Superior NW Enterprises

June 1, 2021

Project: Tree review and assessment at 8480 85th Street SE, Mercer Island, WA.
Parcel number 0736100155.

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Objectives: Evaluate health of existing trees and establish criteria for the preservation of those to be retained.

Description: The existing 8480 home was built in 1973 on a half-acre lot at the south end of Mercer Island. The 'T' shaped house is located in the center of the property. The long cross leg of the main house neatly separates the lot into an open rear yard dropping down to the lake and a front region containing a full sized sport court and wide steep entry drive (Figure 1). The short perpendicular leg, containing the detached garage, butts up against the sport court at its outside end and forms the backdrop for the large autocourt along its face. Steep, staired walkways join the two regions on either end of the house. According to records a rather extensive remodel was completed in the 80s which significantly expanded the footprint of the home and added the outside decking and stairs. Since that time few hardscape changes have been made on the lot.

The property most recently changed hands in October of 2020. The new owners are currently developing plans to remove the existing house and replace it with one nearly in the same footprint as shown in Figures 2 and 3. Understanding that the City of Mercer Island requires onsite trees to be formally evaluated the client contacted Tree Harmony Arborists and requested assistance. They in turn contracted with Superior NW to assess all the trees present on the lot as to their health, stability, and overall suitability for retention.

Site visits were made on during May of 2021 and the trees were documented. For sake of simplicity and consistency with the plan set supplied by the client the side of the property adjacent to 85th Street is designated as west in the notations below. The following itemized list begins at the top left (east) side of the driveway winds mostly clockwise around the property. The numerical designations are reflected in the tree plot shown in Figure 4. Diameters were measured at the standard height of 54" above grade (DSH) during the site visits. Caliper measurements were taken at 6" above grade and heights were estimated.

1) Pacific Dogwood (*Cornus nuttalli*) 3.5" and 5" DSH separating from the base. The larger stem goes to 25' and the smaller to 18' tall. It has a 9' overall radial spread. Tree is in weak condition with stunted new growth and poor color. It stands 7.5' N of the driveway curbing, 17.5' E of the edge of the asphalt for 85th , and 10.5' S of the retaining wall for the sport court. Not shown on the survey plan.

2) Noble Fir (*Abies procera*) 7.5" DSH, 22' tall standing above the SW corner of the sport court, 8' E of the asphalt on 85th. It is growing under the power lines and may have been topped off for clearance. Fair condition but poor placement. Not shown on survey.

3) Douglas Fir (*Pseudotsuga menziesii*) 14" DSH, topped multiple time in the 22-25' range for power line clearance. It is in excellent health with abundant new growth and vibrant color. It stands 28.5' N of the SW corner of the sport court and 14' W of its west wall. The branches on the tree reach as much as 3' over court and are quite dense.

4) Douglas fir 15" DSH standing 18' N of #3 and 19' W of the sport court retaining wall. It has been topped for power line clearance around the same level as the other fir. It is not in as good of health as the previous tree with noticeably less growth throughout.

5) Douglas fir standing 14' W of the sport court wall and in line with #4. This tree is 11" DSH and its entire canopy extends to the south and half the branches reach as much as 4' over the court. Fair health but has been topped to match the height of the other firs.

6) Bigleaf maple standing 6' W of the sport court wall, 3' S of its of its NW corner. Tree had been dual stem but at some point between 2009 and 2013 the east section failed and/or was removed (Figures 5 and 6). The remaining trunk is 27" DSH. It goes to 10' and then bends nearly horizontal to the south (Figure 7). The stem reaches out about 8' before turning back toward vertical. It straightens out between the 20' and 24' level and eventually gets to 65' tall on a handful of large scaffolds. The majority of the canopy is in the NW quadrant with only a quarter or so occupying a single spar on the north side as shown in Figure 8. The color is good and the new growth is at least average. As much as half of the limbs on this tree have been removed as indicated by the pruning scars. There is a significant decay point 6' below the main separation point in the column identified by the birds going in and out of it.

7) Grand fir (*Abies grandis*) 8" DSH, 22' tall standing 6' N of the NW corner of the sport court. According to the survey this places the tree on the 8474 property. It is in fair health but the canopy is somewhat one-sided to the north due to standing so close to big #6 maple. Not shown on the survey plan.

8) Western red cedar (*Thuja plicata*) standing north side center of the existing garage 7.5' N of its foundation. Tree is 17" DSH, 35' tall and exhibits average new growth and color but it has a quite heavy cone load.

There is a large maple stump sitting in the north corner of 'T' (Figure 9). This tree shows as being present in the 2019 aerial image on which the tree plot is overlaid but it is indicated as stump on the survey plan that bears a November 2019 date. Hence it was removed at least a year before the current owners took possession. The circumstances of its removal are not known.

A hedge runs nearly the entire length of the north side of the property. It is formed of English Yew from the lake shore to a point near the NW corner of the garage where it changes over to arborvitae. The yew portion is indicated on the survey. The west end arborvitaes are not. The yew portion has been groomed for many years and held to about the 8' level. The arborvitaes reach up to 10' and their sides are much more rough.

9) Columnar Norway maple (*Acer platanoides* 'Columnare') 17" DSH, 45' tall, 12' radial spread. Tree stands almost in a corner of the existing rear concrete patio. It's 6' E of the outer planter wall and 8' S of the steps (Figure 10). Tree exhibits fair health but has the heavy root crown plate and associated girdling roots common to the species (Figure 11). This tree and its sisters were planted between 2007 and 2009 (Figures 12 and 13). It is likely the trees that had been present (Figure 14) were lost in the 2006 winter storm. The #9-11 maples may have been planted as replacements.

10) Columnar Norway maple 10" DSH, 45' tall, 9' spread standing 13.5' S of #9. This one is more stunted and has a large center stem that died and/or broke out (Figure 15). It also has the girdling roots present (Figure 16).

