the decay? Are there seams, cracks, or other defects in the trunk or main stems? Does the tree have a history of past failures? If so, can the risk of failure be mitigated and reduced?

Finally, the target or targets are evaluated. Is the primary target a building, parking lot, street or public gathering area? How close is the target to the tree? Can the target be moved or its use restricted? What are the consequences of the tree or its parts striking the target?

The two trees in this assessment are both native Western Washington Douglas Fir, (*Pseudotsuga menziesii*). Presumably neither tree was large enough to warrant harvest when the area was originally logged in the first half of the 20th century. Further, both trees survived the clearing and grading of the lot to build original house. While City of Mercer Island maps show that the eastern part of the lot is within an Environmentally Critical Area, (ECA), because of the steep slope, these two trees grow on a large and flat section of the lot, well to the west of this area.

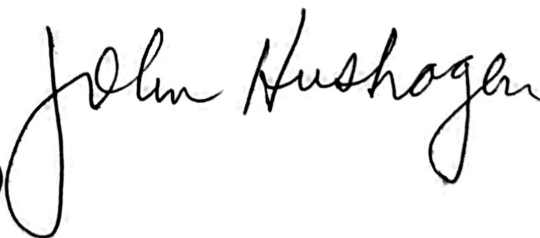
TREE #1 is the larger of the trees, with a DBH of 43.5" and a height of approximately 130', and a canopy spread of 45'. The Critical Root Zone, (CRZ), radius, or roughly the distance from the edge of the trunk to the outer edge of the drip line, is 22'. The tree appears to be growing very well, with a full canopy of dark green needles and little or no dead wood. I saw no evidence of root or trunk decay, and no other obvious structural defects. The property owner reports that since 2012, the tree has been professionally pruned twice; however, because of its open exposure to high southwest winds, several branches have broken in storms and struck the edge of the nearby house roof. Such branch failures are common with large Douglas Fir trees, but the risk can be mitigated and reduced by additional and very specific pruning. I believe that the chances of whole tree failure by the trunk's shearing or breaking, or root failure and uprooting are low. My opinion is that this tree poses a **MODERATE** failure risk.

TREE #2 is a 26" DBH Douglas Fir that grows just a few feet north of Tree #1. It's height is also approximately 130', with a canopy spread of 35', and a CRZ of 18'. This tree also appears to be in very good condition, both physiologically and structurally, and received the same professional pruning as Tree #1. My understanding is that branch failures, as described above, have not been as serious an issue as with Tree #1. My opinion is that the chances of stem breaking or uprooting are low and that this tree poses a **MODERATE** failure risk.

SUMMARY COMMENTS

Both trees are healthy and sound second growth Douglas Firs, and Tree #1, especially, is growing extraordinarily well. If the decision is made to retain the trees, they could be preserved on the site for several more decades. Attached or enclosed are copies of the ISA Basic Tree Risk Assessment Form for each tree, and the required City of Mercer Island tree inventory documents. Please contact me if you have further questions.

John Hushagen, Consulting Arborist
Seattle Arboriculture Associates
M.S. Urban Horticulture
ISA Certified Arborist, PN-0108A
ISA Qualified Tree Risk Assessor, (TRAQ)



ISA Basic Tree Risk Assessment Form

Client Saurabh Khundelwal Date 2/6/22 Time 2:45 PM
 Address/Tree location 8460 SE 83rd St, Mercer Island Tree no. 1 Sheet 1 of 2
 Tree species Douglas Fir dbh 43.5" Height 130' Crown spread dia. 45'
 Assessor(s) Joe Hushagen Time frame 12 MO Tools used Level 2 Visual

Target Assessment

Target number	Target description	Target zone			Occupancy rate 1 - rare 2 - occasional 3 - frequent 4 - constant	Practical to move target?	Restriction practical?
		Target within drip line	Target within 1 x Ht.	Target within 1.5 x Ht.			
1	Residential Home		✓		4	NO	NO
2	Garage		✓		4	NO	NO
3							
4							

Site Factors

History of failures Broken and Falling Branches Topography Flat Slope % Aspect _____
 Site changes None Grade change Site clearing Changed soil hydrology Root cuts Describe _____
 Soil conditions Limited volume Saturated Shallow Compacted Pavement over roots % Describe _____
 Prevailing wind direction SW/NE Common weather Strong winds Ice Snow Heavy rain Describe Seasonal

