

Preliminary Arborist Report

To: JMK Homes c/o Jed Murphy
Site: 6610 E Mercer Way, Mercer Island, WA
Re: Tree inventory
Date: November 4, 2022
Project Arborist: George White,
ISA Certified Arborist #PN-8908A
ISA Qualified Tree Risk Assessor
Reviewed By: Joseph Sutton-Holcomb
ISA Certified Arborist #PN-8397AM
Municipal Specialist, ISA Qualified Tree Risk Assessor
Referenced Documents: Topographic Survey (Pace Engineers, 6.6.2018)
Koneru Building Permit (Pace Engineers, Revised 11.4.2022)
Attached: Table of Trees
Tree Site Map

Summary

We inventoried and assessed ten trees on this lot. Based on the Mercer Island City Code (MICC) large (regulated) and exceptional trees are required to be assessed for development projects. We tagged each tree with an aluminum tree tag. Numerical tree identifiers correspond to the number on each tag. Two additional trees, referred to as dead tree 1 and dead tree 2, were also inventoried. These trees were not tagged but are to be counted towards tree retention/removal totals.

Of the trees assessed, three met the exceptional tree criteria outlined in the MICC. One additional tree, dead tree 1, was also exceptional in size.

There were two adjacent trees that required documentation for this property. Trees on neighboring properties were documented if they appeared to be greater than 10 inches diameter 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.

According to the most recent plans (Koneru Building Permit, updated 11/4/2022) six out of the twelve regulated on-site trees are currently proposed for retention, satisfying the 30% retention requirement outlined in MICC 19.10.060

One exceptional tree that is greater than 24 inches in diameter at survey height (DSH) is currently proposed for removal. Retention of this tree would prevent the creation of an emergency vehicle egress and installation of a fire hydrant and would therefore result in an unavoidable hazardous situation.

A total of 20 replacement trees installed per the specifications in MICC 19.10.070 are required for this project.

Assignment and Scope of Work

This report outlines the site inspection by George White and Scott D. Baker of Tree Solutions Inc, on March 2nd, 2022. We were asked to visit the site and provide an arborist report including findings and management recommendations. Dheeraj Koneru, owner of the property, requested these services for project planning purposes.

Observations and Discussion

Site

This 50,094 square foot site was located on a private drive off of E Mercer Way of Mercer Island. According to King County iMap, a wetland delineation and shorefront setback exists on site.

Across the site I noted several invasive plant species and weeds of concern including Himalayan blackberry (*Rubus bifrons*), English ivy (*Hedera sp.*), Cherry laurel (*Prunus laurocerasus*), English holly (*Ilex aquifolium*), and black locust (*Robinia pseudoacacia*). Invasive plants should be removed prior to development.

Proposed Plans

The most recent plans (Koneru Building Permit, Pace Engineers, revised 5.11.2022) propose the demolition of existing structures on site and the construction of a new, two-story home with a covered porch, patio, and new driveway layout. Plans also include the installation of new, below-ground utilities and storm-drain lines.

Trees

Ten large trees were tagged and assessed on site. Three of the trees assessed, trees 573, 575, and 576, were exceptional by size. (See photo 1.)

MICC 19.10.060 requires that 30% of all large trees must be retained during a development project. Exceptional trees, trees that are greater than 24 inches in diameter, trees that have a greater likelihood of longevity, and trees that are part of a healthy grove are prioritized for retention.

Retention of all exceptional trees greater than 24 inches in diameter is required for all development projects unless retention:

- results in an unavoidable hazardous situation
- will limit the constructable gross floor area to less than 85 percent of maximum gross floor area
- prevents creation of a residential lot through a subdivision or short subdivision

Additionally, we surveyed one dead tree of exceptional size that appeared to have been intentionally girdled by the previous property owners. We observed several trees (some over 10 inches in diameter)

that appeared to have been killed intentionally in this manner. In one case, a dead tree had a funnel protruding from a drilled port that was presumably used to inject herbicide. (See photos 2 and 3.)