11) Columnar Norway maple 14" DSH, 45-50' tall, 9' spread in fair health. Has more pronounced girdling at the base (Figure 17). Tree stands 11' E of the house foundation and 10.5' SW of #10. The brick work for the stairs at the south end of the patio comes to within 7' of the maples base in its NW quadrant.

12) Weeping willow (*Salix babylonica*) stub 18' tall, 50" DSH, with epicormic shoots that reach another 10-15' above the break point (Figure 18). The tree has advanced decay from base to stub crown as shown in Figures 19-21. The large exposed surface roots also show extensive rot present (Figure 22). It is highly likely that the entire willow collapsed during the 2006 storm. Figure 14 shows a quite large canopy presence at this tree's location in 2002 and then just a dot in its place in 2007 (see Figure 12). The largest viable section of the existing canopy comes off the very tip of the north face of the tree and has no more than 8" of viable wood supporting it at that point (Figure 23). The tree stands within 15'of the seawall in the SE corner of the yard. Size not withstanding this is in no way an Exceptional tree.

13) Big Leaf maple 32" DSH, 65-70' tall, with a mixed spread width. The tree stands 12.5' WSW of the SW corner of the driveway hammerhead/parking space (Figure 24). Sighting from the SW property corner marker the tree appears to be on or just over the south property line. The survey shows it straddling the line (Figure 25). The tree has large caliper deadwood throughout and the center stem has atrophied and/or broke out as shown in Figure 26. The maple separates into four main leaders at this level. Two of these stretch north over the subject property for at least 20'. A third goes nearly horizontal to the SW and the fourth hooks away from the die off point and goes vertical to form the uppermost canopy. There is epicormic sprouting along the lower trunk and a handful of smaller scaffolding branches below the separation point. Overall the tree is in fair health but exhibits a quite weak structural condition. There are signs of root uplift in the little hammerhead/parking space area and it is more than likely that these roots are from the maple (Figures 27 and 28). Exceptional by definition.

14) Douglas fir 14" DSH, 65' tall standing 6' S of the #13 maple. Fair condition but 90% of the canopy extends to the south due to phototropism and competition from the maple.

15) Douglas fir 10.5" DSH, 55' tall standing 12' W of the #13 maple and right at the corner of the 8431 parking spot (Figure 29). Fair health. Structure sub optimal because of growing up through the maple.

16) Douglas fir 22" DSH, 65' tall standing next to and just south of the SW corner marker (Figure 30). It is 14" N of the of the curb for the 8431 parking and 11.5' S of the curbing for the existing driveway entrance to the subject property (Figure 31). The current driveway curves to the south and intersects with 85th Avenue 15' W of the tree. It exhibits average new growth and color. The west side of its canopy has been notched to create clearance for the power lines.

Methods: Tree assessment is both an art and a science. To properly perform, an arborist must have an extensive background in biology, tree mechanics, and tree structure that is equal parts academic and field knowledge. It takes years of study to recognize and correctly diagnose the subtle signs trees exhibit before their failure, whether it be partial or total. The process begins with a visual inspection (visual tree assessment, VTA) which is followed up as necessary with soundings, core testing, and/or other detection means. Each tree is examined and evaluated according to several factors including species type, size, vigor, injuries present, root and grade disturbance, deadwood, location and extent of decay, stem taper, exposure, and targets that are at risk.

The International Society of Arboriculture (ISA) spent a number of years developing a Best Management Practices bulletin to aid in their tree risk assessment program. Their methodology supersedes any and all other systems which may be currently in use. While focusing on a qualitative analysis the program is still based on the three primary aspects of tree risk; failure potential, size of part failing (potential of damage from impact), and target rating.

The aspects are scaled as follows. Failure potential (FP) can be imminent, probable, possible, or improbable. Target rating (T) is based on frequency of occupancy and is listed as very low, low, medium, or high. Selections are made in each of the first two categories and a likelihood of target impact found. It can be rated as unlikely, somewhat likely, likely, or very likely as shown in Figure 32. Obviously a level of null risk does not exist if a tree is present. For practical purposes however, arborists assume that if there is no target, the tree poses little or no risk.

The consequences of the failure, usually a function of size of the failed part, are listed as negligible, minor, significant, or severe. Combining the likelihood of a tree failure event with the consequences of that event allows a trained arborist to assign a level of risk to a given tree's situation. There are four risk categories within the model; Low, Moderate, High, or Extreme. The highest level, extreme, can only be assigned when the likelihood of failure and impact is high (very likely) and the consequences are severe (Figure 33).

Risk Assessments: There are two types of failures to consider when looking at this case, partial and catastrophic. Partial failures include branch, scaffold, and stem breaks. Catastrophic only looks at basal failure or uprooting.

The targets within range of a tree differ according to the failure types. A branch falling out of a tree generally does not reach much farther out then the diameter of the canopy itself. Heavy winds may carry a branch sidewise for some distance but the range is directly correlated to the height of the break in the tree. Scaffold failures reach out to no more than 20% past their length. Hence the end of a 20' leader has the potential to hit something 24' away. A failure occurring mid stem can reach targets up to 10% beyond its length with factors for wind velocity and fall height modifying this range to some extent. Trees which uproot or have basal failures cannot strike targets outside their own height in anything less than hurricane force winds.

The #3-5 firs, the #6 and #13 maples, and the #12 willow have **probable likelihoods of scaffold or large limb failures** in the 4-8" caliper range**.** The firs have been topped repeatedly creating a weakened central attachment and over extension of the branches. Both maples have had breakouts at several points already and their scaffolds are carrying too much end weight. They have amorphous conformations leaving single leaders highly exposed. All the material on the willow is quite weakly attached to barely viable sections of live wood.