Tree Health and Species Profile

Vigor Low Normal High Foliage None (seasonal) None (dead) Normal _____% Chlorotic _____% Necrotic _____%
 Pests None Abiotic _____
 Species failure profile Branches Trunk Roots Describe D-Fir can fail in all 3 ways

Load Factors

Wind exposure Protected Partial Full Wind funneling Relative crown size Small Medium Large
 Crown density Sparse Normal Dense Interior branches Few Normal Dense Vines/Mistletoe/Moss
 Recent or planned change in load factors None

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown LCR 75 % Cracks Lightning damage
 Dead twigs/branches _____% overall Max. dia. _____ Codominant Included bark
 Broken/Hangers Number _____ Max. dia. _____ Weak attachments Cavity/Nest hole _____% circ.
 Over-extended branches Previous branch failures Similar branches present
Pruning history
 Crown cleaned Thinned Raised Dead/Missing bark Cankers/Galls/Burls Sapwood damage/decay
 Reduced Topped Lion-tailed Conks Heartwood decay
 Flush cuts Other _____ Response growth Very Good
 Main concern(s) Longest, heaviest branches may break and fall
 Load on defect N/A Minor Moderate Significant
 Likelihood of failure Improbable Possible Probable Imminent

— Trunk —

Dead/Missing bark Abnormal bark texture/color
 Codominant stems Included bark Cracks
 Sapwood damage/decay Cankers/Galls/Burls Sap ooze
 Lightning damage Heartwood decay Conks/Mushrooms
 Cavity/Nest hole _____% circ. Depth _____ Poor taper
 Lean _____° Corrected? _____
 Response growth Very Good
 Main concern(s) NO SERIOUS CONCERNS w/ TRUNK
 Load on defect N/A Minor Moderate Significant
 Likelihood of failure Improbable Possible Probable Imminent

— Roots and Root Collar —

Collar buried/Not visible Depth _____ Stem girdling
 Dead Decay Conks/Mushrooms
 Ooze Cavity _____% circ.
 Cracks Cut/Damaged roots Distance from trunk _____
 Root plate lifting Soil weakness
 Response growth Very Good
 Main concern(s) NO SERIOUS CONCERNS w/ ROOTS
 Load on defect N/A Minor Moderate Significant
 Likelihood of failure Improbable Possible Probable Imminent

Risk Categorization

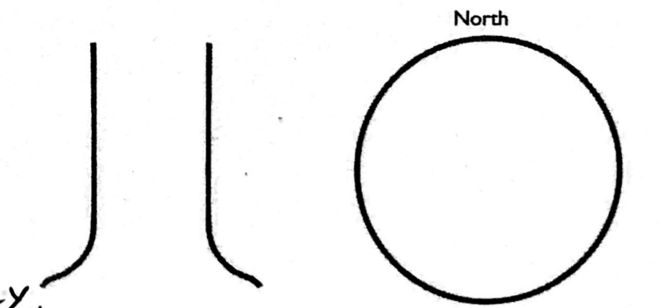
Condition number	Tree part	Conditions of concern	Part size	Fall distance	Target number	Target protection	Likelihood								Consequences				Risk rating of part (from Matrix 2)				
							Failure				Impact				Failure & Impact (from Matrix 1)								
							Improbable	Possible	Probable	Imminent	Very low	Low	Medium	High	Unlikely	Somewhat	Likely	Very likely		Negligible	Minor	Significant	Severe
1	heavy Branches	History of Breaking off	34" 30'		1	NONE	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>				Low to med.
2	Heavy Branches	(Same as above)	34" 30'		2	NONE	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>				Low to med.
3																							
4																							

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impacting Target			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low



Notes, explanations, descriptions This tree has a low to moderate risk of failure. Branches may continue to break and fall, but whole tree failure by uprooting or stem breakage is very low.

Mitigation options end w/ reduction pruning of longest and heaviest branches could reduce the risk of their breaking and falling

Residual risk Low to Med.

Residual risk Med.

Residual risk

Residual risk

Overall tree risk rating Low Moderate High Extreme Work priority 1 2 3 4

Overall residual risk Low Moderate High Extreme Recommended inspection interval 12 mo.

