Tree Solutions Inc
Consulting Arborists

Project No. TS - 7354

Arborist Report

To:	Sturman Architects, City of Mercer Island
Site:	4603 89th Ave SE, Mercer Island, WA 98040
Re:	Tree Inventory for Development
Date:	Feb. 10, 2023
Project Arborist:	Joseph Sutton-Holcomb ISA Board Certified Master Arborist #PN- 8397BM Municipal Specialist; Qualified Tree Risk Assessor
Referenced Documents:	Sheet A1.1 Excavation Plan / Tree Plan (Sturman Architects, dated Feb. 6, 2023)
Attached:	Table of Trees Tree Site Map Tree Retention Worksheet Letter: Explanation and justification for removal of exceptional trees (Sturman Architects, dated Feb. 6, 2023) Sheet A1.X – Tree GFA Diagrams (Sturman Architects, dated Jan. 4, 2023)

Summary

In Sept. 2020, Tree Solutions inventoried and assessed 20 trees on site, 19 of which were large regulated trees. Since the initial inventory, one tree, 1809, failed at the base during a storm. As of Oct. 2022, 18 large regulated trees remain on the site.

Based on the Mercer Island City Code (MICC) trees greater than 10 inches diameter at standard height (DSH) and exceptional trees are required to be assessed for development projects. We tagged each of these regulated trees with an aluminum tree tag. Tree identifier in the table of trees corresponds to the number on each tag.

Of the site trees assessed, five met the exceptional tree criteria for size outlined in the MICC.

The code defines an exceptional tree grove as a group of eight or more trees that are 10 inches DSH or greater with contiguous canopies. All large trees on the site are part of an exceptional tree grove. Trees that are part of a grove are also considered exceptional trees.

Tree Solutions documented four regulated adjacent trees for this property. Trees on neighboring properties were documented if they appeared to be greater than 10 inches DSH and their driplines

extended over the property line. All trees on adjacent properties were estimated from the subject site or public property such as the adjacent right-of-way. We used an alphabetical tree identifier for trees off-site. We collected information on two unregulated adjacent trees for informational purposes. One of these unregulated adjacent trees, tree D, is proposed for removal.

Assignment and Scope of Work

This report outlines the tree inventory by Josh Petter and Andrea Starbird, of Tree Solutions Inc, on September 21, 2020. They were asked to visit the site and provide a report including findings and management recommendations. Sturman Architects requested these services for project planning purposes. Joseph Sutton-Holcomb of Tree Solutions Inc. conducted air excavation on the site in November 2022. Mr. Sutton-Holcomb also conducted a review of construction plans in Feb. 2023 and updated the report to reflect those documents.

Observations

Site

This site is tax parcel number #0191100645 and is 9,525 square feet. The undeveloped lot is located on 89th Ave SE on Mercer Island in an R-9.6 zone. The site is wooded and there is a tree house with zipline near the center of the site. The site topography is primarily flat and there is a walking trail to the north of the site.

According to King County iMap, and the Mercer Island GIS portal, there are no environmentally sensitive areas on-site.

The site has a mix of native and invasive understory vegetation. Native understory observed included: beaked hazelnut (*Corylus cornuta*), salal (*Gaultheria shallon*), and sword fern (*Polystichum munitum*). Invasive plant species observed included: ivy (*Hedera* spp.), which is growing into the canopies of trees, herb Robert (*Robertianum geranium*), English holly (*Ilex aquifolium*), and Himalayan blackberry (*Rubus bifrons*).

We observed several brush piles around the site, it appeared that the site has been used for composting yard waste.

Trees

We tagged and assessed 20 trees on-site. One tree, tree 1801, was below the regulated threshold. Another, tree 1809, failed at the base during the January 2021 winter storm. Tree Solutions confirmed this failure with a site inspection on Oct. 18, 2022. As of Oct. 2022 there are 18 large regulated trees on the site.

Tree 1809 was a western hemlock rated in poor health and structural condition at the time of Tree Solutions 2020 assessment.

Another inventory was conducted by Lee Harrison-Smith on July 7, 2020. His tags were handwritten or on flagging; we tagged each tree with a metal tree tag adjacent to the existing tag.

The trees are predominantly native species and included: Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), red alder (*Alnus rubra*), and bigleaf

maple (*Acer macrophyllum*). Most trees were in fair to good health and structural condition, with one tree in poor condition.
Several trees are used as attachment points and supports for a tree house and adjacent zipline. These trees are 1806, 1810 and 1813.

Five site trees (1802, 1806, 1808, 1810, and 1813) are exceptional by size. All large trees are part of a grove on-site, meaning all large trees are exceptional.

Tree 1808 is 40-inch DSH Douglas-fir in good health and structural condition. We observed pitching on two sides and swelling at the base. Consider advanced testing with micro-resistance drilling to assess for internal decay if this tree is to be retained.

Off-site Trees
Off-site trees A, B, and C are also exceptional by size.

The tree labeled 21 on Mr. Harrison-Smith's arborist report is off-site on adjacent property and does not overhang the subject property, therefore we did not assess this tree. This is confirmed by the site survey produced by Terrane, dated September 28, 2020.

We have attached an annotated aerial image of the site to serve as the site map as well as a table of trees that has detailed information about each tree.

Discussion—Construction Impacts

Tree Removals & Replacement
Tree Solutions has reviewed construction plans that show 13 large regulated trees on site proposed for removal. This includes tree 1809, which failed in January 2021 prior to any construction activity occurring on the site. Six trees (trees 1802, 1803, 1804, 1805, 1813, and 1820) are proposed for retention during construction.

According to MICC 1910.060.5 at least 30 percent of trees must be retained on-site. All exceptional trees outside the buildable area must be retained to the extent feasible. Trees removed will have to be replaced on the site, the number of tree replacements is dependent on the size of the tree removed. If there is not room to accommodate all replacement trees a fee in lieu of $949 per tree will be required.

The plans I reviewed propose to retain 31.5 percent of the trees on site. This calculation includes tree 1809.

Exceptional Tree Removal Justification
Exceptional trees 1806,1808,1810, 1811, 1816 are proposed for removal. Per MICC 19.10.060.A.3 these removals must be justified based on the following criteria:

a. Retention of an exceptional tree(s) with a diameter of 24 inches or more will result in an unavoidable hazardous situation; or
b. Retention of an exceptional tree(s) with a diameter of 24 inches or more will limit the constructable gross floor area to less than 85 percent of the maximum gross floor area allowed under chapter 19.02 MICC; or,

c. Retention of an exceptional tree(s) with a diameter of 24 inches or more will prevent creation of a residential lot through a subdivision or short subdivision that is otherwise allowed by this title.

Justification for the removal of tree 1816 is discussed in a letter from Sturman Architects attached to this report. A diagram showing Gross Floor Area relative to tree locations and setbacks. Also produced by Sturman Architects, is attached as well. These documents provide justification for the tree removals for the proposed project per MICC 19.10.060.A.3.

Tree Protection

Development work may occur within the recommended limits of disturbance (RLOD), defined as eight times trunk diameter at standard height or greater, depending on individual tree species and/or condition. All work proposed within the RLOD must be reviewed and approved by the project arborist and the City of Mercer Island. The RLOD for each retained tree is listed in the attached table of trees.

No ground disturbance is typically allowed within the minimum limits of disturbance (MLOD), defined as five times trunk diameter at standard height, or 6-feet, whichever is greater. Development work within the MLOD has high a potential for mechanical damage to structural roots and may destabilize trees.

The construction plans show impacts within the minimum limits of disturbance for 3 of these retained trees: trees 1805, 1813, and 1820.Tree Solutions has reviewed the impacts proposed within the MLOD and collaborated with the project team on appropriate tree protection measures. The tree protection measures are described below and included on applicable plan sheets.

Tree 1805

The proposed extent of new hardscape area has been adjusted to provide additional clearance from both of these trees. The proposed patio encroaches only slightly on the MLOD for tree 1805.

In our opinion, if tree protection fencing is installed and maintained at the location shown on the plans, and tree 1805 is provided with 4 inches of coarse woody mulch and supplemental irrigation within the fenced area, the tree can be safely retained during construction

Tree 1813

This large western redcedar has an MLOD of 20 feet. There are impacts from new footing drain, footings for a deck, and a new walkway within the MLOD.

The footing drain location was adjusted to be closer to the proposed new building and is now 15 feet from the center of the trunk. This excavation is identified for arborist monitoring on the drainage plan and will be done carefully using hand tools or pneumatic air excavation.
The proposed new walkway is 17 feet from the trunk and will be constructed with pavers in order to limit grade cuts.

Excavation for the sono-tube footings for the deck is called out for arborist monitoring, and the design of the footings was adjusted to require less excavation and to have a narrower profile to limit structural roots.