The fir branches currently just barely reach the sport court and because of the large hedge along 85th can't reach the ground on that side. This means they have **very low likelihoods** of striking persons or property. The fir branches are thus **unlikely to fail and impact** making them automatically **low risk**s.

The stems and large branches which break out of the two maples will have **medium likelihoods** of hitting pedestrian and vehicular traffic on 85th or the driveway respectively. The #6 has a **high likelihood** of hitting the power lines the #12 cars parked in the current driveway, the corner of the existing house, and/or the 8431 carport. This puts the two maples in the **somewhat likely to fail and impact** row of the second matrix for moving targets and the **likely to fail and impact** for stationary ones. The **consequences will be significant** in either case. This makes the maples **moderate risks** for pedestrian and vehicular traffic and **high risks** for the vehicles parked under them and the existing structures.

The willow is currently, and has been for some time, failing. Its structural integrity is completely compromised by the decay destroying the vigor of the wood tissue and the significantly compromised holding power of the epicormic attachments. Currently the material on the willow has no targets in reach. Even if the tree failed at the base and fell directly at the existing house only the tips of the tallest shoots would have a possibility of reaching the house. This makes the tree currently **unlikely to fail and impact** making this tree a **low risk** for both partial and catastrophic failure.

After the redevelopment of the property the circumstances of the #3-5 firs will not change. Neither will that of the willow.

The owners have stated the intention to remove the existing sport court and garage and return the area to the original slope aspect present when the existing house was built. Removing the retaining walls near the #6 maple will more likely than not destabilize the tree. Standing as close as it does to the wall it is expected that its roots are pressing against it. Even if they do not the sudden release of support for the soil could in and of itself create a catastrophic failure event.

The tree is large enough to fall completely across 85th taking the power lines with it. It can reach the 8474 garage and home. It will obviously be able to reach the new house on the subject lot. This means that the tree will be **likely to fail and impact** and the consequences would be **severe** based on the size of the tree and the fall distance involved. Hence, removal of the retaining walls at the base of this tree makes it a **high risk** for catastrophic failure.

The changes in circumstances for the #13, #15, and #16 trees will be explored in the next section.

Impact Analysis: There are primary and secondary impact issues at this site. The primary construction impact zone includes the trees standing within a 10' envelope of the boundaries of the demolition of the existing house, sport court, and garage. It also includes the proposed excavating for the new home, driveway changes, and utilities. In this case trees #1, #2, #6-8, #9-11, #13, #15, and #16 each stand within this zone. Typically all the primary zone trees are removed at project onset. In this case trees #7, #8, #13, #15, and #16 have special circumstances and will be discussed below. The #1, #2, and #9-11 will be removed either during the demolition or the clearing and grading stage.

The secondary impact zone includes those regions where the demolition work or excavating for the new foundation and other hardscaping will cross into the Critical Root Zone (CRZ) of the surrounding trees. This region is defined as a radial distance equal to one foot per inch of tree diameter. For example the #13 maple, with a 32 inch DSH, theoretically has a 32 foot radial root spread. The trees in this zone include #3, #12, and #14. The #7, #8, #13, #15, and #16 trees will considered as setting in this zone as they are ideally to be retained.

Trenching type incursion, that is excavation that will occur along only one sector of a tree's CRZ, can reach significantly into the root growth area without having a detrimental long term effect. What does have to be absolutely protected is a tree's Structural Root Plate (SRP). This radial area is again related to the diameter inches of the tree in question but not quite in a direct proportion as in the CRZ. Figure 34 below illustrates the relationship.

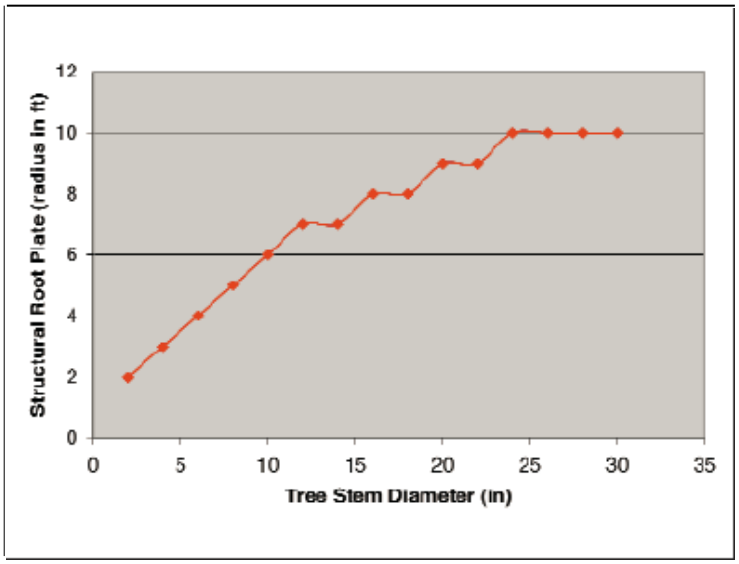

Figure 34. Size of the Structural Root Plate in relation to tree stem diameter. Note that the SRP levels off at 10' for any tree over 24" in diameter. (Coder, 1996)

As discussed above the proposed plan calls for the removal of the sport court. The #3 fir has a 14" DSH and stands 14' away. Its Structural Root Plate will not be effected.

The #6 maple (27" DSH) should have a 10' SRP according to the table. It only stands 6' back from the wall which is why it likely has roots pressing against it. The tree has been using the retaining wall for support for years. This is why removing the wall created the high risk scenario described in the previous section.
The #7 tree has an 8" DSH which translates to a 5.5' SRP. It is 6' away from the north wall so it should experience little to no structural impact.

