TECHNICAL MEMORANDUM

Date	October 20, 2023
To	Lydia Roush
	Bainbridge Island Metro Parks and Recreation
From	John Bornsworth
	Principal and Ecologist with Peninsula Environmental
	ISA Board Certified Master Arborist® #PN-7955BM
	Registered Consulting Arborist #724
Subject	Tree Risk Assessment
Sites	Madison Tot Lot

1 Summary

At the request of Lydia Roush with the Bainbridge Island Metro Parks and Recreation (Client), I reviewed multiple trees on a single property managed by the Client, in an effort to observe and evaluate the risk of certain trees on those properties. This report is a Level 2 Tree Risk Assessment for those trees. The site is:

1) Madison Tot Lot, accessed through 598 Madison Ave N, Bainbridge Island, Kitsap County Parcel 262502-2-105-2005 (Site).

I visited both the parks on July 18th, 2023. This report summarizes site characteristics as they were observed this day only. This report is intended for the exclusive use of the Client and their agents and only for specific application to the referenced Sites. This report should not be applied to any other tree or other property for any purpose.

In summary,

1) Madison Tot Lot contains multiple native, deciduous, hardwood trees which present some management risk in their trunks and canopies. Big leaf maples (*Acer macrophyllum*) on the site are generally declining. A significant pacific madrone (*Arbutus menziesii*) expresses some direct, moderate risk in association with upper canopy dieback. These branches should be pruned to reduce that risk. A median sized big leaf maple growing over the primary activity playground on Site, expresses risk through over elongated branches formed through canopy gaps over the playground. These branches should be pruned to reduce the low to moderate risk associated with canopy branch failures.
2) Douglas-fir (*Pseudotsuga menziesii*) and other trees on Site were assessed and are qualified as low risk. The Douglas-firs on Site contain no conspicuous or inconspicuous signs or symptoms of pest, disease, or decay.
3) The Site is within the Madson Ave District Zoning of Bainbridge Island and outside of all critical area, as identified on Bainbridge Island GIS portal, accessed 10/20/2023.