The holes for the footings will be dug carefully with hand tools or pneumatic air excavation, and the footing locations can be adjusted slightly to avoid large structural roots if they are encountered. In my experience it is unlikely large roots will be encountered at the proposed distance from the trunk given the tree species, though it is possible.

In our opinion, if tree protection fencing is installed and maintained at the location shown on the plans, and tree 1813 is provided with 4 inches of coarse woody mulch and supplemental irrigation within the fenced area, the tree can be safely retained during construction provided all special tree protection measures are strictly followed.

Tree 1820

This 12-inch DSH red alder has an MLOD of 5 feet. a small portion of a new paved walkway is proposed within the MLOD. This work is identified on the plans for arborist monitoring and air excavation to prep the subgrade prior to the walkway installation.

Given the small relative size of the tree, I believe the walkway can be installed at the proposed location so long as structural roots greater than 2 inches in diameter are not impacted. If multiple structural roots must be removed to accommodate the new walkway, the tree may require removal.

In our opinion, if tree protection fencing is installed and maintained at the location shown on the plans, and tree 1820 is provided with 4 inches of coarse woody mulch and supplemental irrigation within the fenced area, the tree can be safely retained during construction provided all special tree protection measures are strictly followed and no structural roots are severed in order to install the new walkway.

Pneumatic air excavation and impacts to trees 1813 and 1820

On November 11, 2022, Tree Solutions Inc. performed pneumatic air excavation in proximity to trees 1813 and 1820. The purpose of the air excavation was to assess the impacts to health and structure from the proposed installation of two sono-tube deck footings and a paved walkway within the MLOD of tree 1813.

We found no structural roots from tree 1813 at the locations of either deck footing.

At the location of the proposed walkway, we found 3 roots 2 inches in diameter, and 15-20 roots ½ inch to 1 inch diameter. However, an analysis of root bark color and texture, as well as the orientation of root growth, strongly indicates these roots are associated with tree 1814 and a non-regulated beaked hazelnut which are both proposed for removal.

We identified 3-5 roots ½ inch diameter that were likely from tree 1813 based on an analysis of bark color and texture and orientation of root growth. In my opinion, these roots can be cut cleanly at the edge of the proposed walkway without negatively impacting the health and structural stability of tree 1813.

The results of air excavation suggest that if the tree protection measures described above and included in Appendix G are rigorously followed for tree 1813 and 1820, both trees can be retained during construction.

Recommendations

- Obtain all necessary permits and approval from the City prior to commencement of site work.
- Tree protection consisting of chain-link fencing should be installed at the dripline of all retained trees. Trees growing in a group should be protected at the edge of their shared driplines. General tree protection specifications can be found in Appendix F and should be included when soliciting bids for development work, including demolition.

- Follow special protection measures for trees 1805, 1813, and 1820 as they are proposed to be impacted within their MLOD.
- All off-site trees must be protected during construction. See specifications in Appendix F.
- All pruning should be conducted by an International Society of Arboriculture (ISA) certified arborist following current ANSI A300 specifications.
- All tree retention and removal regulations must be followed and are outlined in MICC Chapter 19.10 Trees.
- Ensure tree protection standards comply with MICC 19.10.080 and ISA Best Management Practices (BMP) – Managing Trees During Construction.

Respectfully submitted,
Joseph Sutton-Holcomb
Consulting Arborist, Tree Solutions Inc.

Appendix A **Maps & Plans**

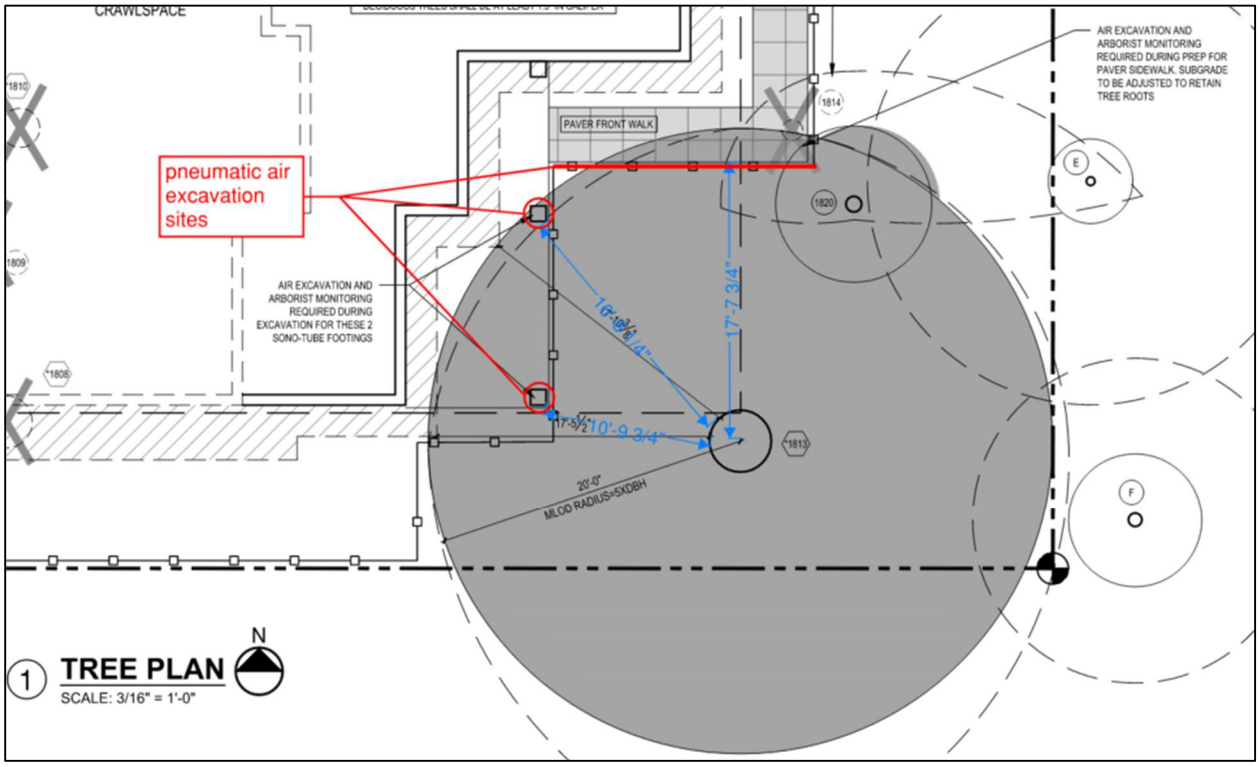


Figure 1. An excerpt from the tree plan showing the areas where air excavation occurred on Nov. 11, 2022. The objective of air excavation was to determine whether structural roots from tree 1813 were present at the deck footings and edge of the proposed front walkway.

Appendix B **Photographs**

Photo 1. Looking southwest into the site. Walkway on the right is a public path adjacent to the site.

Photo 2. There is a treehouse and associated recreation apparatuses attached to trees near the center of the site.

Photo 3. Tree 1806 is not serving as a primary support but is in the center of the treehouse with small attachment hardware. Large diameter surface roots are just below landscape fabric and mulch layer.

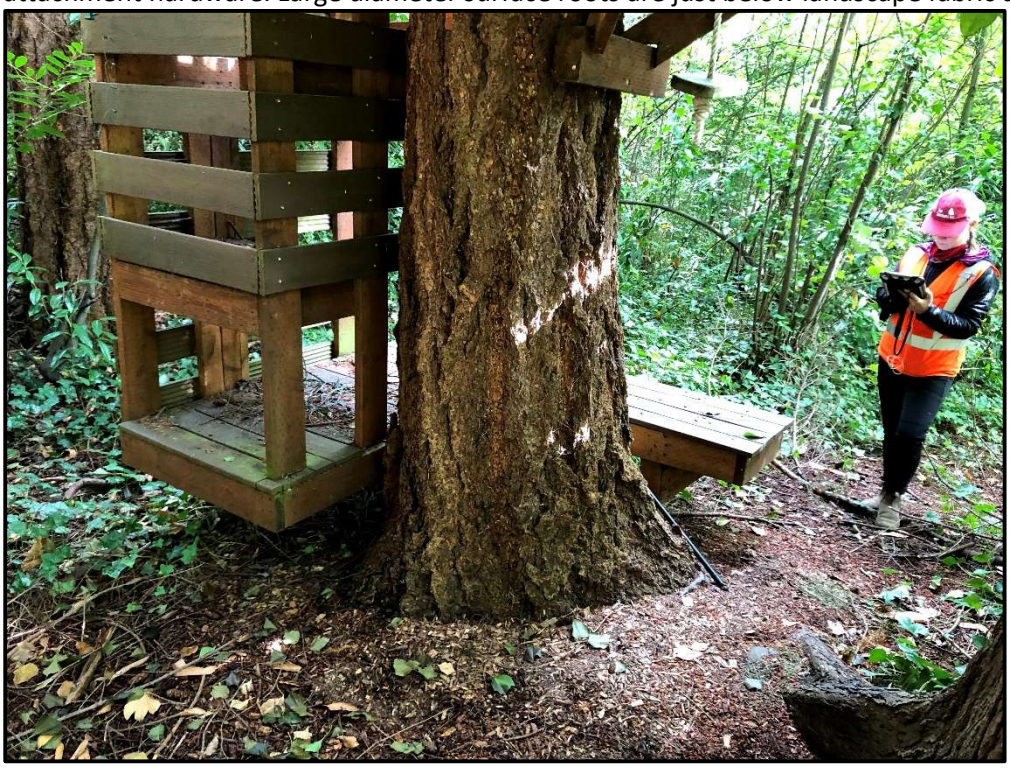


Photo 4. Tree 1810 has a platform and ladder with swing and zipline attachments; it is a primary support for the structures.

