



May 5, 2023

Island Crest Builders
c/o Justin Davis
3605 86th Ave. SE
Mercer Island, WA 98040

Re: **Tree Survey Report** for the address above (Parcel #5021900045).

To Whom It May Concern,

The purpose of this report is to identify and locate significant trees and determine their condition for construction on the property mentioned above. The following survey table documents the identification, measurements, and condition of each significant tree. A property map with the locations of the tagged trees is included at the end of this report. Hazard assessments for Right-of-Way trees are also included in this report.

On May 2, 2023, I provided a basic inspection of trees within and adjacent to the parcel mentioned above. The trees were measured (diameter tape) and tagged with a number engraved metal strip. The tag numbers correspond with the data in the following tree inventory table. Tree trunks were measured 4 ½ feet from the ground which is known as the Diameter at Standard Height (DSH). The City of Mercer Island considers a significant tree to have a 10-inch DSH or greater. The number in the brackets is the total DSH for multiple trunks derived from the square root of the total diameter of all trunks; $DSH = \sqrt{[(DSH1)^2 + (DSH2)^2 + (DSH3)^2 + \dots]}$.

The tree protection zone, also known as the Limit of Disturbance (LOD) is the radius around the trunk where construction activities and access are limited to protect the tree(s) and soil from damage, and to sustain tree health and stability. The LOD is determined by species, branch length from trunk (dripline), DSH, surrounding conditions, and slope. The LOD protection plan and Critical Root Zones (CRZ) will be discussed later in this report.

Each tree is given a level of risk for hazards in the inventory table. Hazards are categorized into four types of risk assessed for a five-year period: *Improbable*, *possible*, *probable*, and *imminent*. *Improbable* risk means the tree is stable, void of defects, and unlikely to fail under normal, and may not in extreme, weather conditions. *Possible* risk means that failure is unlikely to occur in normal weather conditions but may be expected in extreme weather conditions. *Probable* risk means failure may be expected under normal weather conditions. Trees with *imminent* risk are in the act of failing and should be worked on as soon as possible.

The health of the trees is defined as good, fair, and poor. Sturdy trees with no signs of decay, disease, or structural defects have good health. Fair health describes a tree as having vigor but has defects such as disease, included bark, wood decay, weak structure, or root zone issues (i.e., impervious surfaces, compacted soil, etc.) that may not be feasible for mitigation. Poor health describes a tree that is dead, a state of decline, severely diseased, injured, or a hazard to surrounding property with no chance of recovery.

Tree Survey Table:

Tag #	Species	DSH	Drip-line	LOD	Health	Condition
101	Red Cedar <i>Thuja plicata</i>	27.5"	12.0'	18.0'	Good	Sturdy tree with no signs of decay, disease, or structural defects. <i>Improbable</i> risk of tree failure.
102*	Holly <i>Ilex aquifolium</i>	4.8" 5.5" [7.3"]	6.0'	6.0'	Good	Asymmetric canopy to the south. No signs of decay or disease. <i>Improbable</i> risk of tree failure.
103*	Holly	8.0"	6.0'	6.0'	Good	Asymmetric canopy to the south. No signs of decay or disease. <i>Improbable</i> risk of tree failure.
104*	Holly	4.8" 5.1" [7.0"]	6.0'	6.0'	Good	Asymmetric canopy to the south. No signs of decay or disease. <i>Improbable</i> risk of tree failure.
105*	Holly	5.1"	6.0'	6.0'	Good	Asymmetric canopy to the south. No signs of decay or disease. <i>Improbable</i> risk of tree failure.
106	Holly	4.3" 7.5" [8.6"]	8.0'	6.0'	Good	Sturdy tree with no signs of decay, disease, or structural defects. <i>Improbable</i> risk of tree failure.
107	Holly	6.5"	6.0'	6.0'	Good	Asymmetric canopy to the south. No signs of decay or disease. <i>Improbable</i> risk of tree failure.
108	Holly	7.0"	8.0'	6.0'	Good	Sturdy tree with no signs of decay, disease, or structural defects. <i>Improbable</i> risk of tree failure.
109	White Birch <i>Betula pendula</i>	16.9" 19.8" [26.0"]	18.0'	20.0'	Fair	Dead top stem growth from Borer (insect) activity. No signs of decay or disease. <i>Possible</i> large part failure. <i>Improbable</i> whole tree failure.
110	Red Cedar	30.5"	18.0'	22.0'	Good	Sturdy tree with no signs of decay, disease, or structural defects. <i>Improbable</i> risk of tree failure.
111	White Birch	15.2"	14.0'	12.0'	Fair	Dead top stem growth from Borer (insect) activity. No signs of decay or disease. <i>Possible</i> large part failure. <i>Improbable</i> whole tree failure.
112	White Birch	13.6"	14.0'	12.0'	Poor	Dead top canopy from Borer (insect) activity. 50% live crown ratio. No signs of trunk decay. Probable large part tree failure.
113	Lawson cypress <i>Chamaecyparis lawsoniana</i>	29.3"	16.0'	22.0'	Good	Sturdy tree with no signs of decay, disease, or structural defects. <i>Improbable</i> risk of tree failure.