We have included an annotated survey to serve as the site map and attached a table of trees that has detailed information about each tree, including health, structural condition, proposed action, and required number of replacement trees.

Discussion—Construction Impacts

No ground disturbance is 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.

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.

MICC 19.10.060 requires the retention of 30 percent of all large trees over a rolling five-year period. 50 percent of all large trees on site are currently proposed for retention.

Trees to be removed

Tree 573 is an exceptional Douglas-fir (*Pseudotsuga menziesii*) that is located in the middle of the driveway easement in the northwest corner of the property. (See photo 1.) This tree is currently proposed for removal. This tree conflicts with the construction of a driveway that would allow for emergency vehicle egress. It also conflicts with plans to install a required fire hydrant and accompanying 6" water line. Therefore, retention of this tree would result in an "unavoidable hazardous situation" as described in MICC 19.10.060.3. if the driveway and fire hydrant are installed at the proposed locations. Therefore, this tree is exempt from the restriction on the removal of exceptional trees.

The stump of tree 573 should be ground in place, not ripped out to avoid root damage to adjacent trees. Six replacement trees will be required for this tree in accordance with the standards outlined in MICC 19.10.070.

Trees 574 is a 10-inch Florida dogwood (*Cornus florida*) that conflicts with the proposed driveway and is proposed for removal. Two replacement trees will be required.

Trees 577 and 578 are two western redcedars (*Thuja plicata*), 14 and 13 inches in diameter, located near the southeast corner of the property that conflict with proposed structures and are proposed for removal. The stumps of these trees must be ground in place and not ripped out so as to avoid damage to adjacent retained trees. A total of four replacement trees will be required.

Trees to be retained

Tree 575

Tree 575 is an exceptional Douglas fir that is located in the northeast quadrant of the lot. (See photo 4.) This tree must be protected with tree protection fencing at the Recommended Limits of Disturbance (RLOD) listed in the attached table of trees using the specifications provided in appendix F. No machine access, or materials storage will be permitted within the RLOD. All erosion and runoff control (e.g., silt-fencing) must be surface mounted within the RLOD. Any excavation within the RLOD must be monitored by the project arborist.

The most recent plans show a proposed storm drain located approximately 20 feet south of tree 575. The edge of this trench must be excavated carefully under the supervision of the project arborist and any exposed roots must be cut cleanly and immediately backfilled.

Tree 576

Tree 576 is an exceptional western redcedar located southeast of the proposed house that is proposed for retention. The tree must be protected with tree protection fencing at the edge of the RLOD in accordance with the specifications outlined in appendix F. Materials storage, machine access and grading are prohibited within the RLOD. All excavation within the RLOD must be conducted in coordination with the project arborist.

Plans show foundation slabs approximately 18-25 feet northwest of tree 576. All excavation within the RLOD must be conducted carefully under supervision of the project arborist and may require alternate excavation techniques including hydro-excitation. All roots encountered must be cut cleanly and immediately backfilled to prevent desiccation. Tree protection fencing on the house side can be moved to the edge of the concrete foundation following excavation.

In addition to the foundation impacts, plans call for a Storm Drain to pass between the proposed house and tree 576, approximately 19 feet from tree 576. Because of the proposed depth of the storm drain, root impacts are expected to be minimal. This excavation must be conducted carefully under the direct supervision of the project arborist. This should be called out for arborist monitoring on all pertinent plan sheets.

Because of the expected impacts to this tree, and the susceptibility of western red cedars to construction impacts it is imperative that mulch and supplemental irrigation, to the specifications outlined in appendix F, shall be specified on the tree protection plan.

Tree 579

Tree 579 is a western redcedar located along the south property line that is proposed for retention. This tree must be protected at the RLOD with tree protection fencing to the specifications outlined in appendix F. This tree must be mulched and provided supplemental irrigation.