The #8 cedar has a 17" DSH which the table relates to an 8' Structural Root Plate. The tree is only 7.5' away from the existing garage foundation so the proposed demolition is right at the edge of its SRP. Care will have be taken as to not disturb the soil on the north side of the garage.

The #12 willow is much more than 10' from any expected disturbance so its SRP will not be disturbed such as it may be.

The #13 maple, at 32" DSH, has the full 10' SRP. As shown in Figure 35 the proposed limits of excavation come to within 4' of the base of the maple. This would necessitate its removal due to destabilization resulting in a high risk of catastrophic failure for the tree.

The #14 fir (14" DSH) has a 7' SRP and stands 9' back from the excavation limits given. It should not experience structural impact.

The #15 tree has a 6' SRP and the excavation work as shown will be right at the edge of it.

The #16 tree has a 9' SRP according to the table. As shown the excavation may come to within 5' of its base in the NE quadrant and the proposed curve for the driveway entrance will start 8' to its north resulting in potentially severe damage to the trees SRP.

The chart shown in Figure 36 below is used to determine what percentage of a tree's Critical Root Area will be affected by trenching type incursion. In general trees can sustain losses of up to 30% of the overall area within their CRZ without having long term detrimental results.

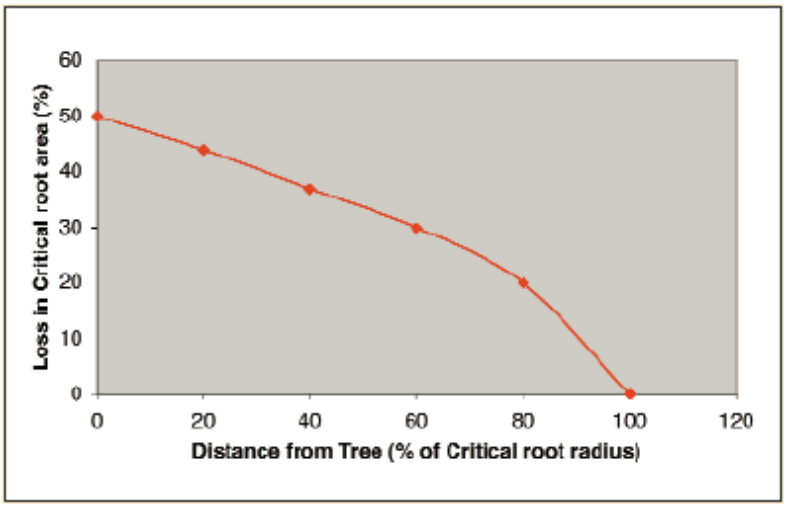

Figure 36. Chart giving the loss in critical root area as a function of the radial distance to the CRZ disturbance. (Coder 1996)

The #3-5 fir trees technically gain Critical Rooting Area (CRA) because the existing concrete retaining wall has acted as a root barricade for all their lives. With its removal they will gain twice the square area in which they have been living.

This would also be true for the #6 maple if it was not depending on the wall(s) for stability. It will gain rooting space only to highly increase its chances of catastrophic failure.
The #7 Grand fir will gain rooting space when the walls are removed. It will also gains airspace when the #6 maple is removed.

The #8 cedar is in more of a tricky situation. The proposed plan calls for the grade in the area of the sport court to be continued out along the existing plane. The grade at the west side of the court will be raised at least 5' and based on the 8' rise over the 15' run shown in the survey it will trail out to match existing grade around 12' east of the retaining wall. When the garage is removed there will be a hole roughly 6' deeper than the grade the cedar stands at. Any grading work will have to take care to add no more than 6" of soil within 14' of this tree's base. Any more than that and its roots will begin to atrophy. The cedar should, as long as proper care is taken, gain significant rooting space and thrive post construction.

The #12 willow theoretically has a 50' radial CRZ based on its diameter. Understanding that the tree failed catastrophically nearly 15 years resulting in significant root atrophy allows for the extrapolation that it more likely than not has no more than a 20' radial live root spread. The limits of excavation for the new house will be at least 30' away from the willow and the storm drain repair work to its north will be around 25' away. The willow should experience no real loss of rooting space.

The #13 maple has been bounded by the existing driveway which winds around it on average 20' to its north side. It has extruded roots beneath the asphalt in the region where the driveway/parking space come as close as 12' to its base shown in Figures 27 and 28. It would be expected that other roots are under the other areas of the driveway. The NE corner of the parking pad for the 8431 property is only about 12' away from the maples base in the SW quadrant. The retaining wall at the west side of the 8431 house is no more than 17' back form the tree. Because of this the #13 maple very likely has a much more concentrated root placement in the uncovered space around it than would normally be found.

Assuming for a moment that the maple, with a 32" DSH, had no constraints on its root system formation then the proposed excavation 3' from its base would result in an impact at a linear distance equal to 9% of the tree's CRZ (3'/32'). The chart shows that this roughly equates to a 45% loss of the maple's Critical Root Area *in a best case scenario*. In reality completing the excavation as proposed could result in as much as 65% of the tree's functional CRA being excised. In either case this level of impact is well beyond the maple's ability to survive.

The #14 fir will experience an impact at 86% of its CRZ for a loss of no more than 17% of its rooting space. It should suffer no long term detrimental effects.

The #15 tree (10.5" DSH) will have the north side cut cross 8' off its base. This will theoretically result in a loss of no more than 20% CRA well within its tolerance levels.

The #16 tree grew up in very limited rooting space and has adapted to its circumstances. The curbing along the subject driveway has most likely acted as a root barricade for this tree and prevented it from stretching into the asphalt of the existing driveway. The curbing to its south side definitely has prevented root growth in that area. Like the #13 maple its roots are highly likely to be much more concentrated within its available space than what is normally found. Any incursion within the space will result in an amplified impact.