 Trees in the Right-of-Way.

* Tree off-site with overlying root zones.

General Requirements:

30% of the trees over 10 inches DSH shall be retained and protected during the development process under Mercer Island Tree Retention Code 19.10.060.2.a. There are four (4) good to fair trees on the parcel. At least one (1) good, significant tree shall be retained to meet the minimum tree retention requirements for development.

Tree Retention Table:

Tag #	Species	DSH
110	Red Cedar	30.5"
113	Lawson Cypress	29.3"

Keeping the trees listed above provides a 50.0% tree retention plan.

I recommend removing Red Cedar tree #101 even though it's considered an exceptional tree under code 19.10.060.3. Retaining this tree may be difficult as its root zone hinders access around the south and southeast corners of the existing and planned structures. Utilities such as the water line may impact the root zone. In addition, too much soil work and disturbance are needed within the critical root zone to either renovate the existing retention wall or to slope between grades.

The removal of Cedar #101 will require the planting of three (3) new trees on the site. I recommend a combination of Red Cedar (*Thuja plicata*) and Douglas Fir (*Pseudotsuga menziesii*) as new tree plantings. New tree placement for mitigation is shown on the included site map (page 10). New Cedar and Fir trees are required to be at least six feet tall when planted under code 19.10.070.3.a.

New trees are best planted during the fall season and second-best during spring season. They should be watered during their first two consecutive dry seasons (June – October). Drip systems and watering bags are the most efficient ways to keep new trees watered. A rate of 2 gallons per week is a start for drip irrigation systems while watering bags need filling about once a week.

Tree Protection Plan:

Protective fencing is required around the perimeters of the LOD for each retained or group of trees during grading and construction. Temporary chain-link fencing is recommended to preserve the trees from soil disturbance due to machines, foot traffic, and materials. Grading and construction should not be allowed within the LOD of retained trees, unless described in this report. Some of the trees have irregular root zones because of compacted surfaces, retaining walls, and structures.

I allow the protection fencing to cut across part of the LOD of retained trees 110 and 113 to provide room for building as shown on the map (page 10). This fencing plan results in less than 30% disturbance of the outer root zone area and protects the inner (critical) root zone area. The bottom branches (canopy) of trees 110 and 113 may be pruned up to 8 feet above the ground prior to fencing placement.

The radius of the Critical Root Zone (CRZ) depends on the species, dripline (branch length), and DSH of the tree. The CRZ is the area around the tree where the minimum biological capacity of roots are located for essential structural stability and health - a distance from the trunk where root growth can recover and still maintain stability. Generally, the CRZ ranges from $\frac{1}{2}$ - $\frac{3}{4}$ of the LOD radius. The threshold for outer root zone disturbance of the LOD is no more than 30% of the area, not including the CRZ area.