Data Final Preliminary Advanced assessment needed No Yes-Type/Reason

Inspection limitations None Visibility Access Vines Root collar buried Describe

ISA Basic Tree Risk Assessment Form

Client Saumabh Khandelwal Date 2/6/22 Time 3:00 P.M.
 Address/Tree location 8410 SE 83rd St, Mercer Island Tree no. 2 Sheet 1 of 2
 Tree species Douglas Fir dbh 26" Height 130' Crown spread dia. 35'
 Assessor(s) John Muehlen Time frame 2 mo. Tools used Level 2 Visual

Target Assessment

Target number	Target description	Target zone			Occupancy rate 1 - rare 2 - occasional 3 - frequent 4 - constant	Practical to move target?	Restriction practical?
		Target within drip line	Target within 1 x Ht.	Target within 1.5 x Ht.			
1	<u>GARAGE</u>		<input checked="" type="checkbox"/>		<u>4</u>	<u>NO</u>	<u>NO</u>
2							
3							
4							

Site Factors

History of failures None detected Topography Flat Slope % Aspect _____
 Site changes None Grade change Site clearing Changed soil hydrology Root cuts Describe _____
 Soil conditions Limited volume Saturated Shallow Compacted Pavement over roots % Describe _____
 Prevailing wind direction SW/NE Common weather Strong winds Ice Snow Heavy rain Describe SEASONAL

Tree Health and Species Profile

Vigor Low Normal High Foliage None (seasonal) None (dead) Normal _____% Chlorotic _____% Necrotic _____%
 Pests None Abiotic _____
 Species failure profile Branches Trunk Roots Describe All Three Are Failure Factors

Load Factors

Wind exposure Protected Partial Full Wind funneling Relative crown size Small Medium Large
 Crown density Sparse Normal Dense Interior branches Few Normal Dense Vines/Mistletoe/Moss
 Recent or planned change in load factors None

Tree Defects and Conditions Affecting the Likelihood of Failure

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Unbalanced crown LCR 75% Cracks Lightning damage
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Pruning history
 Crown cleaned Thinned Raised Dead/Missing bark Cankers/Galls/Burls Sapwood damage/decay
 Reduced Topped Lion-tailed Conks Heartwood decay
 Flush cuts Other _____ Response growth Very Good
 Main concern(s) NO SERIOUS CONCERNS WITH CROWN AND BRANCHES
 Load on defect N/A Minor Moderate Significant
 Likelihood of failure Improbable Possible Probable Imminent

— Trunk —

Dead/Missing bark Abnormal bark texture/color
 Codominant stems Included bark Cracks
 Sapwood damage/decay Cankers/Galls/Burls Sap ooze
 Lightning damage Heartwood decay Conks/Mushrooms
 Cavity/Nest hole _____% circ. Depth _____ Poor taper
 Lean _____° Corrected? _____
 Response growth Very Good
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— Roots and Root Collar —

Collar buried/Not visible Depth _____ Stem girdling
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Risk Categorization

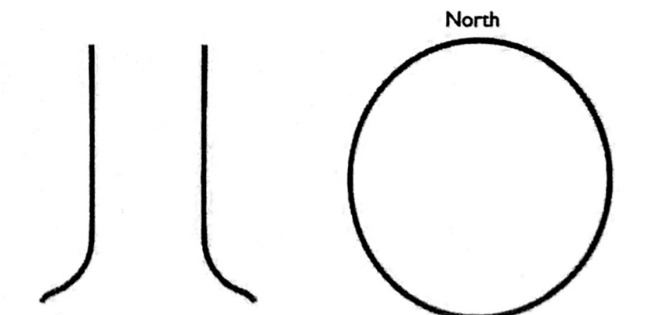
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							Improbable	Possible	Probable	Imminent	Very low	Low	Medium	High	Unlikely	Somewhat	Likely	Very likely					
1	heavy Branches	Could break and fall on Garage	3-4"	30'	1	None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	low TO med.	
2																							
3																							
4																							

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impacting Target			
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Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low



Notes, explanations, descriptions Tree is in very good condition and poses only a low to moderate risk of failure

Mitigation options end wt reduction pruning of longest and heaviest branches Residual risk low TO med.