As calculated from the proposed plan sheet conservatively 34% of the given rooting space for the fir will be excised. This is beyond the recommended threshold without the concentration factor coming into play. It could easily be closer to a loss of 45% of the functional CRA for the fir.

Recommendations: Based on its condition and placement the #6 maple should be removed along with the #1, #2 and #9-11 trees during the demolition or clearing and grading stages of the project.

The #13 tree is Exceptional and according to Mercer Island statute must be retained. This will necessitate somewhat of a re-conceptualization of where exactly the driveway entrance will be cut and how the SW corner of the new home will intersect with the proposed garage. To ensure its survival there should be absolutely no impact to the right (south) of the existing driveway. Ideally the asphalt covering the small hammer head would be carefully removed and the tree allowed that space for rooting purposes.

At this juncture the #16 tree also has to be retained as it belongs to the neighbor. Like the #13 maple it must not experience any impact to its exiting rooting space if it is to survive this project.

Damaging the roots on either the #13 or #16 trees may result in potentially deadly catastrophic failure.

Setting up tree protection fencing before project onset, even before the demolition, and at the proper distances will ensure that no accidents will result in having to remove trees slated for retention. Making sure that the contractors understand what the fences mean and that they cannot move them without arborist oversite is critically important for the health and longevity, if not outright safety, of the onsite trees. No materials can be stored, even temporarily, within the protection zones.

Typically fencing is installed at the distance proscribed by the City of Mercer Island for non-incursion which is one linear foot per linear inch of diameter. Orange vinyl barrier fencing can be used, although chain link is preferred.

In this case fencing for the #3-5 trees can be simply stretched above and behind the west sport court retaining wall. No soil should be disturbed between the wall and the fir trees.

Once the #6 tree is removed fencing for the #7 tree can be set around the NW corner of the retaining walls and tied into that for the firs.

The fencing for the #8 cedar should be set 17’ east and west of its base and then right along the north side of the garage. The demolition of the garage should only be done with arborist oversite to ensure the protection of the cedar. Without guidance excavator crews have a tendency to over reach and tear roots when in tight situations like this.

Fencing can be set in a 20' radial circle around the #12 willow. This will both protect whatever remnant roots the tree has and ensure no workers have a heavy shoot land on them.

The fencing for the #13-16 trees will have to be set along the south side of the existing driveway and stretched across to meet the SW corner of the existing house essentially cutting off and including the hammerhead within the protection zone. This section of fence should not be moved for any reason without arborist oversite.

The removal of the asphalt in the driveway should be done with an arborist present so as to document the extent of roots that are present beneath.

If at any time during either the demolition or construction phases the work begins to expose roots, systematic hand pruning should be utilized, rather than tearing and shearing the roots by machinery. As an arborist should be on hand when working within the CRZs of the trees they will be able to assist with showing how to properly prune the roots to the onsite crews.

The #8 cedar and the #12-16 trees should have a 6-8" layer of arbormulch laid within their fenced protection zones. This aids in preventing compaction and controlling ground moisture. It will also begin the process of establishing a proper soil biology for the trees.

The #3-5 firs should be pruned to reduce the end weight on their branches as necessary to prevent breakage. This can be completed at any time before or after the project.

The #13 maple will likewise require remedial pruning but it should be completed before project onset for safety reasons. Two of the spars do extend over the intended workspace and have considerable end weight. This may best be accomplished with the aid of a man lift such as a Teupen Spider.

The City will require some amount of replanting based on the removals made during the project. Ideally a tree or trees are selected which are able to replace the lost canopy when mature. For instance, hornbeams, columnar maples, or katsuras make sense to replace the #9-11 trees. Once the plans are finalized the City's tree replacement form can be completed and the required numbers calculated.

Waiver of Liability Because the science of tree risk assessment is constantly broadening its understanding, it cannot be said to be an exact science. Every tree is different and performing tree risk assessment is a continual learning process. Many variables beyond the control, or immediate knowledge, of the arborist involved may adversely affect a tree and cause its premature failure. Internal cracks and faults, undetectable root rot, unexposed construction damage, interior decay, and even nutrient deficiencies can be debilitating factors. Changes in circumstance and condition can also lead to a tree's rapid deterioration and resulting instability. All trees have a risk of failure. As they increase in stature and mass their risk of breakdown also increases, eventual failure is inevitable.

While every effort has been taken to provide the most thorough and accurate snapshot of the trees' health, it is just that, a snapshot, a frozen moment in time. These findings do not guarantee future safety nor are they predictions of imminent events. It is the responsibility of the property owner to adequately care for the tree(s) in question by utilizing the proper professionals and to schedule future assessments in a timely fashion.

This report and all attachments, enclosures, and references, are confidential and are for the use of the Scott Sinclair, Tree Harmony Arborists, Andreas Bechtolsheim, Xiaoxia Wu, and their representatives only. It may not be reproduced, used in any way, or disseminated in any form without the prior consent of the clients concerned.

Anthony Moran, BS
ISA Certified Arborist
Qualified Tree Risk Assessor
#PN-5847A

Figure 1. Aerial imagery circa 2019 showing the layout of the subject property and the two neighboring ones.

