TECHNICAL MEMORANDUM

Date:	January 25, 2023
To:	Mike Burke NW Lifestyle Homes
From:	Drew Foster, ISA Certified Arborist® PN-8213A Tree Risk Assessment Qualified
Project Name:	Houtchens Residence
Project Number:	201107

Subject: Tree Health Assessment – 6024 SE 22nd St, Mercer Island

The following memo describes the findings of a tree health assessment for Tree # 545 – a 34-inch DBH blue Atlas cedar (*Cedrus atlantica* var. 'Glauca') – at the Houtchens Residence. The Watershed Company ISA Certified Arborist® and Qualified Tree Risk Assessor (TRAQ) Drew Foster visited the property, located at 6024 SE 22nd St (parcel # 2439700110) on Mercer Island, WA on January 18, 2023, at the request of NW Lifestyle Homes. Current tree health and attribute data – including size and condition – were updated from the original tree inventory and assessment for the property which was conducted in March 2021 (Arborist Report, The Watershed Company, April 2021).

A basic level 2 assessment of the subject tree was conducted according to the methodology from the Tree Risk Assessment Manual (Dunster et al. 2017). Health condition was assessed following the ratings outlined by the Council of Tree and Landscape Appraisers (CTLA 2020), as summarized in the attached table.

Findings

Tree # 545 is a blue Atlas cedar with a diameter at breast height (DBH) of 34 inches and an approximate height of 90 feet. The assessment found the tree to be in Very Poor condition due to the presence of multiple severe defects, poor vigor, almost no live foliage, and is in the last stages of life. It was originally misidentified as a western larch in March 2021 and documented in Fair condition. However, it was likely rated at a better condition due to its misidentification as a deciduous conifer. This implies there was little to no live foliage during the 2021 survey and has been in steady decline for several years. The subject tree is located on the southwest side of the parcel, west of a driveway atop a rockery. It is within 30 feet of the neighboring house to the west and within about 60 feet of the primary house on the parcel.

There is an old topping cut, approximately 24 inches in diameter, about 15 feet up on the main stem. Five branches have regrown to fill in the remaining canopy. These branch attachments are likely structurally weak because of their extended growth as a response to the topping cut. Additionally, there is likely significant internal decay throughout the main stem as a result of the topping cut, compounding the risk of branch failure at the attachment points. It is common for overextended, large-diameter branches in this genus (*Cedrus*) to fail in this region. Moreover, the subject tree is growing atop a rockery with poor soil volume and is likely restricted in rooting depth and area. Please refer to the additional figures below for more detail.

The branches have *possible* likelihood of failure within a 1-year time frame under normal weather conditions. The likelihood of impact on the neighboring house is *high* and *medium* for the house on the subject parcel. Therefore, the likelihood of failure and impact for the neighboring house is *somewhat likely*, and *unlikely* for the primary house. The consequences of failure would be *significant* for both targets. Overall, branch failure presents a *moderate* risk to the neighboring house, and a *low* risk to the primary house. Please refer to the tree risk matrix tables below which demonstrates how risk ratings are estimated.

Matrix1. 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

Matrix2. 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

Figure 1. Tree Risk matrices (Dunster et al 2017).

Recommendations

The only risk identified, in a 1-year time frame for the subject tree, is branch failure on existing structures. Normal mitigation options for this issue (including pruning or cabling) are not applicable because the tree has almost no live growth left and is nearly dead. Therefore, removal is recommended. Options include branch removal, leaving the main trunk as a wildlife snag, or removing the entire tree and trunk to grade. Overall residual risk following either of these options will be low.

Limitations of the Study

This report's findings are based on the best available science and are limited to the scope, budget, and site conditions at the time of the assessment. Although the information in this report is based on sound methodology, internal physical flaws (such as cracking or root rot) or other conditions that are not visible cannot be detected with this basic visual screening. Trees

are inherently unpredictable. Even vigorous and healthy trees can fail due to high winds, heavy snow, ice storms, rain, age, or other causes.

This report is based on the current observable conditions and may not represent future conditions of the trees. Changes in site conditions, including clearing and grading, will alter the condition of remaining trees in a way that is not predictable.

Limitations of tree risk assessments arise from uncertainties related to trees, defects, and the loads to which they are subjected. Additionally:

1. Tree risk assessment is limited in scope to the specific target(s) of interest and does not include all risks.
2. Not all defects are detectable and not all failures are predictable.
3. The time frame for risk categorization should not be considered a "guarantee period" for the risk assessment.
4. Only those trees specified above were assessed, and assessments were performed within the limitations specified.
5. Any tree, whether it has visible weaknesses or not, will fail if the forces applied exceed the strength of the tree or its parts.