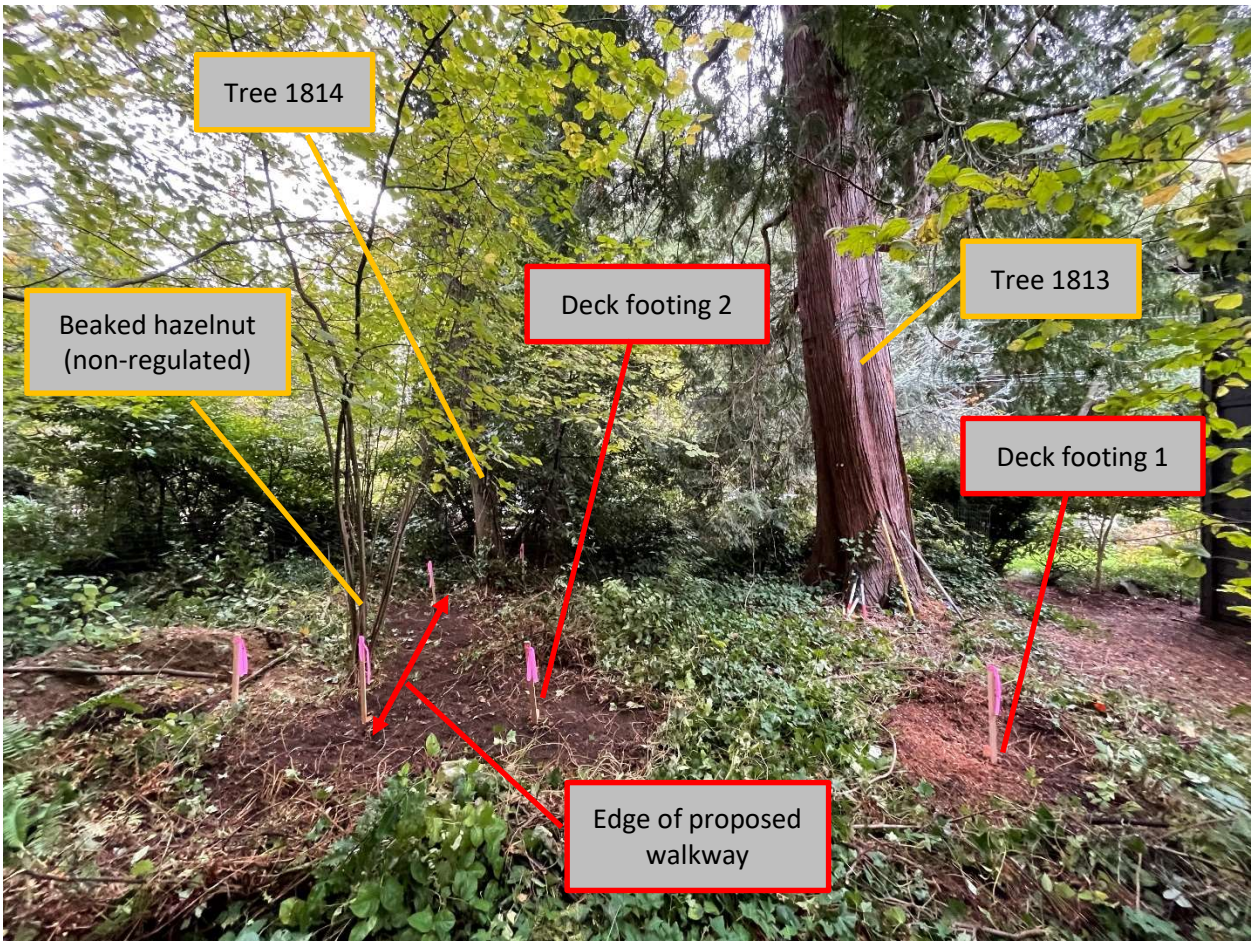


Photo 5. A view of the site prior to air excavation. Locations of impact areas to be assessed are indicated.

Photo 6. A view of the air excavation at deck footing 1, which is 11 feet to the east of tree 1813. No structural roots were found.

Photo 6. A view of the air excavation at deck footing 2, which is 17 feet to the east of tree 1813. No structural roots were found.

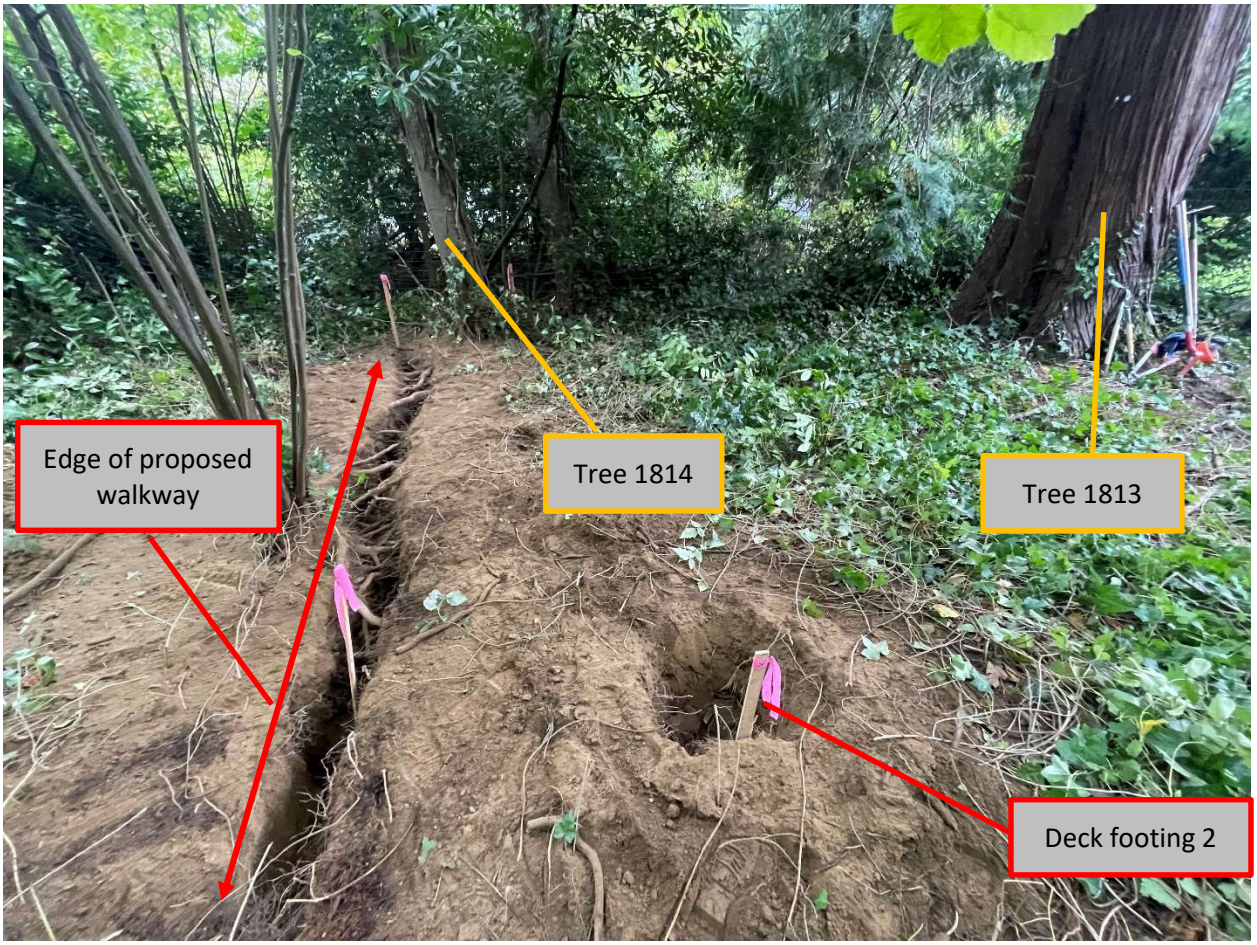


Photo 7. A view of the trench at the edge of the proposed walkway. All large structural roots found are associated with tree 1814 and an unregulated beaked hazelnut, both of which are proposed for removal. We found 3 to 5 roots ½ inch diameter that are associated with tree 1813 based on the bark color and texture.

