Superior NW Enterprises

June 1, 2020

Project: Tree review and assessment at 3633 90th Avenue SE, Mercer Island, WA.
Parcel number 5021900400.

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Objectives: Addendum to MacCoy report dated 2/21/2020 correcting tree species, conditions, and sizes as necessary.

Description: RKK Construction submitted plans to the City of Mercer Island in anticipation of re-developing the 3633 property. During the review process questions about the site trees arose from the City arborist. RKK reached out for help to Scott Sinclair of Tree Harmony who in turn contacted Superior NW Enterprises and asked for aid in assessing the trees to clarify the situation.

A site visit was made on May 29, 2020 and the trees were documented. The following itemized tree list begins with the #2 Pacific Dogwood at the NW corner of the property and winds mostly counter-clockwise around the parcel. It follows the numeration given in the February 21 report shown in Figure 1 and is reflected in the aerial image shown in Figure 2. Diameters were measured at the standard height of 54" above grade (DSH) during the May 2020 site visit. Caliper measurements were taken at 6" above grade and heights were estimated.

1) Given as offsite in the previous report. Not known what tree this was supposed to be.

2) Pacific Dogwood (*Cornus nuttalli*) standing against the west fence in the NW corner of the yard. The tree is decayed/hollow from its base to near the 5' mark as shown in Figures 3 and 4. The tree measured 22" DSH, reached close to 40' tall, and had a 16' radial spread with the majority of the canopy extending to the west.

3) Weeping Cherry (*Prunus sp*) 8" DSH, 7' tall, 4' radial spread. Fair condition.

4) Siberian Elm (*Ulmus pumila*) 27" DSH, 45' tall in highest reaches but has been breaking down in the 30' range and then resprouting. It spreads unevenly 18-24' radially and has breakage along the limbs of most of its scaffolds (Figure 5 and 6). It is heavy coated in ivy from the base to at least the mid canopy. This elm is in weak condition with limited new growth, elongation, and poor color.

5) Japanese Vine Maple (*Acer palmatum*) 14" Cal, 20' tall, 14' radial spread in fair condition. The mainstem separates at 14" above grade, each of those separates 6" higher, and those four separate multiple times near the 4' level. The tree has been neglected and has considerable deadwood throughout the canopy and some breakage and conflicting elements.

6) Big Leaf Maple (*Acer macrophyllum*) multistem from near the base, separating fully at 4' and measured as 12", 13", and 16" DSH. It reaches 55' tall and spread 18' to the north but has been pruned back on the south for electrical line clearance. Some of the scaffolds twist around each other. Exhibits decent health. May be an old stump sprout formation. Existing driveway is less than 5' off its base on the east side.

7) Big Leaf Maple with three stems coming off a humped up base (Figure 7). Likely formed as stump sprouts. The stems measured 15, 17.5", and 18" DSH, rise to 55', and they each reach out to around 18'. Some sections of the tree are stunted and exhibiting die-back others have decent new growth and color. The center column of the 18" stem has atrophied down to the 16' level and all its scaffolds are coming off compromised attachment points (Figure 8). The 17.5" stem is dead from the 20' level and there is a split between one of its larger scaffolds and the column. The top of the 15" stem broke off and has several leaders growing from that point. South side of the tree's canopy has been pruned for power line clearance. Existing driveway runs along the base of the tree less than 30" to the south and there is a driveway spur used for parking 6' to the west.

8) Apple tree (*Malus domestica*) 16" Cal, separating at the 18" mark into 9" and 12" diameter stems which spread out more horizontally than vertically. Tree reaches 18' tall, mainly due to non-pruning of epicormics, and spreads 16' radially. It is in weak condition.

9) Stump

10) Fruiting pear (*Pyrus sp*) 9" Cal, 18' tall, 6' spread standing 40" off the SW corner of the main house. Tree separates at the 40" level into four stems 3", 3", 4", and 6" DSH. It is in weak condition.

11) Colorado Blue spruce (*Picea pungens*) 10" DSH, 40' tall with a one-sided canopy all to the north. The tree leans north toward and somewhat over the main house. Below average condition.

12) Scots pine (*Pinus sylvestris*) 9" DSH, 45' tall in fair condition. Majority of its canopy is to the east side.