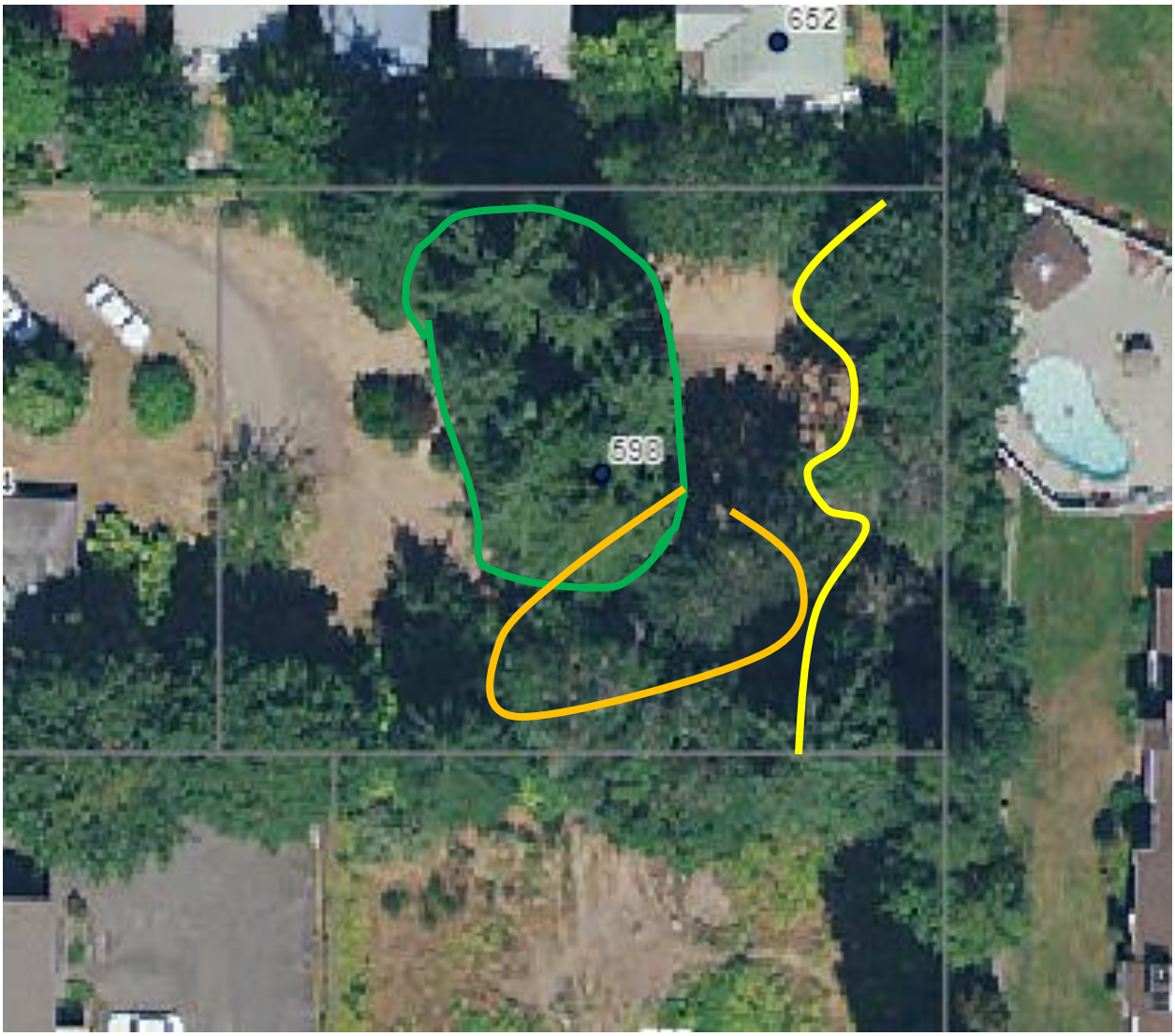

Figure 1: Snip of aerial imagery from Bainbridge Island GIS Portal, dated 2018. Accessed 10/20/23.

1. Green circle is generally over low risk, healthy Douglas-fir remnant forest stand.
2. East of yellow line is generally the stand of declining big leaf maple.
3. Orange ellipse is general canopy of pacific madrone with canopy dieback.

**Line colors do not correlate with risk qualification*

Figure 2: Same image as above without annotations.

2 Observations, Findings, Discussion and Recommendations

1. **Tree 1:** Pacific madrone tree, multiple stems at base, approximately 40 inches in diameter summing the square of the individual stems diameter. Located south of the stand of Douglas-fir trees, along the southern property line (but not over or on the property line).

   Tree shows significant die back, roughly 35%-40% of the canopy. Three to four large dead branches with no visible foliage are growing generally apical and upwards.

   Significant colonization of madrone canker (*Neofusicoccum arbuti*) along main stems and trunks. *N. arbuti* is expressed with sunken, black cankers with callused margins, with margins often appearing greenish due to the consistent new wood growth. *N. arbuti* can be pruned away, but not in this scenario as the cankers are too widespread.

   N. arbuti is not a wood decay pathogen, meaning the wood of the host tree is not compromised by the fungi, but it will result in death of the host tree. Pacific madrone wood is not prone to failure, as can be observed with this specimen showing significant dieback with almost no limb failure. Nonetheless, the dead woo on this tree should be pruned away.

   a. Entire tree is qualified as low risk of significant trunk failure in three years.

   b. The declining canopy of tree is moderate to high risk of failure in three years.

   c. Targets include the park's sitting areas, thoroughfare, and potentially the activity playground.

   d. Recommendations to reduce associated risk –

      i. **Objective:** Remove smaller, longer dead wood that has a tendency of failure. Retain larger, shorter dead wood that is attached enough to be stable from typical wind and snow loads. Retain safe habitat features in tree, including birds nests on large stems that are unlikely to fail in typical weather.

      ii. Remove all dead branches from tree that are less than 6 inches in diameter.

      iii. In this process, leave no dead wood branch greater than 6 feet long, irrelevant of diameter.