Photo 8. A closer view of roots encountered during air excavation at the edge of the proposed walkway. All visible roots are associated with the non-regulated beaked hazelnut or red alter tree 1814, which is proposed for removal.

Photo 9. A closeup of the structural roots from tree 1814 found during air excavation of the proposed walkway. None of the roots visible are associated with tree 1813.

Appendix C **Glossary**

DBH or DSH: diameter at breast or standard height; the diameter of the trunk measured 54 inches (4.5 feet) above grade (Council of Tree and Landscape Appraisers 2019)

tree grove: a group of eight or more trees each 10 inches or more in diameter that form a continuous canopy. Trees that are part of a grove shall also be considered exceptional trees, unless they also meet the definition of a hazardous tree. (MICC 19.16.010)

exceptional tree: a tree measuring 36 inches DSH or greater or with a diameter that is equal to or greater than the diameter listed in the Exceptional Tree Table (MICC 19.16.010)

ISA: International Society of Arboriculture

large tree (regulated): A tree measuring 10 inches or greater DSH (MICC 19.16.010)

MLOD (Minimum Limits of Disturbance) Minimum Limits of Disturbance: represents a distance five (5) times that of the trunk and is the minimum distance from a trunk that a structural root can be cut to maintain tree stability.

RLOD (Recommend Limits of Disturbance): As outlined in ISA Best Management Practices: Managing Trees During Construction, this is calculated as a radial distance 8 times the trunk diameter. Some cases require 12 times the trunk diameter. For the purpose of this report, this represents the critical root zone (CRZ).

Visual Tree Assessment (VTA): method of evaluating structural defects and stability in trees by noting the pattern of growth (Mattheck & Breloer 1994)

Appendix D **References**

Accredited Standards Committee A300 (ASC 300). ANSI A300 (Part 1) Tree, Shrub, and Other Woody Plant Management – Standard Practices (Pruning). Londonderry: Tree Care Industry Association, 2017.

Council of Tree and Landscape Appraisers, Guide for Plant Appraisal, 10th Edition Second Printing. Atlanta, GA: The International Society of Arboriculture (ISA), 2019.

Fite, Kelby and Dr. E. Thomas Smiley. Best Management Practices: Managing Trees During Construction, Second Edition. Champaign, IL: International Society of Arboriculture (ISA), 2016.

Mattheck, Claus and Helge Breloer, The Body Language of Trees.: A Handbook for Failure Analysis. London: HMSO, 1994.

Mercer Island Municipal Code (MICC) 19.16.010. Definitions

Mercer Island Municipal Code (MICC) 19.10. Trees

Appendix E **Assumptions & Limiting Conditions**

1 Consultant assumes that the site and its use do not violate, and is in compliance with, all applicable codes, ordinances, statutes or regulations.

2 The consultant may provide a report or recommendation based on published municipal regulations. The consultant assumes that the municipal regulations published on the date of the report are current municipal regulations and assumes no obligation related to unpublished city regulation information.

3 Any report by the consultant and any values expressed therein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specific value, a stipulated result, the occurrence of a subsequent event, or upon any finding to be reported.

4 All photographs included in this report were taken by Tree Solutions, Inc. during the documented site visit, unless otherwise noted. Sketches, drawings and photographs (included in, and attached to, this report) are intended as visual aids and are not necessarily to scale. They should not be construed as engineering drawings, architectural reports or surveys. The reproduction of any information generated by architects, engineers or other consultants and any sketches, drawings or photographs is for the express purpose of coordination and ease of reference only. Inclusion of such information on any drawings or other documents does not constitute a representation by the consultant as to the sufficiency or accuracy of the information.

5 Unless otherwise agreed, (1) information contained in any report by consultant covers only the items 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, climbing, or coring.

6 These findings are based on the observations and opinions of the authoring arborist, and do not provide guarantees regarding the future performance, health, vigor, structural stability or safety of the plants described and assessed.

7 Measurements are subject to typical margins of error, considering the oval or asymmetrical cross-section of most trunks and canopies.

8 Tree Solutions did not review any reports or perform any tests related to the soil located on the subject property unless outlined in the scope of services. Tree Solutions staff are not and do not claim to be soils experts. An independent inventory and evaluation of the site's soil should be obtained by a qualified professional if an additional understanding of the site's characteristics is needed to make an informed decision.

9 Our assessments are made in conformity with acceptable evaluation/diagnostic reporting techniques and procedures, as recommended by the International Society of Arboriculture.

Appendix F **Methods**

Measuring

I measured the diameter of each tree at 54 inches above grade, diameter at standard height (DSH). If a tree had multiple stems, I measured each stem individually at standard height and determined a single-stem equivalent diameter by using the method outlined in the Guide for Plant Appraisal, 10th Edition Second Printing published by the Council of Tree and Landscape Appraisers. A tree is regulated based on this single-stem equivalent diameter value. Because this value is calculated in the office following field work, some unregulated trees may be included in our data set. These trees are included in the tree table for informational purposes only and not factored into tree totals discussed in this report.

Tagging

I tagged each tree with a circular aluminum tag at eye level. I assigned each tree a numerical identifier on our map and in our tree table, corresponding to this tree tag. I used alphabetical identifiers for trees off-site.

Evaluating

I evaluated tree health and structure utilizing visual tree assessment (VTA) methods. The basis behind VTA is the identification of symptoms, which the tree produces in reaction to a weak spot or area of mechanical stress. A tree reacts to mechanical and physiological stresses by growing more vigorously to re-enforce weak areas, while depriving less stressed parts. An understanding of the uniform stress allows the arborist to make informed judgments about the condition of a tree.

Rating

When rating tree health, I took into consideration crown indicators such as foliar density, size, color, stem and shoot extensions. When rating tree structure, I evaluated the tree for form and structural defects, including past damage and decay. Tree Solutions has adapted our ratings based on the Purdue University Extension formula values for health condition (*Purdue University Extension bulletin FNR-473-W - Tree Appraisal*). These values are a general representation used to assist arborists in assigning ratings.

Excellent - Perfect specimen with excellent form and vigor, well-balanced crown. Normal to exceeding shoot length on new growth. Leaf size and color normal. Trunk is sound and solid. Root zone undisturbed. No apparent pest problems. Long safe useful life expectancy for the species.

Good - Imperfect canopy density in few parts of the tree, up to 10% of the canopy. Normal to less than ¾ typical growth rate of shoots and minor deficiency in typical leaf development. Few pest issues or damage, and if they exist, they are controllable, or tree is reacting appropriately. Normal branch and stem development with healthy growth. Safe useful life expectancy typical for the species.

Fair - Crown decline and dieback up to 30% of the canopy. Leaf color is somewhat chlorotic/necrotic with smaller leaves and “off” coloration. Shoot extensions indicate some stunting and stressed growing conditions. Stress cone crop clearly visible. Obvious signs of pest problems contributing to lesser condition, control might be possible. Some decay areas found in main stem and branches. Below average safe useful life expectancy

Poor - Lacking full crown, more than 50% decline and dieback, especially affecting larger branches. Stunting of shoots is obvious with little evidence of growth on smaller stems. Leaf size and color reveals overall stress in the plant. Insect or disease infestation may be severe and uncontrollable. Extensive decay or hollows in branches and trunk. Short safe useful life expectancy.

Appendix G **Tree Protection Specifications**

The following is a list of protection measures that must be employed before, during and after construction to ensure the long-term viability of retained trees.