13) Douglas Fir (*Pseudotsuga menziesii*) 24" DSH, 70' tall with average new growth and decent color.

14) White spruce (*Picea glauca*) 13" DSH, 50' tall in fair health. Tree has been pruned back severely for power line clearance.

15) White spruce dual stem from the 4' level, 11" and 16" DSH, with an active fracture plane. The trunks wind as they rise, intersecting first at the 25' level and twice after. The tree is exhibiting fair health. It was pruned severely for power line clearance.

16) Weeping Beech (*Fagus sylvatica* 'Pendula') 12" DSH, 22' tall, 12' radial spread. Foundation of existing house is less than 4' from base of tree. Good condition.

17) Japanese Vine maple 6" Cal, 10' tall, 6' radial spread standing in the SE corner of the yard. May be in the City ROW. Fair condition.

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.

Discussion: The original report made a few mistakes in determining the sizes of the surveyed trees. The author believes this occurred for two reasons. First, in measuring the elm, which was noted as being 36" DSH, I believe Mr. MacCoy may have either used an electronic measuring device or roughed the size with a straight eye measurement. What he did not do was stretch a tape around the tree and pull it tight through the ivy foliage which would have given him the 28" diameter reading the author took. Taking into account the quite thick covering of ivy stems girdling the elm a conservative 1" adjustment was deducted and a final size of 27" DSH was assigned to this tree. It is not, and never should have been listed as an exceptional tree notwithstanding its poor health and structure.

Second, and somewhat less forgivable, Mr. MacCoy, did not use the industry accepted formula for calculating stem diameter in a multi stem tree. He simply added the measurements together resulting in greatly exaggerated sizes non-reflective of reality. One could only hope to see a 30" DSH Japanese maple in one's lifetime. The true methodology is somewhat more involved. The arborist has to add up the *squares* of the various measured stems and then take the square root of that sum. In the case of the aforementioned #5 Japanese vine maple, and using Mr. MacCoy's original measurements, it would look like this:

$(8*8) + (7*7) + (9*9) + (6+6) = 64+49+81+36= 230$
The square root of 230 is 15.17

So the #5 tree should have been listed in the original report as having a 15" DSH not one literally twice as massive. The calculated value is much closer to the basal caliper measurement of 14" which is probably much more reflective of the extent of the Japanese Maple's Critical Root Zone than even the 15" size. And this is one of the primary reasons for why an arborist documents the diameter of a tree, to determine the required protection zone during a construction event, which has a one foot of radial distance to one inch of tree diameter ratio. Our maple would be expected to have a nearly 14' radial Critical Root Zone to account for and protect from harm.

As the City of Mercer Island categorizes 12" as the Exceptional Tree threshold for Japanese maples this one still qualifies. There is nothing inherently wrong with the tree and it would be an excellent choice for retention if it did not stand squarely in the center of the parcel. This most likely puts it in the middle of the planned development and it could be removed under the rule given in MICC 19.10.060(A)(3).

Looking at the other trees which were incorrectly sized and using the proper formula results in the #6 maple having a 26" DSH rather than 45", the #7 tree a 32" DSH rather than 55", the #8 apple a 15" DSH, rather than 21", and the #10 pear an 8" rather than 16" diameter.

The corrected diameters still puts the #7 maple technically over its 30" Exceptional Tree threshold. However this tree is in quite poor structural condition resulting from it being in an advanced state of decline. It is an inadvisable candidate for retention. While its risk could be mitigated by hard pruning of the various dead, weak, and broken sections there would not be a great deal of the tree left. The maple will continue to decline and have adverse growth response.

It is also assumed that the existing driveway will not be retained and its removal and the subsequent preparation for the construction of the proposed new homes will effectively destroy this maple's root system. As there is no feasible means of re-developing the property with the tree in place it also falls into the MICC 19.10.060(A)(3) rule bucket.

Recommendations: Based solely on their conditions and suitability for retention the author would advise that the #2, #4, and #7 trees be removed.

Based on their placement within the parcel it is likely that in addition the #3, #5, #6, #8, #10, #11 and #16 trees will have to be removed.

Without having looked at the plot plan for the proposed re-development the author can offer little guidance as to the possibility of retaining the remaining five trees or how to protect them adequately during the project if they are.