Retention walls within the root zones may be renovated with minimal effects to tree health. Installation of updated stone may be done with minimal impact to the root zone. Before fencing and demolition of the existing retention wall, 3-4 inches of mulch (i.e., bark or wood chips) shall be applied over the LOD to minimize root zone disturbance. Thick plywood ($\geq \frac{1}{2}$ inch) shall be used over the mulch where foot traffic is needed to demo and build a new retention wall. A Certified Arborist is recommended during soil work (base work) within the CRZ to ensure root mitigation and report procedures. Orange barricade fencing may be used around the wall construction to protect the rest of the LOD. Tree protection placement during retention wall renovation is shown on the included map. No foot traffic or material staging within the LOD other than on plywood. Machinery used for wall demo and construction shall stage outside the LOD. Tree protection fencing shall be replaced back to its original placement as shown on the included map when the new retention wall is finished.

Please reply if you have questions.

Thank you,



Lonnie Olson, Owner

ISA Certified Arborist (PN-5427A) exp. 12/31/2023

Qualified Tree Risk Assessor (#697) exp. 7/23/2024

Birch Tree #109:



The picture above taken at the time of the inspection shows Birch tree #109. The red arrows indicate the two trunks of the tree. The top canopy exhibits dieback from Birch Bronze Borer (insect) activity which there is no control. This tree is not feasible for preservation and will not be able to recover from insect activity.

Birch Trees #111 and #112:



The picture above shows Birch trees #111 and #112 at the time of the inspection. The yellow arrow indicates tree #111 and the red arrow indicates tree #112. Both trees exhibit partial dead canopies from Bronze Birch Borer (insect) activity with tree #112 having the most dieback. These two trees are not feasible for preservation and cannot recover from insect activity.

ISA Basic Tree Risk Assessment Form

Client: **Hand Crest Builders** Date: **May 1, 2023** Time: **9:10 am**

Address/Tree location: **3605 86th Ave. SE, Mercer Island** Tree no.: **111** Street: **2** of **3**
 Tree Species: **Betula pendula** dbh: **15.2"** Height: **80'** Crown spread dia: **28'**
 Assessor(s): **Lannie Olson PN-54274** Tools used: **Basic inspection tools, camera** Time frame: **4 years**

Target number	Target description	Target protection	Target zone			Occupancy 1-10' = 1 11-20' = 2 21-30' = 3 31-40' = 4 41-50' = 5 51-60' = 6 61-70' = 7 71-80' = 8 81-90' = 9 91-100' = 10	Restriction practical?
			Target within drip line	Target within 1 x HL	Target within 1.5 x HL		
1	Structure (existing & new)	None	X		4	no	no
2	Road (86th Ave SE)	None	X		4	no	no
3							
4							

History of failures: **None** Topography Flat Slope % Aspect

Site changes: None Grade changes Site carrying Charged soil/hydrology Root cuts Describe
 Soil conditions: Limited volume Saturated Shallow Compacted Permanent over runoff % Describe Fair
 Prevailing wind direction: **NE** Common weather: Strong winds Ice Snow Heavy rain Describe

Tree Health and Species Profile
 Vigor: Low Normal High Foliage: None (seasonal) None (leafy) Normal 80% Chlorotic % Necrotic %
 Species failure profile: **Bronze Birch Borer** Trunk Root Describe **Dead wood** **albinic** **None**

Wind exposure protected Partial Full Wind funneling
 Crown density: Sparse Normal Dense Interior branches: Few Normal Dense Vines/Mistletoe/Moss **None** Large
 Recent or expected changes in load factors: **Seasonal winds**
 Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —
 Untrimmed trees ICR: **50** % Max. dia: **6"** Lightning carriage
 Dead w/branches **20** % overall Year dia: **6"** Induced bark
 Over-sprayed branches Weak attachments Codominant Cavity/rot holes % circ.
 Pruning history: Crown cleaned Thinned Raised Dead/rotting bark Corky/Forklifts Sapwood damage/dead
 Radial cuts Topped Lion tailed Conks Heartwood decay
 1 inch cuts Other: Responses: growth **Dead wood**