1. **Project Arborist:** The project arborists shall at minimum have an International Society of Arboriculture (ISA) Certification and ISA Tree Risk Assessment Qualification.
2. **Tree Protection Zone (TPZ):** The city of Mercer Island requires a tree protection zone (TPZ) for retained trees. The TPZ shall be at the Limits of Disturbance (LOD) as shown in the arborist report and associated table of trees. In some cases, the TPZ may extend outside tree protection fencing. Work within the TPZ must be approved and monitored by the project arborist.
3. **Tree Protection Fencing:** Tree protection shall consist of 6-foot chain-link fencing installed at the TPZ as approved by the project arborist. Fence posts shall be anchored into the ground or bolted to existing hardscape surfaces.
    a. Where trees are being retained as a group the fencing shall encompass the entire area including all landscape beds or lawn areas associated with the grove.
    b. Per arborist approval, TPZ fencing may be placed at the edge of existing hardscape within the TPZ to allow for staging and traffic.
    c. Where work is planned within the TPZ, install fencing at edge of TPZ and move to limits of disturbance at the time that the work within the TPZ is planned to occur. This ensures that work within the TPZ is completed to specification.
    d. Where trees are protected at the edge of the project boundary, construction limits fencing shall be incorporated as the boundary of tree protection fencing.
4. **Access Beyond Tree Protection Fencing:** In areas where work such as installation of utilities is required within the TPZ, a locking gate will be installed in the fencing to facilitate access. The project manager or project arborist shall be present when tree protection areas are accessed.
5. **Tree Protection Signage:** Tree protection signage shall be affixed to fencing every 20 feet. Signage shall be fluorescent, at least 2' x 2' in size, with 3" tall text. Signage will note: "Tree Protection Area – Do Not Enter: Entry into the tree protection area is prohibited unless authorized by the project manager." Signage shall include the contact information for the project manager and instructions for gaining access to the area.
6. **Filter / Silt Fencing:** Filter / silt fencing within the TPZ of retained trees shall be installed in a manner that does not sever roots. Install so that filter / silt fencing sits on the ground and is weighed in place by sandbags or gravel. Do not trench to insert filter / silt fencing into the ground.
7. **Monitoring:** The project arborist shall monitor all ground disturbance at the edge of or within the TPZ, including where the TPZ extends beyond the tree protection fencing.
8. **Soil Protection:** No parking, foot traffic, materials storage, or dumping (including excavated soils) are allowed within the TPZ. Heavy machinery shall remain outside of the TPZ. Access to the tree protection area will be granted under the supervision of the project arborist. If project arborist allows, heavy machinery can enter the area if soils are protected from the load. Acceptable methods of soil protection include applying 3/4-inch plywood over 4 to 6 inches of wood chip mulch or use of AlturnaMats® (or equivalent product approved by the project arborist). Retain existing paved surfaces within or at the edge of the TPZ for as long as possible.
9. **Soil Remediation:** Soil compacted within the TPZ of retained trees shall be remediated using pneumatic air excavation according to a specification produced by the project arborist.
10. **Canopy Protection**: Where fencing is installed at the limits of disturbance within the TPZ, canopy management (pruning or tying back) shall be conducted to ensure that vehicular traffic does not

damage canopy parts. Exhaust from machinery shall be located five feet outside the dripline of retained trees. No exhaust shall come in contact with foliage for prolonged periods of time.

11. **Duff/Mulch:** Apply 6 inches of arborist wood chip mulch or hog fuel over bare soil within the TPZ to prevent compaction and evaporation. TPZ shall be free of invasive weeds to facilitate mulch application. Keep mulch 1 foot away from the base of trees and 6 inches from retained understory vegetation. Retain and protect as much of the existing duff and understory vegetation as possible.
12. **Excavation:** Excavation done at the edge of or within the TPZ shall use alternative methods such as pneumatic air excavation or hand digging. If heavy machinery is used, use flat front buckets with the project arborist spotting for roots. When roots are encountered, stop excavation and cleanly sever roots. The project arborist shall monitor all excavation done within the TPZ.
13. **Fill:** Limit fill to 1 foot of uncompacted well-draining soil, within the TPZ of retained trees. In areas where additional fill is required, consult with the project arborist. Fill must be kept at least 1 foot from the trunks of trees.
14. **Root Pruning:** Limit root pruning to the extent possible. All roots shall be pruned with a sharp saw making clean cuts. Do not fracture or break roots with excavation equipment.
15. **Root Moisture:** Root cuts and exposed roots shall be immediately covered with soil, mulch, or clear polyethylene sheeting and kept moist. Water to maintain moist condition until the area is back filled. Do not allow exposed roots to dry out before replacing permanent back fill.
16. **Hardscape Removal:** Retain hardscape surfaces for as long as practical. Remove hardscape in a manner that does not require machinery to traverse newly exposed soil within the TPZ. Where equipment must traverse the newly exposed soil, apply soil protection as described in section 8. Replace fencing at edge of TPZ if soil exposed by hardscape removal will remain for any period of time.
17. **Tree Removal:** All trees to be removed that are located within the TPZ of retained trees shall not be ripped, pulled, or pushed over. The tree should be cut to the base and the stump either left or ground out. A flat front bucket can also be used to sever roots around all sides of the stump, or the roots can be exposed using hydro or air excavation and then cut before removing the stump.
18. **Irrigation:** Retained trees with soil disturbance within the TPZ will require supplemental water from June through September. Acceptable methods of irrigation include drip, sprinkler, or watering truck. Trees shall be watered three times per month during this time.
19. **Pruning:** Pruning required for construction and safety clearance shall be done with a pruning specification provided by the project arborist in accordance with American National Standards Institute ANSI-A300 2017 Standard Practices for Pruning. Pruning shall be conducted or monitored by an arborist with an ISA Certification.
20. **Plan Updates:** All plan updates or field modification that result in impacts within the TPZ or change the retained status of trees shall be reviewed by the senior project manager and project arborist prior to conducting the work.
21. **Materials:** Contractor shall have the following materials onsite and available for use during work in the TPZ:
    - **Sharp and clean bypass hand pruners**
    - **Sharp and clean bypass loppers**
    - **Sharp hand-held root saw**
    - **Reciprocating saw with new blades**
    - **Shovels**
    - **Trowels**
    - **Clear polyethylene sheeting**
    - **Burlap**
    - **Water**

Tree Solutions Inc
Consulting Arborists

Table of Trees

Tax Parcel 0191100645
89th Ave SE, Mercer Island, 98040 WA

Arborist: JP AS
Date of Inventory: 9/21/2020
Table Prepared: 11/14/2022

DSH (Diameter at Standard Height) is measured 4.5 feet above grade, or as specified in the Guide for Plant Appraisal, 10th Edition, published by the Council of Tree and Landscape Appraisers.
DSH for multi-stem trees are noted as a single stem equivalent, which is calculated using the method defined in the Guide for Plant Appraisal, 10th Edition.
Letters are used to identify trees on neighboring property with overhanging canopies.
Dripline is measured from the center of the tree to the outermost extent of the canopy.
Rows shaded in grey indicate trees that were inventoried, but are below the regulated size threshold
**Critical Root Zone is the radius extending from the center point of the tree*

							Dripline Radius (feet)									
Tree ID	**Scientific Name**	**Common Name**	**DSH** (inches)	**DSH Multistem**	**Health Condition**	**Structural Condition**	**N**	**E**	**S**	**W**	**Exceptional Threshold**	**Exceptional**	**Exceptional Grove**	**Proposed Action**	**Minimum Limits of Disturbance 5x trunk diameter (feet)**	**Notes**
1801	*Corylus cornuta*	*Beaked hazelnut*	9.4	4,3,3,3,4,2,5	Good	Fair	13.0	13.4	13.4	13.4	-		N/A	Retain	3.9	below regulated threshold, Ivy climbing, estimated DSH
1802	*Thuja plicata*	*Western Redcedar*	39.3		Good	Good	14.0	16.6	18.6	18.6	*30.0*	Exceptional - Size	Exceptional - Grove	Retain	16.4	Ivy climbing stem
1803	*Pseudotsuga menziesii*	*Douglas-fir*	22.5		Good	Good	9.9	14.9	12.9	10.4	*30.0*		Exceptional - Grove	Retain	9.4	
1804	*Thuja plicata*	*Western Redcedar*	26.8		Good	Fair	16.1	8.1	13.1	16.1	*30.0*		Exceptional - Grove	Retain	11.2	Previously broken top, codominant at 30 feet
1805	*Thuja plicata*	*Western Redcedar*	16.8		Good	Good	10.7	12.7	9.7	10.7	*30.0*		Exceptional - Grove	Retain	7.0	Canopy overhangs tree house
1806	*Pseudotsuga menziesii*	*Douglas-fir*	47.0		Good	Good	22.0	22.0	22.0	22.0	*30.0*	Exceptional - Size	Exceptional - Grove	Remove	19.6	Center of tree house, only small attachments, not primary support, large surface roots present covered with landscape fabric and thin layer of wood chip mulch
1807	*Tsuga heterophylla*	*Western Hemlock*	17.2		Fair	Fair	7.7	10.7	12.7	11.7	*24.0*		Exceptional - Grove	Remove	7.2	Heavy witches broom in canopy, previously lost top
1808	*Pseudotsuga menziesii*	*Douglas-fir*	40.0		Good	Good	11.7	16.7	19.7	16.7	*30.0*	Exceptional - Size	Exceptional - Grove	Remove	16.7	Estimated, hazelnut at base, pitching on 2 sides consider advanced assessment, swollen base
1809	*Tsuga heterophylla*	*Western Hemlock*	17.8		Poor	Poor	5.7	22.7	17.7	6.7	*24.0*		Exceptional - Grove	Remove	7.4	Good candidate for removal, low retention value. Tree failed in January 2021 storm, examination of root flare in Oct. 2022 indicates extensive heart rot present in structural roots
1810	*Pseudotsuga menziesii*	*Douglas-fir*	30.1		Good	Good	13.3	13.3	13.3	13.3	*30.0*	Exceptional - Size	Exceptional - Grove	Remove	12.5	Platform attached at 7 feet, ladder attached, large bolts for zipline attachment. Ivy present at base, landscape fabric over surface roots with thin woodchip mulch layer
1811	*Pseudotsuga menziesii*	*Douglas-fir*	25.7		Good	Good	13.1	13.1	13.1	13.1	*30.0*		Exceptional - Grove	Remove	10.7	Ivy on stem that has been previously managed, low live crown ratio, suppressed canopy, phototropic to the NE
1812	*Pseudotsuga menziesii*	*Douglas-fir*	15.3		Fair	Fair	1.6	15.6	15.6	1.6	*30.0*		Exceptional - Grove	Remove	6.4	Canopy mostly east and south, suppressed, ivy on stem previously managed, dead trunk adjacent.
1813	*Thuja plicata*	*Western Redcedar*	47.5		Good	Good	20.0	21.0	27.0	20.0	*30.0*	Exceptional - Size	Exceptional - Grove	Retain	19.8	Adjacent to fence, has zipline attachment.
1814	*Alnus rubra*	*Red alder*	15.9		Fair	Good	15.7	16.7	8.7	10.7	-		Exceptional - Grove	Remove	6.6	Ivy on stem