Tree 580

Tree 580 is a saucer magnolia (*Magnolia x soulangiana*) located in the center of the site. This tree must be protected at the RLOD with tree protection fencing to the standards outlined in appendix F. Clearance pruning on the east aspect of the tree may be required to facilitate the adjacent proposed staging area. All pruning is to be completed by an ISA certified arborist in accordance with ANSI A300 standards. Pruning should not exceed more than 25 percent of the overall canopy.

Trees 581 and 582

Trees 581 and 582 are two western redcedars that are a part of a larger grove of trees in the northwest corner of the site. Other trees in the grove consist of smaller, unregulated trees and off-site trees. Both trees are proposed for retention. These must be protected at the edge of the RLOD with tree protection fencing to the specifications outlined in appendix F. These trees would do best if the tree protection fencing protected the entire grove continuously at the edge of their shared RLOD.

There is currently an existing asphalt driveway immediately to the north of tree 582 that is proposed for demolition. This asphalt should be pulled back carefully using a flat fronted bucket under supervision of the project arborist. The freshly exposed soil within the RLOD should be protected from compaction by expanding the tree protection fencing. Woodchip mulch to the standards outlined in appendix F should be installed following the driveway demolition. Supplemental irrigation should be provided to the retained grove during the dry months (May-Sept). These specifications should be included on all pertinent plan sheets.

Replacement Trees

The city of Mercer Island requires replacement trees for trees cut as part of a development permit. In this case, 20 replacement trees are required. Replacement trees must primarily be of species native to the Pacific Northwest. Detailed tree replacement requirements can be found in MICC 19.10.070.

Discussion- Correction Responses

Dead Tree 1

Dead tree 1 was an exceptional western redcedar that was killed by the previous property owner. Because this tree was exceptional it would have been required to be retained and not damaged by development in the tree protection zone. The only proposed structure that encroaches on the minimum limits of disturbance is a deck which is to be constructed on piles. In my professional opinion, the impacts from this deck would have been manageable should the tree be alive and required for retention.

Trees 575

Tree 575 is an exceptional Douglas-fir located north of the proposed structure. There is currently a proposed storm drain approximately 20 feet from the base of this tree. All trenching within the RLOD of this tree is to be conducted under arborist supervision.

Tree 576

Tree 576 is an exceptional western redcedar located southeast of the proposed house. The most recent plans show that the storm drain is 19 feet from the base of the tree, which is outside of the MLOD for this tree. Because of the existing grade, storm drain excavation is expected to be minimal across this area. I believe that root impacts due to this excavation will be minimal. Any excavation related to this storm drain is to be conducted by air excavation or by hand tools under arborist supervision.

Tree 573

Tree 573 is an exceptional Douglas fir located in the middle of the existing driveway. This tree is currently proposed for removal because it conflicts with the installation of the required fire hydrant. Although the fire hydrant itself is outside of the MLOD, it is required to be hooked up to a new 6-inch water line which parallels the existing driveway. A 6-inch waterline will require a minimum 4-foot

trench. There is no way to install this water line without routing it through the MLOD of tree 573 (See Figure 1).

Recommendations

- Update tree protection plan sheets to include the RLOD, Minimum Limits of Disturbance (MLOD) and tree protection fencing using the data from the attached table of trees.
- Any excavation or ground disturbance within the RLOD of retained trees must be called out for arborist monitoring on the plan set and may require alternative excavation techniques.
- Tree protection fencing on the plan set must be expanded to encompass the entire tree protection area for retained trees.
- Obtain all necessary permits and approval from the city prior to commencement of site work.
- Tree protection consisting of 6-foot chain link fencing should be installed at the RLOD of retained trees. Trees growing in a group should be protected at the edge of their shared RLOD. General tree protection specifications can be found in Appendix F.
- All Pruning must be conducted by an ISA certified arborist in Accordance with ANSI A300 standards.
- All off-site trees must be protected during construction.
- 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,

George White,
Consulting Arborist

Appendix A 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 or 6-feet, whichever is greater, and is the minimum distance from a trunk that a structural root can be cut to maintain tree stability.