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, Jason Koehler, RKK Construction, 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.

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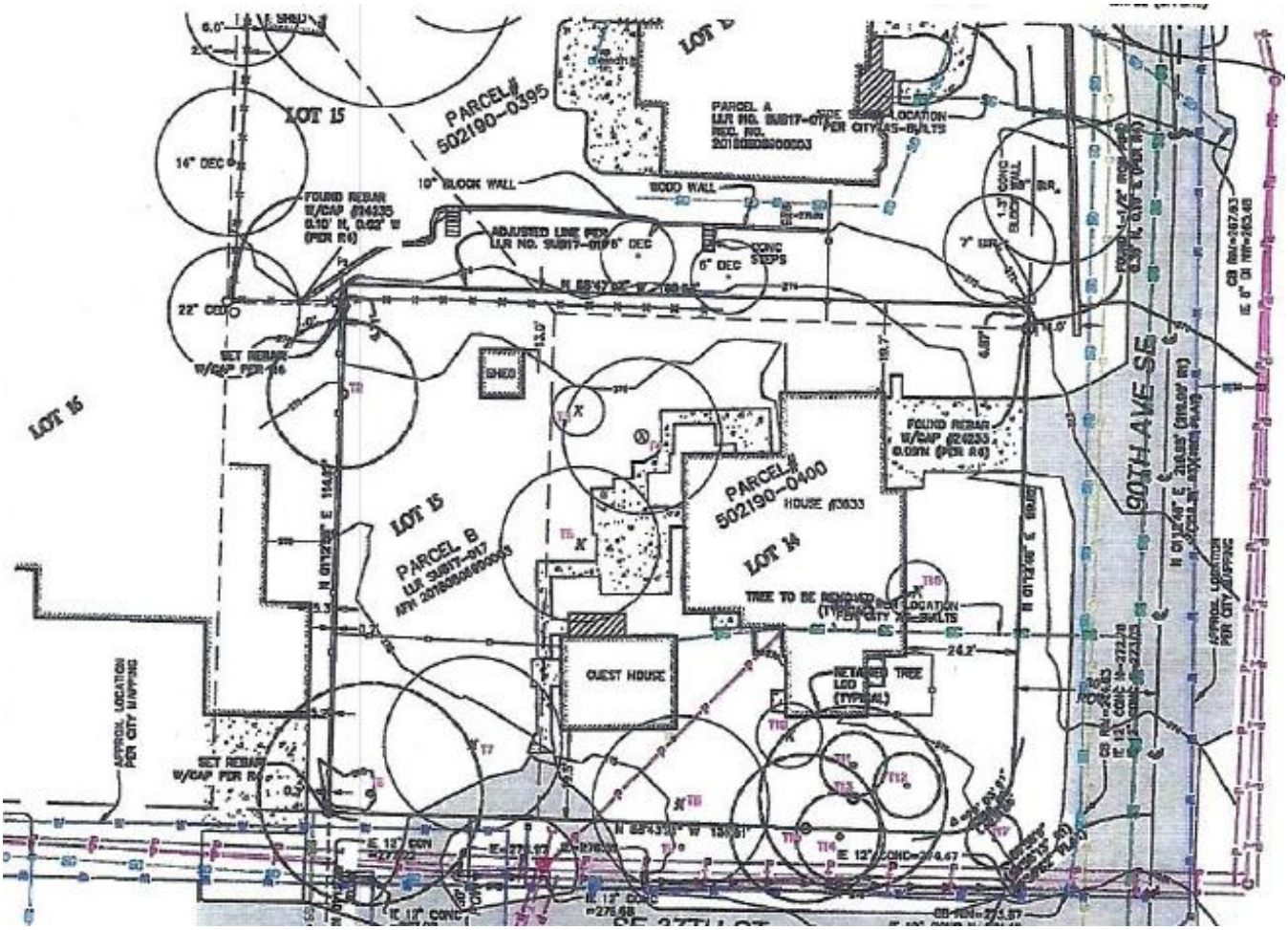

Figure 1. Excerpt from the MacCoy February 2020 report showing the tree placements and numbers.