2. **Tree 2/3 (Big leaf maples with branches near and over the activity park):** Two big leaf maple trees are growing on the southwestern corner of the property, and are approximately 23-26 inches in diameter. Trees have significant dieback on the upper canopy, likely due to signs of mechanical damage on the lower trunk. No fungal or pest symptoms or signs were observed.

   The other maple trees in the same general location show similar mechanical damage on their trunks. The mechanical damage and sloughing bark has signs of callusing wound wood, a sign that the damage was done 5-10 years ago. The location of damage and timeline corresponds to the nearby construction at the apartment complex and creation of the park.

   Further, there is a large, elongated branch growing above the activity playground. This elongated branch is fully foliated, yet its growth habitat is indicative of future failure. This branch should be fully removed.

   There are no signs of Cryptostroma corticale, sooty bark disease, on these specimens.

   a. Entire tree is qualified as low risk of significant trunk failure in three years.
   b. The declining canopy of tree is high risk of failure in three years.
   c. Targets include the activity playground and park sitting areas.
   d. Recommendations to reduce associated risk with dead wood –
      i. **Objective:** Remove entire upper canopy that is died back. The size of existing deadwood is too small to be commonly associated with habitat.
      ii. Remove all dead branches from trees, irrelevant of diameter.
   e. Recommendations to reduce associated risk with elongated branch –
      i. Remove entire branch at branch collar connection to trunk.

3 Recommendations

1) Follow recommendations for individual trees above.
2) As always, during extreme weather events, we recommend staying away from large trees, whether healthy or not. Even healthy trees that have a low potential for failure under normal conditions, could fail if their load limits are surpassed.

4 Closing

Work for this project was performed and this report prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. No warranty, expressed or implied, is made. Neither the Consultants, nor Peninsula Environmental Group, Inc., has any current or prospective interest in the plants or properties discussed. Acceptance of this report acknowledges receipt and agreement with Peninsula Environmental Groups, Inc. Assumptions & Limiting Conditions.

Thank you for the opportunity to evaluate your project. We appreciate your business and look forward to working with you in the future. If you have questions now, or in the future, do not hesitate to contact us.

As always, during extreme weather events, we recommend staying away from large trees, whether healthy or not. Even healthy trees that have a low potential for failure under normal conditions, could fail if their load limits are surpassed.

Respectfully,

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5 Photos and Site Maps

5.1 Tree 1 Pacific madrone

Figure 3: Pacific madrone mid-canopy.

Note dead steam and nesting cavities created in decayed wood.

Note protruding growths of *Neofusicoccum arbuti.*

Figure 4: Pacific madrone full canopy.

Note the upper canopy dieback of approximately 40% of the pacific madrone.

Figure 5: Pacific madrone cankers

Note more madrone canker presence along stems of tree.