RL0D (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 or greater depending on tree species and/or condition. 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 B **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 C Photographs and Figures



Photograph 1. Tree 573, An exceptional Douglas-fir in the NW corner of the lot. This tree conflicts with required driveway improvements and new fire-hydrant.



Photograph 2. Dead tree 1, An exceptional western redcedar that appeared to have been girdled by the previous property owner.



Photograph 3. Dead tree 2, a dead western redcedar with funnel and signs of intentional girdling.



Photograph 4. Tree 275, and exceptional Douglas-fir with windblown canopy that is proposed for retention.

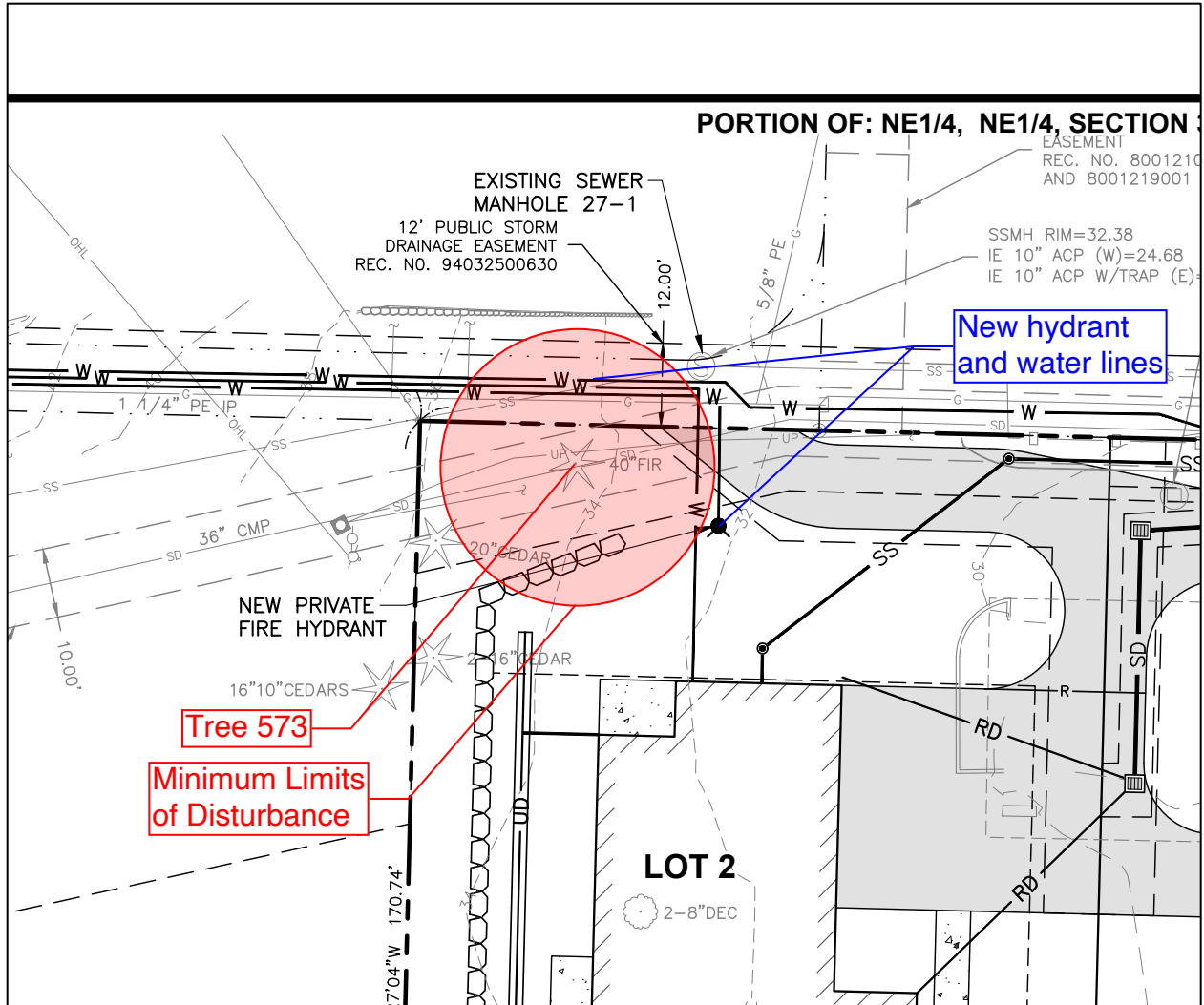


Figure 1. An excerpt from Composite Utility Plan C3.0 (7.20.2021) indicating the location of the new fire hydrant and water lines in relation to tree 573

Appendix D 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 E Methods

Measuring

We 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 city of Seattle Director's Rule 16-2008 or 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

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

Evaluating

We 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, we took into consideration crown indicators such as foliar density, size, color, stem and shoot extensions. When rating tree structure, we 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.

Health

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.

Structure

Excellent - Root plate undisturbed and clear of any obstructions. Trunk flare has normal development. No visible trunk defects or cavities. Branch spacing/structure and attachments are free of any defects.

Good - Root plate appears normal, with only minor damage. Possible signs of root dysfunction around trunk flare. Minor trunk defects from previous injury, with good closure and less than 25% of bark section missing. Good branch habit; minor dieback with some signs of previous pruning. Codominant stem formation may be present, requiring minor corrections.

Fair - Root plate reveals previous damage or disturbance. Dysfunctional roots may be visible around the main stem. Evidence of trunk damage or cavities, with decay or defects present and less than 30% of bark sections missing on trunk. Co-dominant stems are present. Branching habit and attachments indicate poor pruning or damage, which requires moderate corrections.

Poor - Root plate disturbance and defects indicate major damage, with girdling roots around the trunk flare. Trunk reveals more than 50% of bark section missing. Branch structure has poor attachments, with several structurally important branches dead or broken. Canopy reveals signs of damage or previous topping or lion-tailing, with major corrective action required.