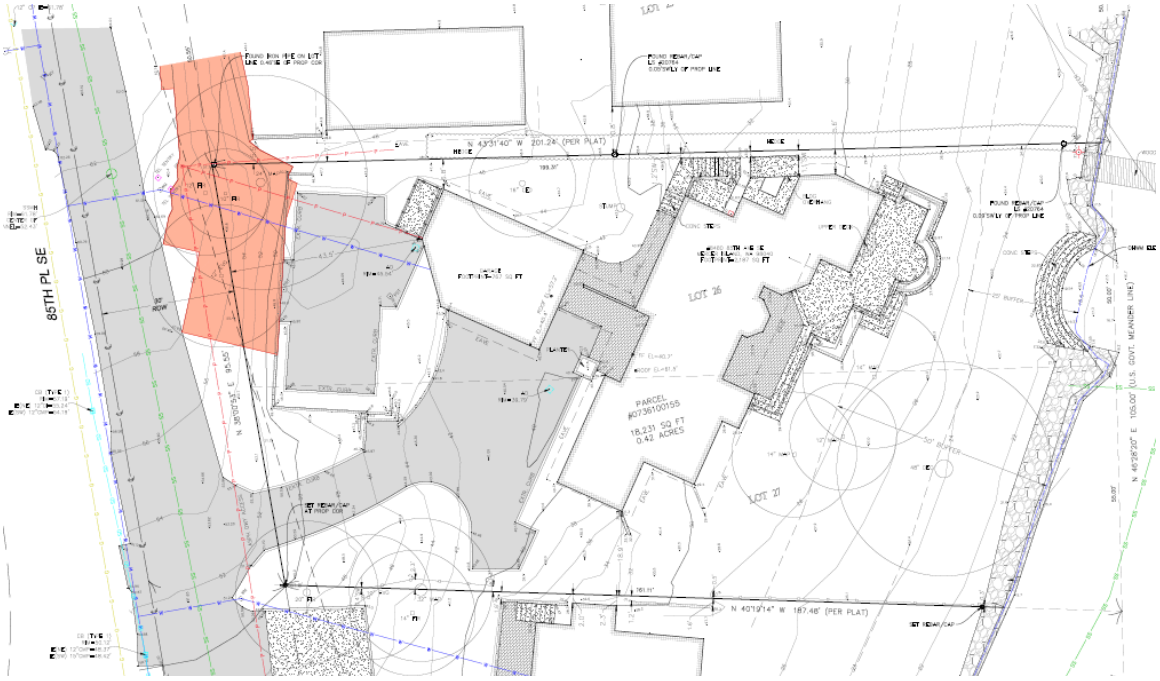

Figure 2. Excerpt from the survey showing the existing house and hardscaping.

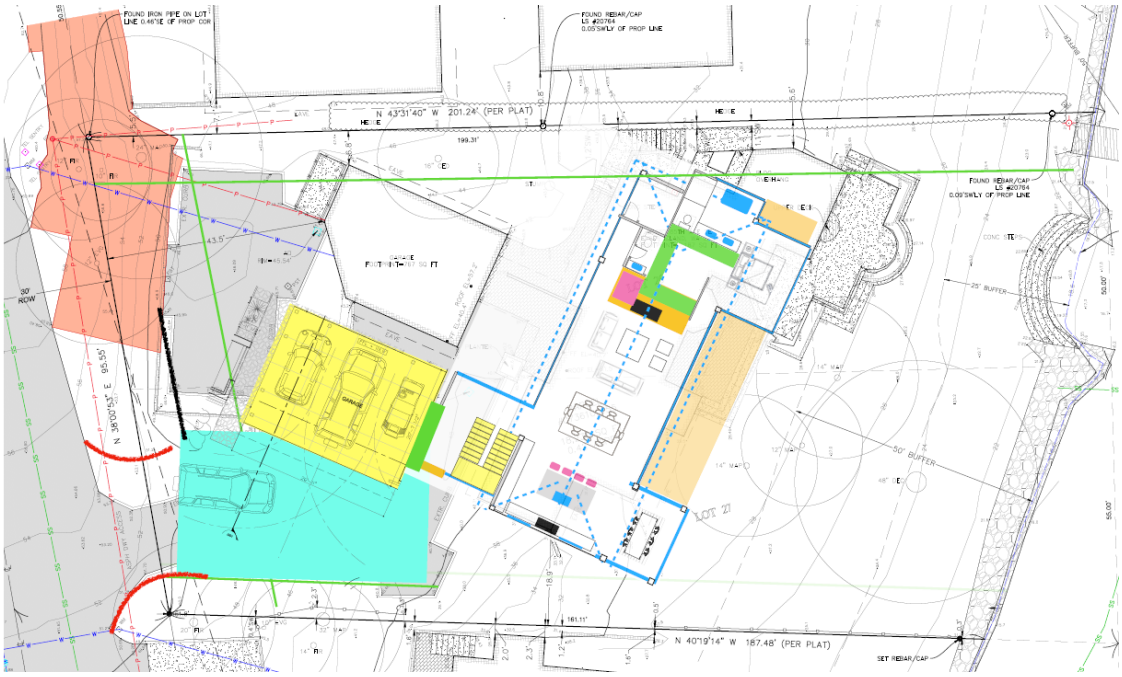

Figure 3. Excerpt from the plan set showing the proposed layout of the new home hardscaping. The existing sport court and garage are to be removed and the area brought back to pre-original construction grade.

Figure 4. Aerial view of the subject property showing the rough locations of the trees listed in the description section. ‘NP” stands for ‘not present’.

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Figure 5. Aerial circa 2009 showing the conformation of the #6 maple's canopy (circled).

Figure 6. Aerial circa 2013 showing the changes in the #6 tree.

Figure 7. Looking at the bend and horizontal section of the #6 tree's trunk.

Figure 8. Looking up and to the west at the canopy of the #6 maple. Note how one-sided and rather flat the aspect is.

Figure 9. Maple stump in the corner of the house and garage. This tree shows as being present in 2019.

Figure 10. Looking north at the base of the #9 maple.

Figure 11. Looking at the plating and girdling roots present at the root crown of the #9 tree.

Figure 12. Aerial from 2007 showing the stub of the #12 willow left after the 2006 storm. Note the #9-11 maples are not present.

Figure 13. Aerial from 2009 showing the #9-11 maples at the back of the house and the #12 tree with sprouts on it.