Tree Solutions Inc
Consulting Arborists

Table of Trees

Tax Parcel 0191100645
89th Ave SE, Mercer Island, 98040 WA

Arborist: JP AS
Date of Inventory: 9/21/2020
Table Prepared: 11/14/2022

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	N	E	S	W	Exceptional Threshold	Exceptional	Exceptional Grove	Proposed Action	Minimum Limits of Disturbance 5x trunk diameter (feet)	Notes
1815	*Acer macrophyllum*	*Bigleaf Maple*	15.0		Good	Good	19.6	19.6	19.6	19.6	*30.0*		Exceptional - Grove	Remove	6.3	Heavy ivy with some previous management
1816	*Pseudotsuga menziesii*	*Douglas-fir*	25.2		Good	Good	15.1	15.1	15.1	15.1	*30.0*		Exceptional - Grove	Remove	10.5	
1817	*Thuja plicata*	*Western Redcedar*	22.3		Good	Good	12.9	12.9	12.9	12.9	*30.0*		Exceptional - Grove	Remove	9.3	Heavy ivy, canopy a bit sparse
1818	*Pseudotsuga menziesii*	*Douglas-fir*	20.8		Good	Good	14.9	14.9	14.9	14.9	*30.0*		Exceptional - Grove	Remove	8.7	
1819	*Pseudotsuga menziesii*	*Douglas-fir*	18.7		Good	Fair	4.8	12.8	12.8	4.8	*30.0*		Exceptional - Grove	Remove	7.8	Previously broken top, heavy ivy
1820	*Alnus rubra*	*Red alder*	12.0		Good	Good	8.5	18.5	1.0	8.5	-		Exceptional - Grove	Retain	5.0	Canopy phototropic east, no canopy to west, ivy on stem

Tree Solutions Inc
Consulting Arborists

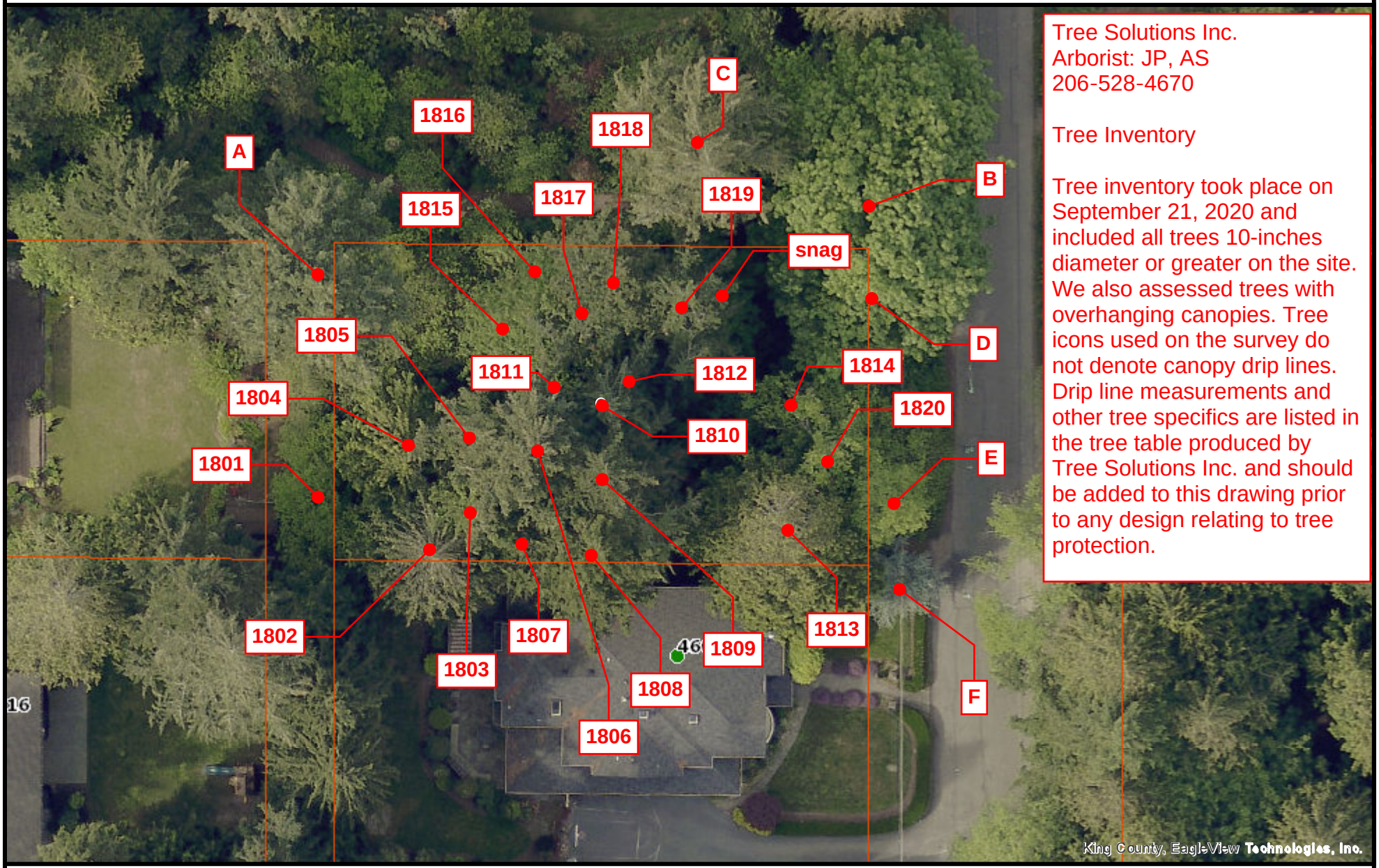
Table of Trees

Tax Parcel 0191100645
89th Ave SE, Mercer Island, 98040 WA

Arborist: JP AS
Date of Inventory: 9/21/2020
Table Prepared: 11/14/2022

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	N	E	S	W	Exceptional Threshold	Exceptional	Exceptional Grove	Proposed Action	Minimum Limits of Disturbance 5x trunk diameter (feet)	Notes
A	*Pseudotsuga menziesii*	*Douglas-fir*	40.0		Good	Good	22.7	22.7	22.7	22.7	*30.0*	Exceptional - Size	N/A	Retain	16.7	9 feet from NW property corner, surface roots observed, DSH estimated
B	*Acer macrophyllum*	*Bigleaf Maple*	52.0		Good	Good	40.2	40.2	40.2	40.2	*30.0*	Exceptional - Size	N/A	Retain	21.7	Opposite side path, overhangs site, part of grove
C	*Pseudotsuga menziesii*	*Douglas-fir*	40.0		Good	Good	22.7	22.7	22.7	22.7	*30.0*	Exceptional - Size	N/A	Retain	16.7	
D	*Corylus cornuta*	*Beaked hazelnut*	7.5	2,2,2,2,3,4,4	Good	Good	16.3	16.3	16.3	16.3	-		N/A	Remove	3.1	Below regulated threshold, Some ivy throughout canopy, in ROW
E	*Corylus cornuta*	*Beaked hazelnut*	6.5	3,3,4,2,2	Good	Good	14.3	14.3	14.3	14.3	-		N/A	Retain	2.7	Below regulated threshold, in ROW
F	*Cedrus atlantica*	*Atlas Cedar*	10.3		Good	Good	10.4	10.4	10.4	10.4	*30.0*		N/A	Retain	4.3	Previously topped for power lines, in ROW

King County iMap



Tree Solutions Inc.
Arborist: JP, AS
206-528-4670

Tree Inventory

Tree inventory took place on September 21, 2020 and included all trees 10-inches diameter or greater on the site. We also assessed trees with overhanging canopies. Tree icons used on the survey do not denote canopy drip lines. Drip line measurements and other tree specifics are listed in the tree table produced by Tree Solutions Inc. and should be added to this drawing prior to any design relating to tree protection.