5.2 Tree 2/3 Big Leaf Maple Canopies

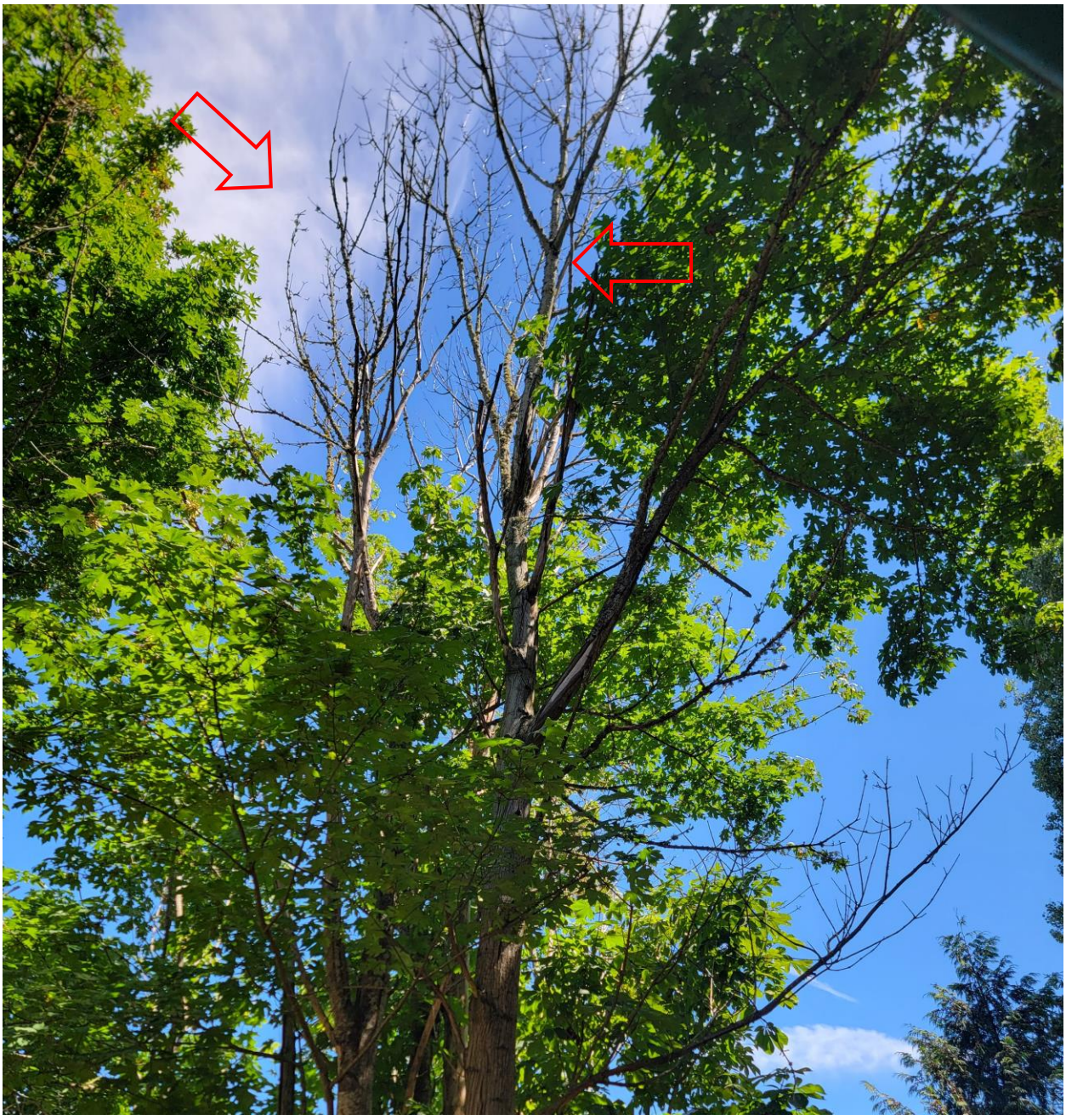

Figure 6: Tree 2/3 big leaf maple deadwood in canopies

Figure 7: Tree 2/3 big leaf maple extended branch.

Note activity playground is directly beneath.

Figure 8: Tree 2/3 big leaf maples

Red line indicates overhanging branch to remove.

6 Appendix A: Tree Risk Evaluation Methodology

Tree risk assessment methods used on this project were developed by the International Society of Arboriculture in 2013. The Tree Risk Assessment Manual authored by Dr. Julian Dunster and published by the ISA is the standard for qualifying and managing tree risk. This systematic approach to tree risk incorporates *likelihood of failure*, *likelihood of impact* and *consequence of failure* to measure the tree risk of specific targets. See Table 1 for details. The ANSI standard for risk assessment and ISA's Best Management Practices: Tree Risk Assessment defines three levels of tree risk assessment.