Figure 14. Aerial circa 2002 showing the massive canopy on the #12 willow and what might be other trees between it and the house.

Figure 15. Looking at the stub of the missing section of the #10 tree

Figure 16. Looking at the base of the #10 maple.

Figure 17. Base of the #11 tree. Large girdling root is quite noticeable.

Figure 18. Looking up into the canopy of the #12 willow.

Figure 19. Looking at the base of the #12 willow.

Figure 20. The lower column of the #12 willow.

Figure 21. Looking at the extensive decay present in the upper column.

Figure 22. The atrophy and decay present in the #12 structural roots.

Figure 23. Extremely weak attachment point of the largest shoot on the #12 tree.

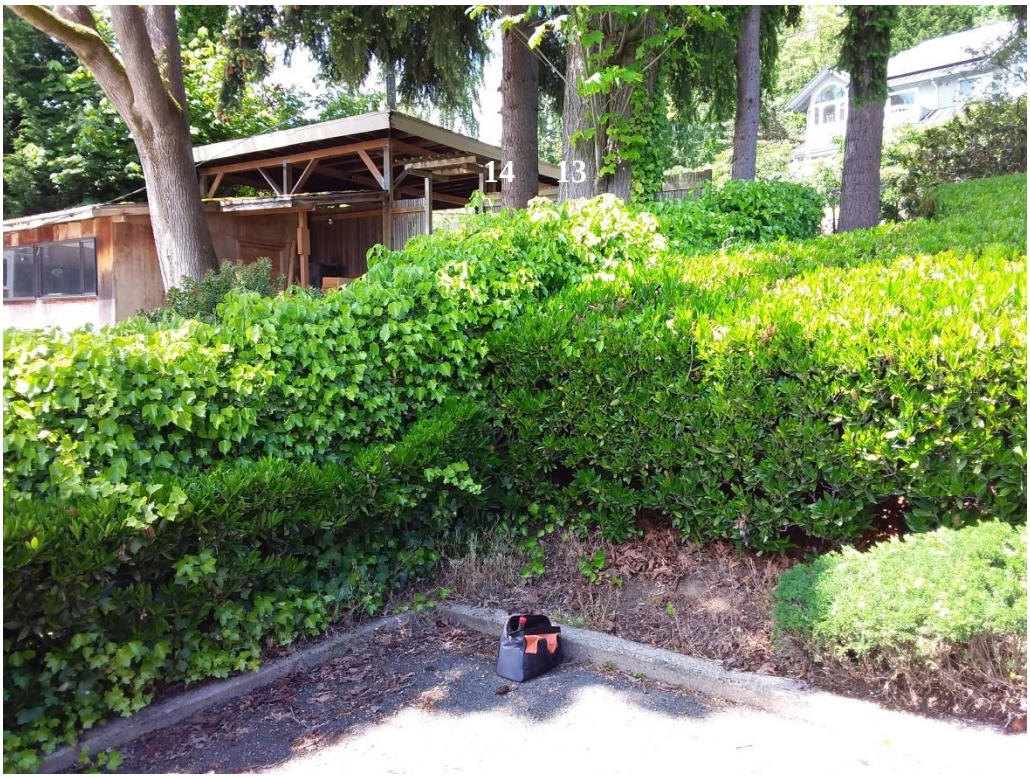

Figure 24. Looking SW at the base of the #13 maple. Note the #14 next to it.

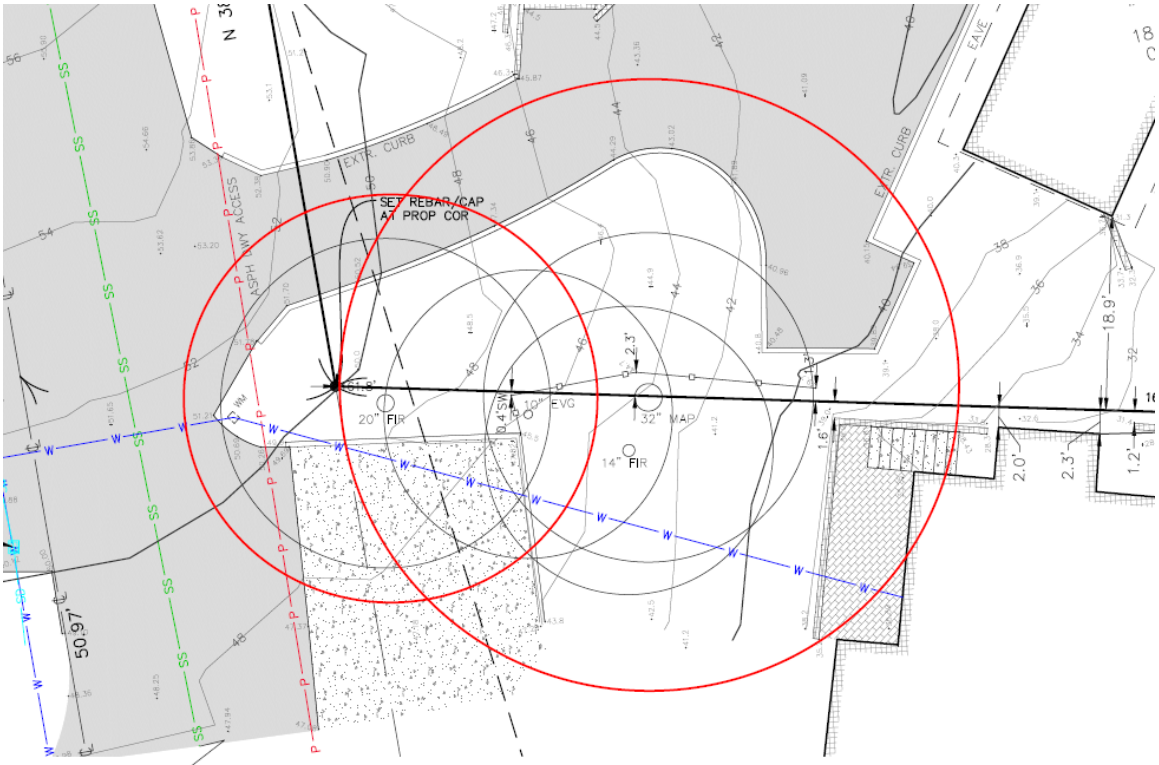

Figure 25. Excerpt from the survey with the correctly sized CRZs for the #13 and #16 trees overlaid. This is the extent that the trees would have if left alone in nature. Note that the maple encompasses the hammerhead completely.