Date: 9/21/2020 Notes:

N

King County

CITY OF MERCER ISLAND

COMMUNITY PLANNING & DEVELOPMENT
9611 SE 36TH STREET | MERCER ISLAND, WA 98040
PHONE: 206.275.7605 | www.mercergov.org

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: 4

List tree numbers: 1802, 1806, 1808, 1813

Number of trees 24" or greater (including 36" or greater): 8

List tree numbers: 1802, 1804, 1806, 1808, 1810, 1811, 1813, 1816

Number of trees from Exceptional Tree Table (MICC 19.16): ~~17~~ 16

List tree numbers: 1802,1803,1804,1805,1806,1807,1808,~~1809~~,1810,1811,1812,1813,1815,1816,1817,1818,1819

Failed in storm in 2021

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: ~~19~~ 18 (A)

List tree numbers: 1802-1820 (excluding 1809)

Failed in storm in 2021

Number of Large Regulated Trees on site proposed for removal: ~~13~~ 12 (B)

List tree numbers: 1806, 1807, 18~~08, 18~~09, 1810, 1811, 1812, 1814, 1815, 1816, 1817, 1818, 1819

Percentage of trees to be retained ((A-B)/Ax100) note: must be at least 30%: ~~31.3~~ 33 %

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: 1

List tree numbers: F

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

List tree numbers: _____

Reason for removal: _____

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	1	1
10" up to 24"	2		
Greater than 24" up to 36"	3		
Greater than 36" and any Exceptional Tree	6	~~13~~ 12	~~78~~ 72
	TOTAL TREE REPLACEMENTS		73

STURMAN
ARCHITECTS

Date: February 6, 2023

To: City of Mercer Island
Community Planning & Development

From: Kati Eitzman – Sturman Architects
Brad Sturman – Sturman Architects

Re: Lanctot Residence
4603 89th Ave SE
Mercer Island, WA 98040

Subj.: Explanation and Justification for removal of exceptional trees

This letter is being submitted as part of an application for a building permit.

Applicable to all removed trees:

Per code 19.10.060(3)(b):
"Retention of an exceptional tree(s) with a diameter of 24 inches or more will limit the constructable gross floor area to less than 85 percent of the maximum gross floor area allowed under chapter 19.02 MICC;"

Per 19.02.020(D)(3)(b), the zoning of this lot allows us a maximum of 4500 square feet for our GFA, including a maximum addition of 5% for an ADU. Per code 19.10.060(3)(b), we are allowed 85% of this maximum GFA. 85% of 4500 square feet is 3825 square feet GFA guaranteed. The building pad allowed for development equals 4917 square feet. To minimize negative impact to the site and its trees, a two-story house is proposed. A basement isn't feasible as it would create increased excavation, impacting a greater area of the building pad. The proposed detached ADU location doesn't cause removal of any trees that won't already be removed to accommodate the house.

Without the removal of the proposed trees, it would not be feasible to construct a house on this lot. We have done our very best to retain as many trees as possible, minimize harmful impacts, and thoughtfully site our house.

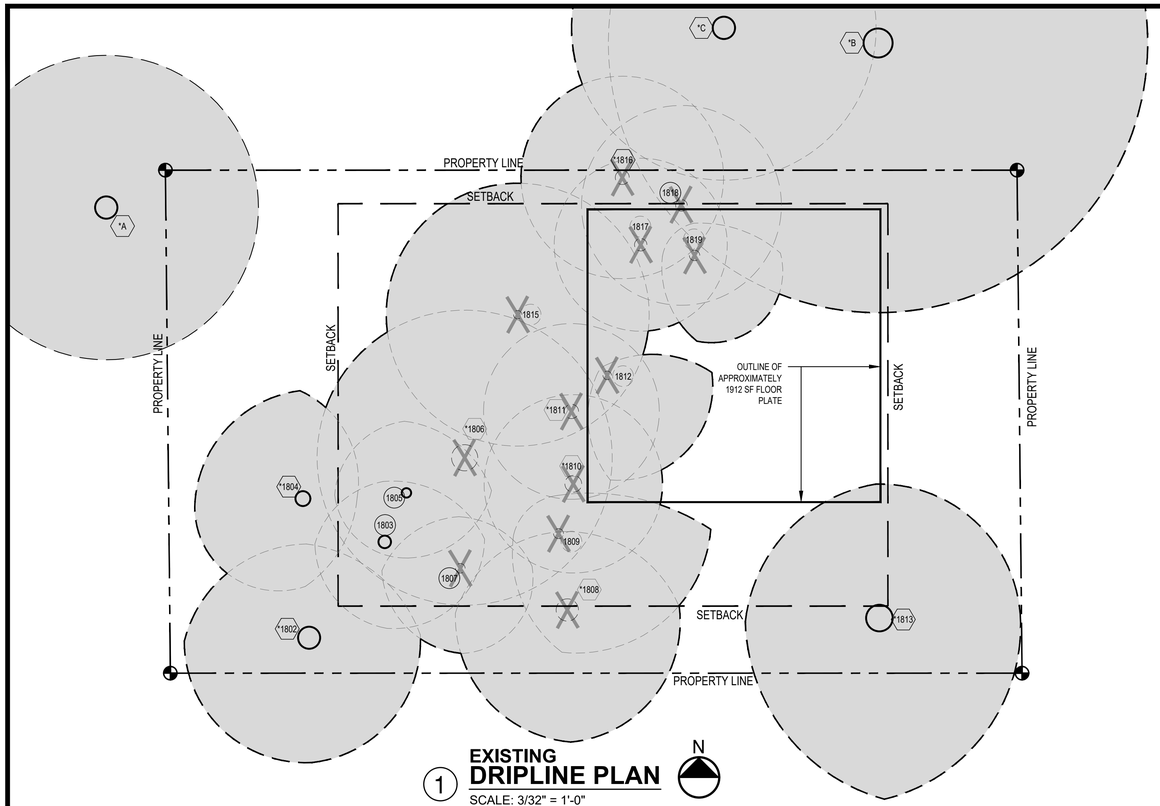
9 – 103rd Ave. N.E., Bellevue WA 98004 **T-425 451-7003**
www.SturmanArchitects.com

STURMAN
ARCHITECTS

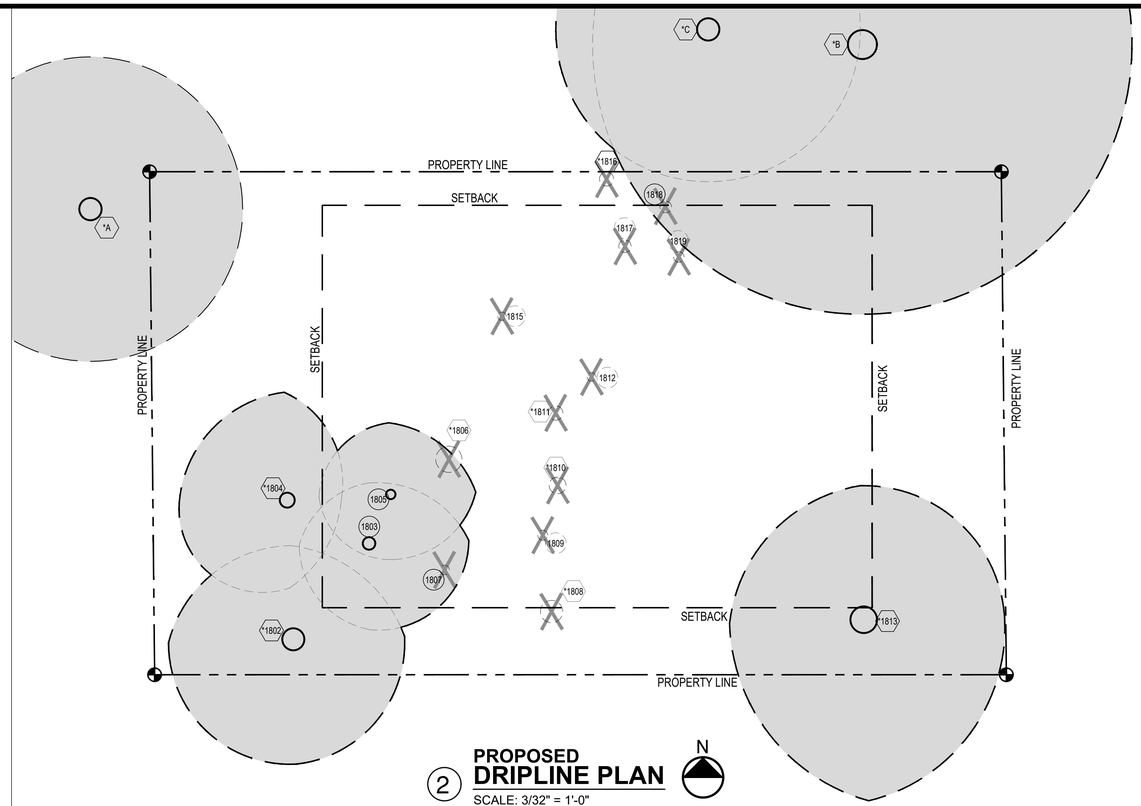
Additional Info

#1816- Excavation for the house foundation will extend through about 25% of the Minimum Limits of Disturbance/root zone and survival is not possible. Additionally, a required stormwater detention tank is planned for the north side of the house. Its location was chosen by our civil engineer based on the existing grades, size of pipe required and the need for the amount of fall required from the building's FFE to the bottom of the ditch. We have raised our house out of the ground as much as possible while still staying under the Building Height Limit by only a few inches. Locating the detention tank anywhere else on the site would have necessitated the removal of additional trees not already being removed for the house, particularly tree 1813.