Part Size: **10" dia.** Fall Distance: **80'** Part Size: **6" dia.** Fall Distance: **80'**
 Load on defects: **N/A** Minor Moderate Significant Load on defect: **N/A** Minor Moderate Significant
 Likelihood of failure: **improbable** Possible Probable Imminent Likelihood of failure: **improbable** Possible Probable Imminent

— Trunk —
 Decay/Missing bark Abnormal bark texture/color Stem girdling
 Coccinellid stems Included by R.K. Cankers Corky/Multicankers
 Sapwood damage/decay Canker/Gall/Burls Sap zone Cavity % circ.
 Lightning damage Heartwood decay Conk/Multicankers
 Cavity/Heart hole % circ. Depth Root rot Sap weakness
 Loom Connector? Responses: growth **No concerns**
 Condition(s) of concern: **None** Fall Distance: **40'** Condition(s) of concern: **No concerns**
 Part Size: **15" dia.** Fall Distance: **40'** Part Size: **15" dia.** Fall Distance: **20'**
 Load on defect: **N/A** Minor Moderate Significant Load on defect: **N/A** Minor Moderate Significant
 Likelihood of failure: **improbable** Possible Probable Imminent Likelihood of failure: **improbable** Possible Probable Imminent

Risk Categorization

Target (Target number or description)	Tree part	Confidence of concern	Likelihood					Consequences	Risk rating (from Matrix 2)												
			Failure	Impact	Failure & Impact (from Matrix 2)	Negligible	Minor			Significant	Severe										
1	Stem/Branch	Dead wood	Improbable																		
2	Stem/Branch	Dead wood	Probable	X																	

Matrix 1: Likelihood matrix.

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

Notes, explanations, descriptions

Canopy exhibits dieback from Bronze Birch Borer activity. No control available for such insect activity. Expect continued dieback and eventual death. Tree is not viable for retention.