Figure 26. Looking up into the canopy of the #13 tree. The large breakout point is just visible (circled).

Figure 27. Uplift in the asphalt from the #13 maple roots.

Figure 28. Another uplift point.

Figure 29. Locations of the #13-16 trees looking east from the neighbor's parking area.

Figure 30. Looking at the base of the #16 fir. Note proximity to the SW corner marker and the curb for the neighbor's parking pad.

Figure 31. Looking south at the base of the #16 tree showing subject curbing. It is only 11.5' away at the point.

Figure 32. The matrix used to estimate the likelihood of a tree failure impacting a specific target.

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

Figure 33. Risk rating matrix showing the level of risk as the combination of likelihood of a tree failing and impacting a specific target, and severity of the associated consequences.

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

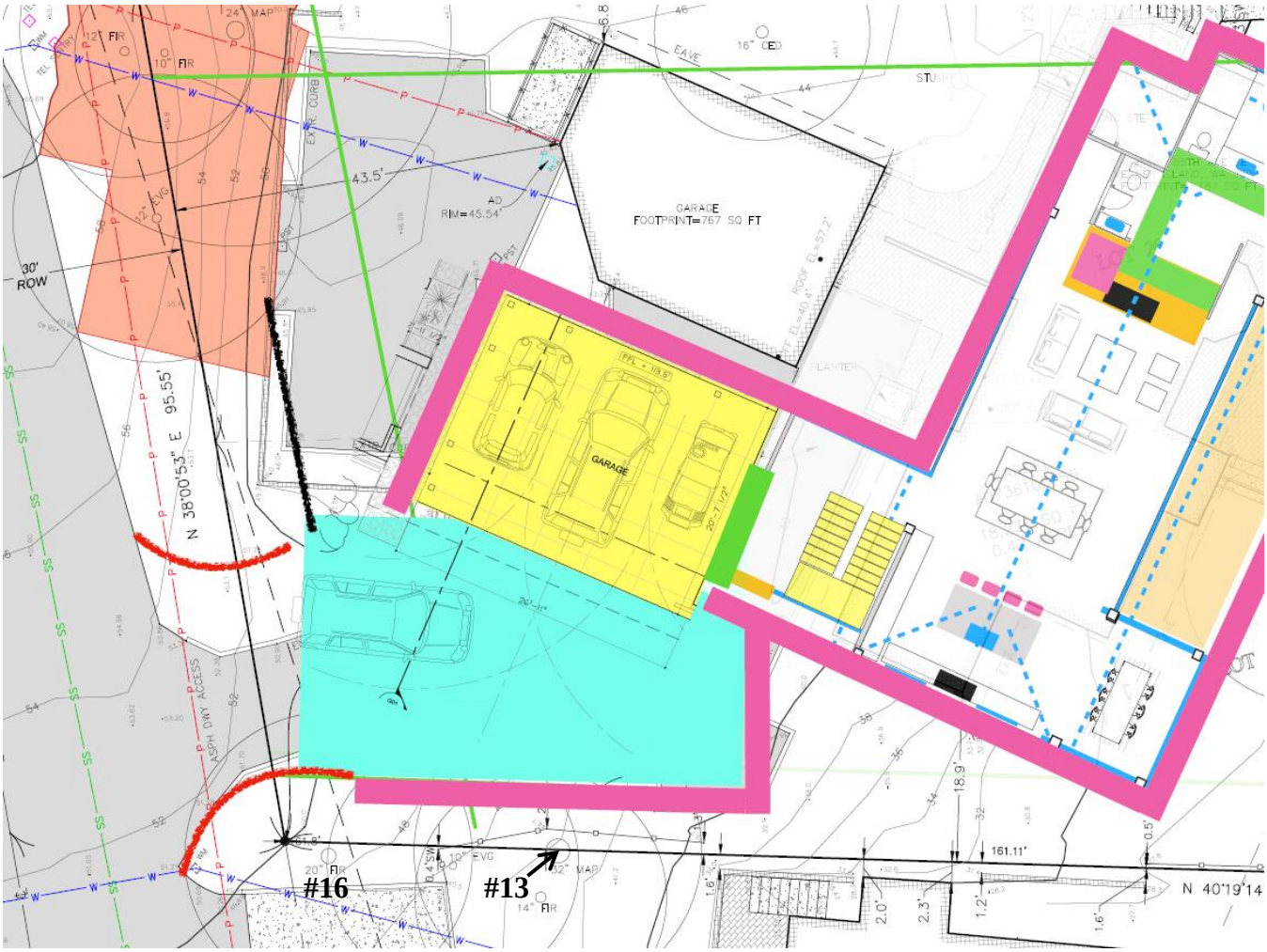

Figure 35. Conception sketch of the proposed new home and driveway entrance. The heavy pink border represents the excavation limits. Tree #13 and #16 are noted to bring clarity of impact potential to the fore. The excavation cut will be as close as 4' to the #13 and 5' to the #16. This is within the 10' SRP non-intrusion region for the maple and the 9' SRP for the fir. Neither would survive this damage long term and both are likely to fail catastrophically in the short term.