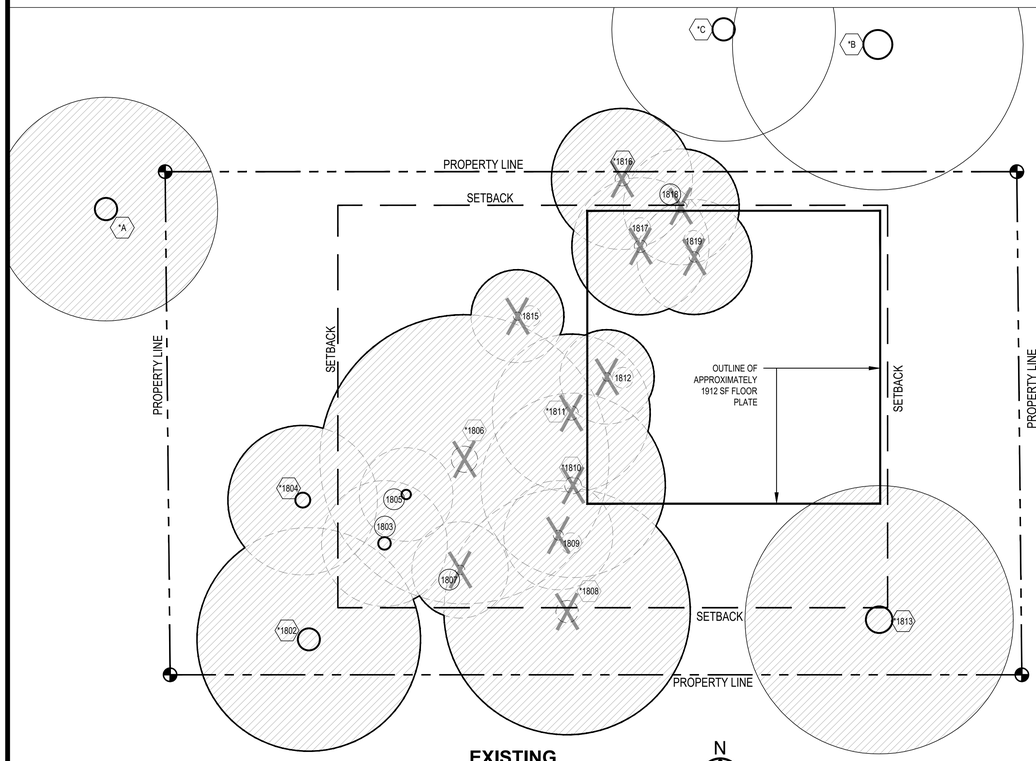
9 – 103rd Ave. N.E., Bellevue WA 98004 **T-425 451-7003**
www.SturmanArchitects.com



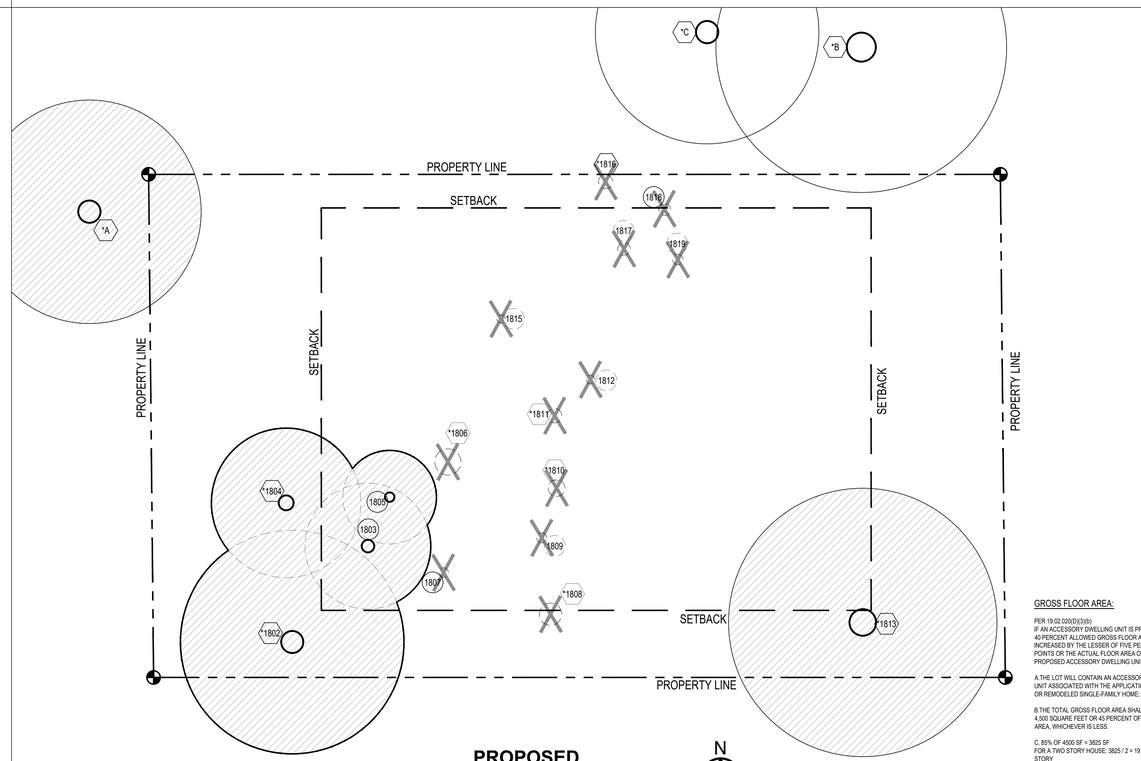
1 **EXISTING DRIPLINE PLAN**
SCALE: 3/32" = 1'-0"



2 **PROPOSED DRIPLINE PLAN**
SCALE: 3/32" = 1'-0"



3 **EXISTING ROOT ZONE PLAN**
SCALE: 3/32" = 1'-0"



4 **PROPOSED ROOT ZONE PLAN**
SCALE: 3/32" = 1'-0"

GROSS FLOOR AREA:

PER 19.02.020(D)(3)(b)
IF AN ACCESSORY DWELLING UNIT IS PROPOSED, THE 40 PERCENT ALLOWED GROSS FLOOR AREA MAY BE INCREASED BY THE LESSER OF FIVE PERCENTAGE POINTS OR THE ACTUAL FLOOR AREA OF THE PROPOSED ACCESSORY DWELLING UNIT, PROVIDED:

A THE LOT WILL CONTAIN AN ACCESSORY DWELLING UNIT ASSOCIATED WITH THE APPLICATION FOR A NEW OR REMODELED SINGLE-FAMILY HOME; AND

B THE TOTAL GROSS FLOOR AREA SHALL NOT EXCEED 4,500 SQUARE FEET OR 45 PERCENT OF THE LOT AREA, WHICHEVER IS LESS.

C. 85% OF 4500 SF = 3825 SF
FOR A TWO STORY HOUSE: 3825 / 2 = 1912.5 SF PER STORY

SCALE: IF SHEET IS LESS THAN 24" X 36", IT IS A REDUCED PRINT; REDUCE SCALE ACCORDINGLY

PERMIT SET 01/04/23

STURMAN ARCHITECTS
9 - 103rd Avenue NE Suite 203
Bellevue, WA 98004
TEL: 425.451.7003

REGISTERED ARCHITECT
BRADLEY J. STURMAN
STATE OF WASHINGTON
5562

LANCTOT RESIDENCE
PERMIT SET
4603 89TH AVE SE
MERCER ISLAND, WA 98040

TREE GFA DIAGRAMS

REVISIONS:
1 2022-11-29 Corrections #1
2
3
4
5

DRAWN BY: KE
CHECKED BY: BJS

SHEET
A1.X

PLOT DATE: 1/4/2023