Appendix F 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. **Recommended Limits of Disturbance (RLOD):** The city of Mercer Island requires a recommended limits of disturbance (RLOD) of 5 feet per 12 inches diameter at survey height, or a minimum of 6 feet. In some cases, the RLOD may extend beyond these minimums at the discretion of the project arborist. Work within the RLOD 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 RLOD 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, RLOD fencing may be placed at the edge of existing hardscape within the RLOD to allow for staging and traffic.
 - c. Where work is planned within the RLOD, install fencing at edge of RLOD and move to limits of disturbance at the time that the work within the RLOD is planned to occur. This ensures that work within the RLOD 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 RLOD, 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 RLOD 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 RLOD, including where the RLOD extends beyond the tree protection fencing.
8. **Soil Protection:** No parking, foot traffic, materials storage, or dumping (including excavated soils) are allowed within the RLOD. Heavy machinery shall remain outside of the RLOD. 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 RLOD for as long as possible.
9. **Soil Remediation:** Soil compacted within the RLOD 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 RLOD, 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 RLOD to prevent compaction and evaporation. RLOD 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 RLOD 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 RLOD.
13. **Fill:** Limit fill to 1 foot of uncompacted well-draining soil, within the RLOD 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 RLOD. Where equipment must traverse the newly exposed soil, apply soil protection as described in section 8. Replace fencing at edge of RLOD 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 RLOD 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 RLOD 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 RLOD 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 RLOD:
 - **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**

Explanation of Discrepancies Between Tree Inventories

Tree 133 ID	Tree Solutions ID	Explanation
1	582	
2	581	
3	573	
4	480	
5	-	Not found to be of significant size/located off site on provided survey
6	-	Tree dead/failed at time of survey, not included on provided survey
7	-	Tree dead/failed at time of survey, not included on provided survey
8	-	Tree dead /failed. Labeled as dead on Site Map
9	-	Labeled as NS. Tree not estimated to be of significant size
10	dead tree 2	
11	578	
12	577	
13	-	Not found to be of significant size
14	578	
15	dead tree 1	
16	575	
A	B	
B	-	Did not appear to be of significant size
C	A	
-	579	Not picked up by Tree 133 inventory
-	574	Not picked up by Tree 133 inventory

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. Minimum Limit of Disturbance (MLOD) is defined as 5 times trunk diameter or 6 feet, whichever is greater. **Recommended Limit of Disturbance (RLOD) is 8 times trunk diameter or greater depending on tree species and/or condition.** Drip-line is measured from the center of the tree to the outermost extent of the canopy.