Overall tree risk rating Low Moderate High Extreme Work priority 1 2 3 4

Overall residual risk Low Moderate High Extreme Recommended inspection interval 12 mo.

Data Final Preliminary Advanced assessment needed No Yes-Type/Reason _____

Inspection limitations None Visibility Access Vines Root collar buried Describe _____

CITY OF MERCER ISLAND

COMMUNITY PLANNING & DEVELOPMENT

9611 SE 36TH STREET | MERCER ISLAND, WA 98040

PHONE: 206.275.7605 |

Inspection Requests: Online:

VM: 206.275.7730

TREE SUBMITTAL CHECKLIST

If a box is checked, please provide the information in your next submittal

SUBMITTAL ITEMS

1. The Mercer Island Tree Inventory Form

- Provide the City's Mercer Island Tree Inventory Form
-

2. Arborist report/tree inventory

- Provide an Arborist report, prepared by a qualified Arborist. Include the following information in the arborist report.
1. Description of how the arborist meets the threshold requirements for Qualified Arborist.
2. A complete description of each tree's diameter, species, critical root zone, limits of allowable disturbance, health, condition, and viability.
3. A description of the method(s) used to determine the limits of allowable disturbance (i.e., critical root zone, root plate diameter, or a case-by-case basis description for individual trees).
4. Any special instructions specifically outlining any work proposed within the limits of disturbance protection areas (i.e. hand-digging, air space, tunneling, root pruning, any grade changes, clearing, monitoring, and aftercare).
5. For trees not viable for retention, a description of the reason(s) for removal based on poor health, high risk of failure due to structure, defects, unavoidable isolation, windfirmness, unsuitability species, etc. If there is no reasonable alternative action (pruning, cabling, etc.) possible, replacement recommendations must be given.
6. Describe the impact of necessary tree removal on the remaining trees, including those in a grove or on adjacent properties.
7. Describe timing and installation of tree protection measures. Such measures must include fencing and be in accordance with the tree protection standards as outlined in MICC 19.10.
8. The suggested location and species of replacement trees to be used when required. The report shall include planting and maintenance specifications to ensure long term survival.
9. **A Tree Inventory** containing the following:
- a. A numbering system of all existing large trees on the property (with corresponding tags on trees). The inventory shall also include large trees on adjacent property with driplines or critical root zones extending into the property.
- b. Tree size (diameter). Where a tree splits into several trunks close to ground level, the dbh (Diameter at Brest Height) for the tree is the square root of the sum of the dbh for each individual stem squared (example with 3 stems: $dbh = \sqrt{(stem1)^2 + (stem2)^2 + (stem3)^2}$).
- c. Proposed tree status (retained or proposed for removal).
- d. Tree type or species.
- e. Identify all Exceptional trees and differentiate between those less than 24 inches and those greater than or equal to 24 inches in diameter.
- f. Brief general health or condition rating of each tree (i.e. poor, fair, good, etc.).
-

3. Site/tree retention plan

Indicate the following on all civil/utility and grading sheets. If there are no civil sheets indicate on the architectural site plan

- 1. Location of all proposed improvements (building footprint, access, utilities, buffers, required landscape areas).
- 2. Surveyed location of all large trees and Exceptional trees on the property
- 3. Show dripline and limits of disturbance for Large trees on site and adjacent properties if driplines extend over the subject property line.
- 4. Trees labeled corresponding to the tree inventory numbering system on the Mercer Island Tree Inventory Form, and Arborist Report.
- 5. Identify Exceptional trees using different symbols for trees less than 24 inches and trees greater than or equal to 24 inches.
- 6. Location of tree protection measures. Chain-link fence will be required for exceptional trees. Show silt fence outside tree protection measures. Do not use any x in the protection illustration.
- 7. Limits of excavation near potential saved trees (e.g. excavation limits for building foundation).
- 8. Indicate clearing limits/limits of disturbance (LOD) around all trees potentially impacted by site disturbances - grading, demolition, construction activities (including approximate LOD of off-site trees with overhanging driplines), etc.
- 9. Proposed tree status (trees to be removed or retained) noted by an 'X' for removal.

4. Replanting plan

- Provide the Replanting plan showing proposed locations of any required replacement trees.