Additional Tables and Figures

Table 1. Tree Condition Ratings (CTLA 2020)

Rating Category	Condition Components			Percent Rating
	Health	Structure	Form	
Excellent - 1	High vigor and nearly perfect health with little or no twig dieback, discoloration, or defoliation.	Nearly ideal and free of defects.	Nearly ideal for the species. Generally symmetric. Consistent with the intended use.	81% to 100%
Good - 2	Vigor is normal for species. No significant damage due to diseases or pests. Any twig dieback, defoliation, or discoloration is minor.	Well-developed structure. Defects are minor and can be corrected.	Minor asymmetries/deviations from species norm. Mostly consistent with the intended use. Function and aesthetics are not compromised.	61% to 80%
Fair - 3	Reduced vigor. Damage due to insects or diseases may be significant and associated with defoliation but is not likely to be fatal. Twig dieback, defoliation, discoloration, and/or dead branches may compromise up to 50% of the crown.	A single defect of a significant nature or multiple moderate defect. Defects are not practical to correct or would require multiple treatments over several years.	Major asymmetries/deviations from species norm and/or intended use. Function and/or aesthetics are compromised.	41% to 60%
Poor - 4	Unhealthy and declining in appearance. Poor vigor. Low foliage density and poor foliage color are present. Potentially fatal pest infestation. Extensive twig and/or branch dieback.	A single serious defect or multiple significant defects. Recent change in tree orientation. Observed structural problems cannot be corrected. Failure may occur at any time.	Largely asymmetric/abnormal. Detracts from intended use and/or aesthetics to a significant degree.	21% to 40%
Very Poor - 5	Poor vigor. Appears dying and in the last stages of life. Little live foliage.	Single or multiple severe defects. Failure is probable or imminent.	Visually unappealing. Provides little or no function in the landscape.	6% to 20%
Dead - 6				0% to 5%

Figure 2. Tree # 545 shown here looking northwest from the driveway toward the neighboring house. The large topping cut can be seen on the main trunk, along with the branches which have grown to form a new canopy following removal of the main trunk. The rockery and exposed surface roots indicate shallow soils and limited rooting space.

Figure 3. Looking up at the canopy of Tree # 545. Very little live foliage remains. This tree has likely been declining in health for several years and is nearly dead.

Figure 4. Tree # 545 showing the thin remaining live foliage in the upper canopy, estimated at 10-15% live growth.

Figure 5. Another view of the large topping cut and overextended branches regrowing into new tops.

References

Council of Tree & Landscape Appraisers (CTLA). 2020. Guide for Plant Appraisal: 10th Edition, Revised. Champaign, IL: International Society of Arboriculture.

Dunster, J. et al 2017. Tree Risk Assessment Manual, Second Edition. Champaign, IL: International Society of Arboriculture.

Glossary of Terms

Hazard: a situation or condition that is likely to lead to a loss, personal injury, property damage, or disruption of activities; a likely source of harm. Concerning trees, a hazard is the tree or tree part(s) identified as a likely source of harm.

Failure (of a tree or tree part): the breakage of stem, branch, or roots, or loss of mechanical support in the root system.

Occupancy rate: an estimated amount of time the target is within the target zone. Corresponding number codes (1-4):

1. **Rare**—the target zone is not commonly used by people or other mobile/movable targets.
2. **Occasional**—the target zone is occupied by people or other targets infrequently or irregularly.
3. **Frequent**—the target zone is occupied by people or other targets for a large portion of the day or week.
4. **Constant**—a target is present at nearly all times, 24 hours a day, 7 days a week.

Likelihood of failure: the chance of a tree failure occurring within the specified time frame.

Improbable: the tree or tree part is not likely to fail during normal weather conditions and may not fail in extreme weather conditions within the specified time frame.

Possible: failure may be expected in extreme weather conditions, but it is unlikely to occur during normal weather conditions within the specified time frame.

Probable: failure may be expected under normal weather conditions within the specified time frame.

Imminent: failure has started or is most likely to occur in the near future, even if there is no significant wind or increase load. This is an infrequent occurrence for a risk assessor to encounter and may require immediate action to protect people from harm. The imminent category overrides the time frame.

Likelihood of impact: the chance of a tree failure impacting a target during the specified time frame.

High (likelihood of impact): the failed tree or tree part is likely to impact the target. This is the case when there is a constant target, with no protection factors, and the direction of fall is toward the target.

Imminent (likelihood of impact): failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load. The imminent category overrides the stated time frame.

Low (likelihood of impact): there is a slight chance that the failed tree or tree part will impact the target.

Consequences of failure:

Negligible: no personal injury, low-value property damage, or disruptions that can be replaced or repaired.

Minor: minor personal injury, low- to moderate-value property damage, or small disruption of activities.

Significant: substantial personal injury, moderate- to high-value property damage, or considerable disruption of activities.

Severe: serious personal injury or death, high-value property damage, or major disruption of important activities.

Levels of risk: Four terms used in tree risk assessment—extreme, high, moderate, low.

Extreme (risk rating): defined by its placement in the risk rating matrix (Matrix 2); failure is *imminent* with *high* likelihood of impacting the target, and the consequences of the failure are *severe*.

High (risk rating): defined by its placement in the risk rating matrix (Matrix 2); consequences are *significant*, and likelihood is *very likely* or *likely*, or consequences are *severe,* and likelihood is *likely.*

Moderate (risk rating): defined by its placement in the risk rating matrix (Matrix 2); consequences are *minor* and likelihood is *very likely* or *likely*, or likelihood is *somewhat likely* and consequences are *significant* or *severe*.

Low (risk rating): defined by its placement in the risk rating matrix (Matrix 2); consequences are *negligible*, and likelihood is *unlikely*, or consequences are *minor* and likelihood is *somewhat likely*.

Overall tree risk rating: the highest risk determined for the tree and target of concern. If there is more than one part or target rating, the tree risk rating is the highest of the group.

Overall residual risk: risk remaining if the highest-risk tree part is mitigated.

Risk evaluation: the process of comparing the assessed risk against given risk criteria to determine the significance of the risk (usually done by the tree owner or risk manager).

Inspection interval: the time between assessments.

Time frame: the time period for which an assessment is defined.