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	Drip-line Radius (feet)			Exceptional Threshold	Exceptional Size	24-inch DSH or Greater	MLOD (feet)	RLOD (feet)	Proposed Action	Required Replacement Trees	Notes	
							N	E	S									W
573	<i>Pseudotsuga menziesii</i>	Douglas-fir	47.0		Good	Good	24.0	24.5	22.5	28.5	30.0	Exceptional - Size	Yes	20	47	Remove	6	Pavement on all sides, center of drive, crown raised, end weight reduction pruning on north side, water main bored beneath tree
574	<i>Cornus florida</i>	Eastern Dogwood	10.7	8,8,6,1	Good	Good	6.4	8.9	11.9	12.9	12.0		-	6	10	Remove	2	Hollow tree, very old specimen
575	<i>Pseudotsuga menziesii</i>	Douglas-fir	39.5		Good	Good	21.6	19.6	23.6	25.6	30.0	Exceptional - Size	Yes	16	40	Retain	-	Top blown out repeatedly, storm damaged limbs, excellent health, soil saturated, gnarled trunk
576	<i>Thuja plicata</i>	Western Redcedar	37.0		Fair	Good	18.5	20.5	18.5	19.5	30.0	Exceptional - Size	Yes	15	37	Retain	-	Thin canopy, drought stress
577	<i>Thuja plicata</i>	Western Redcedar	14.0		Fair	Good	11.6	10.6	10.6	4.6	30.0		-	6	14	Remove	2	
578	<i>Thuja plicata</i>	Western Redcedar	13.0		Fair	Good	4.5	11.5	10.5	11.5	30.0		-	6	13	Remove	2	
579	<i>Thuja plicata</i>	Western Redcedar	10.0		Fair	Good	8.4	8.4	8.4	8.4	30.0		-	6	10	Retain	-	
580	<i>Magnolia x soulangiana</i>	Saucer magnolia	15.0	9,12	Good	Fair	23.6	20.6	15.1	9.6	-		-	6	15	Retain	-	Phototropic sprouting, failed tree on top
581	<i>Thuja plicata</i>	Western Redcedar	27.0		Good	Good	21.1	23.1	19.1	5.1	30.0		Yes	11	27	Retain	-	Codominant at 6' with narrow union
582	<i>Thuja plicata</i>	Western Redcedar	23.0		Good	Good	22.0	21.0	11.0	19.0	30.0		-	10	23	Retain	-	
Dead 1	<i>Thuja plicata</i>	Western Redcedar	34.8	27,14,17	N/A	N/A	16.5	23.0	21.5	22.5	30.0	Exceptional - Size	Yes	15	N/A	Reduce to wildlife snag	6	Dead tree, clear signs of purposeful grinding, codominant at base, good candidate for wildlife snag
Dead 2	<i>Thuja plicata</i>	Western Redcedar	20.0		N/A	N/A	16.8	19.8	18.8	18.8	30.0		-	8	N/A	Remove	2	Dead tree, clear signs of purposeful grinding, funnel sticking out of tree, likely for herbicide application
A	<i>Fraxinus pennsylvanica</i>	Green Ash	18.0		Good	Good	30.8	30.8	30.8	30.8	30.0		-	8	18	Retain	-	
B	<i>Thuja plicata</i>	Western Redcedar	23.7	11,21	Good	Good	15.0	13.0	19.0	21.0	30.0		-	10	24	Retain	-	Codominant with narrow union, part of grove with tree 582 and 581