PEER REVIEW AND CONFLICT OF INTEREST

A peer review of the tree permit application by a qualified arborist may be required to verify the adequacy of the information and analysis. **The applicant shall bear the cost of the peer review.**

The City Arborist may require the applicant retain a replacement qualified arborist or may require a peer review where the City Arborist believes a conflict of interest may exist.

For example, if an otherwise qualified arborist is employed by a tree removal company and prepares the arborist report for a development proposal, a replacement qualified arborist or peer review may be required.

ARBORIST QUALIFICATION

For tree reviews associated with a development proposal, a qualified arborist must have

- A minimum of three (3) years' experience working directly with the protection of trees during construction
- Have experience with the likelihood of tree survival after construction
- Be able to prescribe appropriate measures for the preservation of trees during land development
- ISA Tree Risk Assessment Qualification

Your qualified arborists must have at least one (1) of the following credentials:

- ISA Certified Arborist;
- ISA Certified Arborist Municipal Specialist;
- ISA Board Certified Master Arborist;
- American Society of Consulting Arborists (ASCA) registered Consulting Arborist;
- Society of American Foresters (SAF) Certified Forester for Forest Management Plans;

John Hushogan
Seattle Arboriculture Associates
2/6/22

ADDITIONAL INFORMATION

Additional Information. The City Arborist or Code Official may require additional documentation, plans, or information as needed to ensure compliance with applicable City regulations.

CITY OF MERCER ISLAND

COMMUNITY PLANNING & DEVELOPMENT

9611 SE 36TH STREET | MERCER ISLAND, WA 98040

PHONE: 206.275.7605 |

MERCER ISLAND TREE INVENTORY & REPLACEMENT SUBMITTAL INFORMATION

EXCEPTIONAL TREES

Exceptional Trees- means a tree or group of trees that because of its unique historical, ecological or aesthetic value constitutes an important community resource. A tree that is rare or exceptional by virtue of its size, species, condition, cultural/historical importance, age, and/or contribution as part of a tree grove. Trees with a diameter of more than 36 inches, or with a diameter that is equal to or greater than the diameter listed in the Exceptional Tree Table shown in MICC 19.16 under Tree, Exceptional.

List the total number of trees for each category and the tree identification numbers from the arborist report.

Number of trees 36" or greater _____

List tree numbers:

#1 Douglas Fir 43.5" DBH 1 tree

Number of trees 24" or greater (including 36" or greater) _____

List tree numbers:

#2 Douglas Fir 26" DBH 1 tree

Number of trees from Exceptional Tree Table (MICC 19.16) _____

List tree numbers:

Tree # 1 shown above: 43.5" DBH 1 tree

LARGE REGULATED TREES

Large Regulated Trees- means any tree with a diameter of 10 inches or more, and any tree that meets the definition of an Exceptional Tree.

Number of Large Regulated Trees on site _____

(A)

List tree numbers:

shown above

Number of Large Regulated Trees on site proposed for removal _____

(B)

List tree numbers:

shown above

Percentage of trees to be retained $((A-B)/Ax100)$ note: must be at least 30% _____

%

RIGHT OF WAY TREES

Right of Way Trees- means a tree that is located in the street right of way adjacent to the project property.

Number of Large Regulated Trees in right of way _____

List tree numbers:

None

Number of Large Regulated Trees in right of way proposed for removal _____

List tree numbers: #1, #2

Reason for removal: Potential Construction impact to
Critical Root Zones

TREE REPLACEMENT

Tree replacement- removed trees must be replaced based on the ratio in the table below. Replacement trees shall be conifers at least six feet tall and or deciduous at least one and one-half inches in diameter at base.

Diameter of Removed Tree (measured 4.5' above ground)	Tree replacement Ratio	Number of Trees Proposed for Removal	Number of Tree Required for Replacement Based on Size/Type
Less than 10"*	1		
10" up to 24"	2		
Greater than 24" up to 36"	3	1	3
Greater than 36" and any Exceptional Tree	6	1	6
TOTAL TREE REPLACEMENTS			

**no replacement tree is needed if the tree fits all of the following;*

*Less than 10 inches in diameter, not an exceptional tree, and not a replacement tree from another tree permit. **

John Hushogen
Seattle Arboricultural Associates
2/6/22