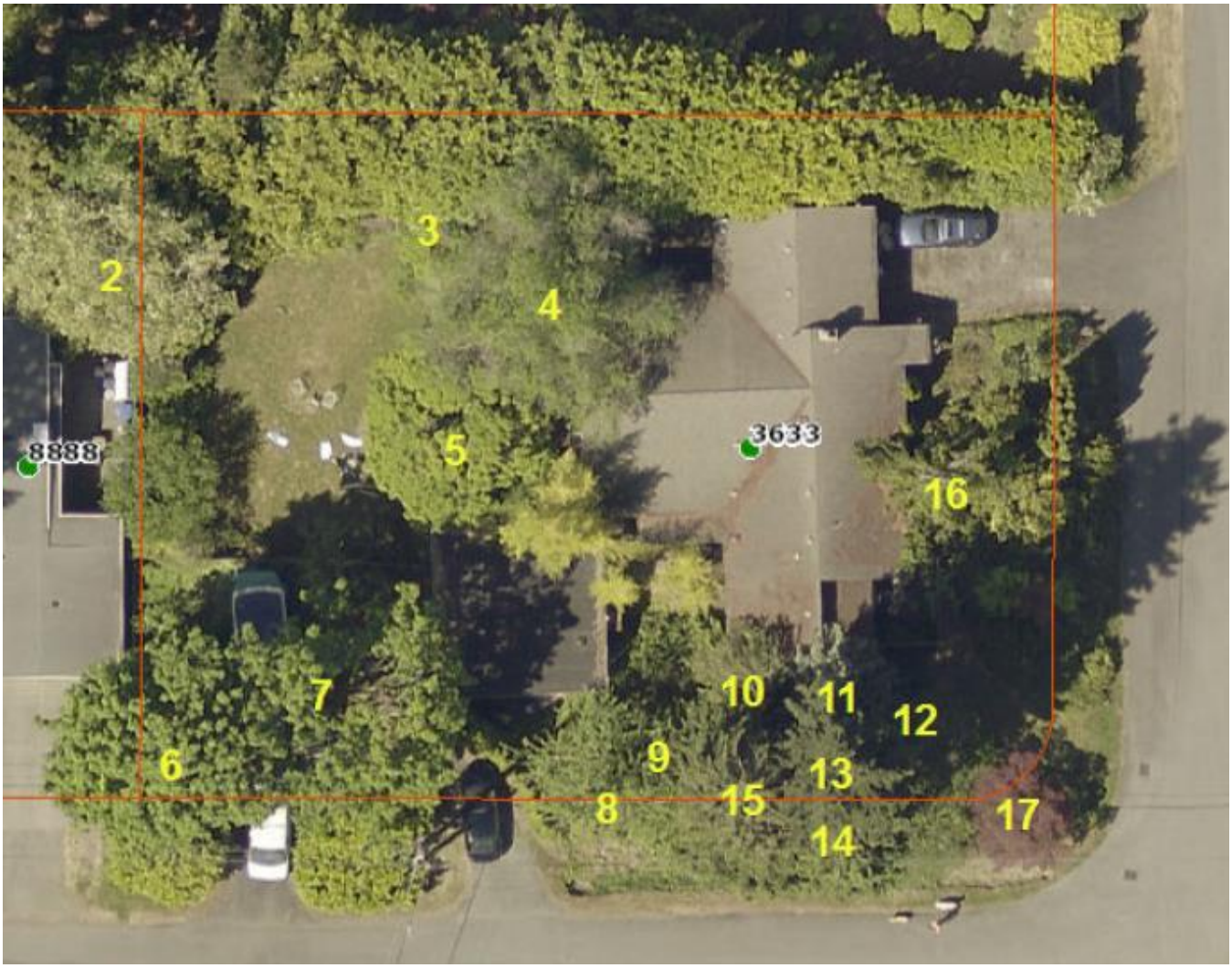

Figure 2. Aerial view of the subject property showing the rough locations of the trees listed in the description section.

Figure 3. Photo of the top of the decay column of the dogwood.

Figure 4. Photo of the base of the dogwood showing the open decay.

Figure 5. Photo of breakage in the crown of the elm.

Figure 6. Another breakage area in the canopy of the elm.

Figure 7. Photo of base of the #7 maple.

Figure 8. Photo of atrophied center column on the large stem in the #7 maple. Note the large caliper deadwood also present.