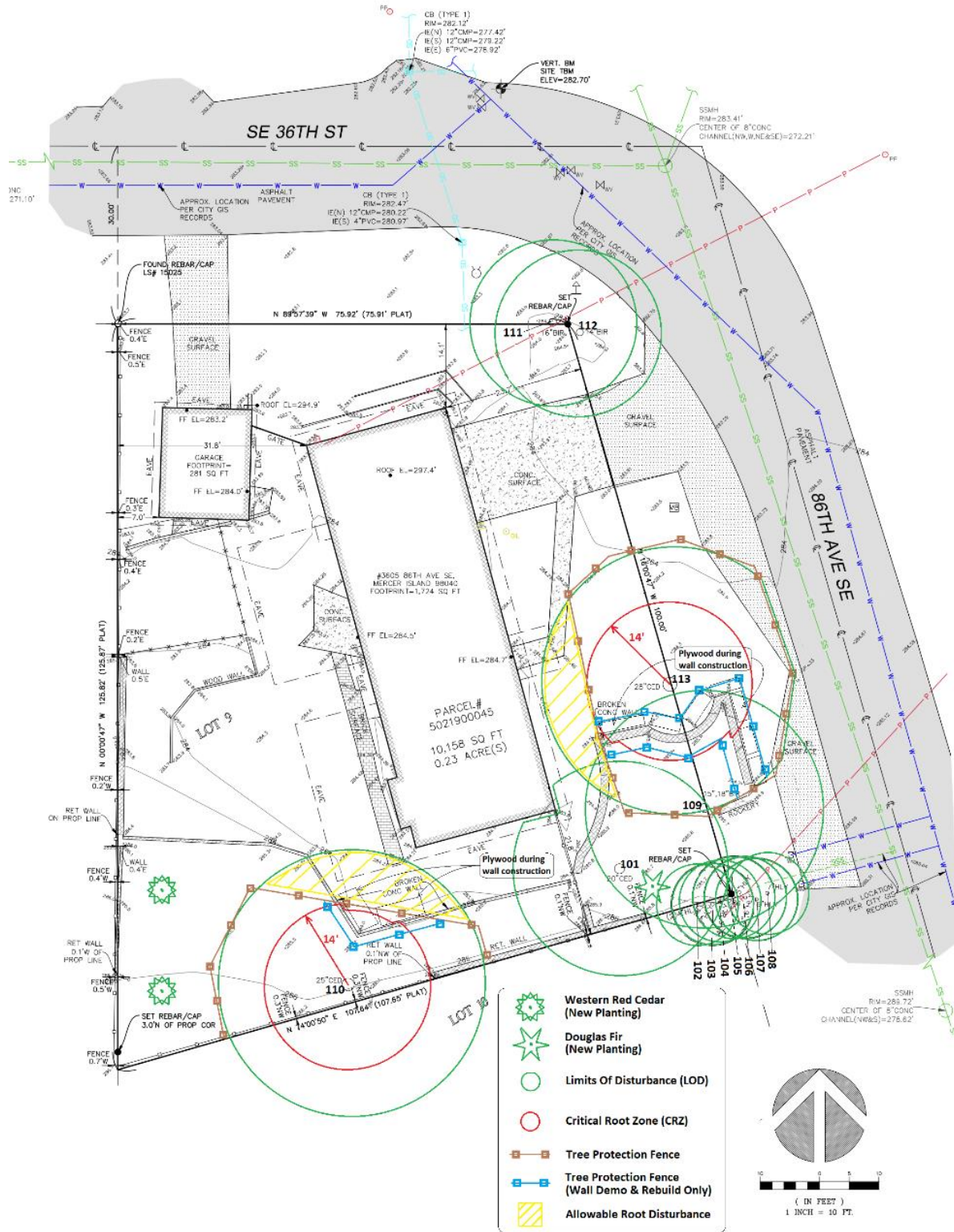
Mitigation options

Remove

Overall tree risk rating	Low	Workforce	High	Extreme
Overall residual risk	None	Low	Moderate	High
Residual risk	None	Low	Moderate	High
Residual risk	None	Low	Moderate	High

Recommended inspection interval: **None**
 Data: Final Preliminary Advanced assessment needed One-Type/Reason
 Inspection limitations: None Visibility Access Drones Dron earlier burned Describe

Property Map: 3605 86th Ave. SE, Mercer Island.



Assumptions & Limiting Conditions

1. Any legal description provided to the consultant 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. All property is appraised or evaluated as though free and clear, under responsible ownership and competent management.
2. All data has been verified insofar as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.
3. I shall not be required to give testimony or attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee.
4. Loss or alteration of any part of this report invalidates the entire report.
5. 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.
6. Neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, news, sales, or other media, without the prior expressed written or verbal consent of the consultant particularly as to value conclusions, identity of the consultant, or any reference to any professional society or institute or to any initialed designation conferred upon the consultant as stated in my qualification.
7. This report and values expressed herein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
8. Sketches, diagrams, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
9. Unless expressed otherwise: (1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

Certification of Performance & Appraisal

I, Lonnie Olson, certify that all the statements of fact in this report are true, complete, and correct to the best of my knowledge and belief, and that they are made in good faith.

- ❑ I have personally inspected the trees and the property referred to in this report and have stated my findings accurately. The extent of the evaluation or appraisal is stated in the attached report and the terms of assignment.
- ❑ The analysis, opinions, and conclusions stated herein are my own and are based on current scientific procedures and facts.
- ❑ No one provided significant professional assistance to me, except as indicated within the report.
- ❑ My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.

I further certify that I am a member in good standing with the International Society of Arboriculture. I have been involved in the field of arboriculture in a full-time capacity for more than 26 years.

Lonnie Olson

Signed: _____