Level 1: Limited visual	Level 2: Basic	Level 3: Advanced

Level 1 is a tree analysis from a single perspective taken from a vehicle, while walking, aerially, or other mode of limited eyesight. Level 1 is used to ascertain high-priority, conspicuous tree features and defects, rapidly from a large population of trees. Street trees and other municipally owned trees are often prioritized with a Level 1 assessment. Level 2 involves a full spectrum visual evaluation of an individual tree. The perspective includes 360° of the trees, and with an adequate level canopy assessment from the ground. Level 2 allows the tree assessor to identify conspicuous and some inconspicuous features, defects, conditions, diseases, and pests on a tree. Tree health, structure, form, compensatory growth, and external influences are outlined in Level 2. Level 3 can be used when tree features/defects/conditions cannot be determined by other assessments. Level 3 includes aerial inspections, resistance-drill tests, sonic-tomography, UAVs, LIDAR and more.

Tree risk exposure is measured through targets. A target must be present for the presence of risk. Targets may include houses, vehicles, driveways, utility wires, infrastructure, other plants, and environmentally critical areas. Using the Matrix 1 and 2, we identify a likelihood of tree part failure. This can be root, trunk, branch, or twig failure. We then evaluate the likelihood of this failure impacting a predetermined target. Finally, we evaluate the consequences of failure shall a tree part both fail and impact a target.

Some options for mitigation of tree risk include:

Acceptance of risk: All vegetation comes with some inherit risk. Most often this risk is tolerable and will have no significant effects on risk potential. Normally, tree benefits far outweigh associated risks.

Retain and monitor for changes: When a tree has some level of potential risk but not enough to warrant a more extensive mitigation. Most retain and monitor plans recommend a return timeframe of 1-10 years.

Move offending target from damage radius: If target is not fixed, this can be the simplest of mitigation techniques.

Modify probability of failure: This mitigation includes techniques like stress-load-reductions, propping, cabling, bracing and habitat conversions.

Full removal of tree risk: Full removal of offending tree or tree parts.

Limitations: The Science of Arboriculture cannot detect and predict with certainty tree failure or timing of tree failure. An "Act of God" is when a tree fails after tree owner due diligence and Standard of Care have been met. As always, during extreme weather events, we recommend staying away from large trees, whether healthy or not. Even healthy trees that have a low potential for failure under normal conditions, could fail if their load limits are surpassed.

Matrix 1. Likelihood of Failure and Impact (Dunstser, 2013)

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

Matrix 2. Risk Rating

Likelihood of Failure and 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

Roles and Responsibilities of Tree Risk:

The proper roles of Tree Risk Assessors (Certified Arborists with additional training and qualification as a Qualified Tree Risk Assessor) and Tree Risk Managers (owners of trees) are very different. These roles are clearly delineated in two publications which are generally accepted guidelines for tree risk assessment in the arboricultural industry, Tree Care Industry Association (2011) and Smiley et al. (2011).

The Tree Risk Assessor's role includes the following responsibilities, as defined in a scope of work or project assignment:

Evaluate and classify the likelihood of a tree failure impacting a target, valuate the potential consequences of a tree failure, record and explain findings to the client, determine tree risk, and provide options for treatment to mitigate risk.

Responsibilities of Tree Risk Managers (tree owner or controlling authority) may include the following:

Meet a duty of care, determine the scope of work, specify the desired level of assessment, choose among risk mitigation options, decide the level of acceptable risk, and, prioritize work.

References:

Dunster, J., Smiley, E. T., Matheny, N., and Lilly S. 2013. Tree Risk Assessment Manual. Champaign, Illinois: International Society of Arboriculture.

Smiley, E. T., N. Matheny, and S.J. Lilly. 2011. Best Management Practices: Tree Risk Assessment. International Society of Arboriculture, Champaign, IL. 81 pp.

Tree Care Industry Association. 2011. American National Standard for Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Tree Risk Assessment a. Tree Structure Assessment) (A300, Part 9) Tree Care Industry Association, Manchester, NH. 14pp.