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Tree Retention Plan:

61 Pinehurst

Background

The client wishes to develop 61 Pinehurst Avenue, demolishing the current building and erecting a new, larger dwelling in its place. The development could impact several trees on the property as well as adjacent properties.

Summary

Tree	Diameter at Breast height (DBH)	Ownership[1]	Condition[2]	Recommendation[3]
1. Norway maple (*Acer platanoides*)	70cm	Municipal	Good	Retain

[1] All claims to ownership made in this report are based on the most recent draft of the site plan, which is provided by the client, as well as on-site observations. The author of this report is not responsible for any possible inaccuracies in these resources.
[2] Tree condition is rated on a three-point scale, with each scale rated as follows: Poor—the tree is dead, dying, or poses a hazard; Fair—the tree is vigorous, but has some significant stressors or risk factors; Good—the tree is vigorous and does not have significant stressors or risk factors.
[3] For the purposes of this report, "recommendation" is the best course of action, based on an assessment of the tree and consideration of good arboricultural practices. It does not necessarily denote contingencies for a construction project's approval or completion.

2. Norway maple (*Acer platanoides*)	46cm	Private: 61 Pinehurst	Good	Retain
3. Norway Maple (*Acer platanoides*)	38cm	Private: 61 Pinehurst	Good	Remove
4. Norway Maple (*Acer platanoides*)	32cm	Private: 63 Pinehurst	Fair	Retain; erect fencing around part of CRZ
5. Norway Maple (*Acer platanoides*)	38cm	Private: 63 Pinehurst	Good	Retain; some root pruning

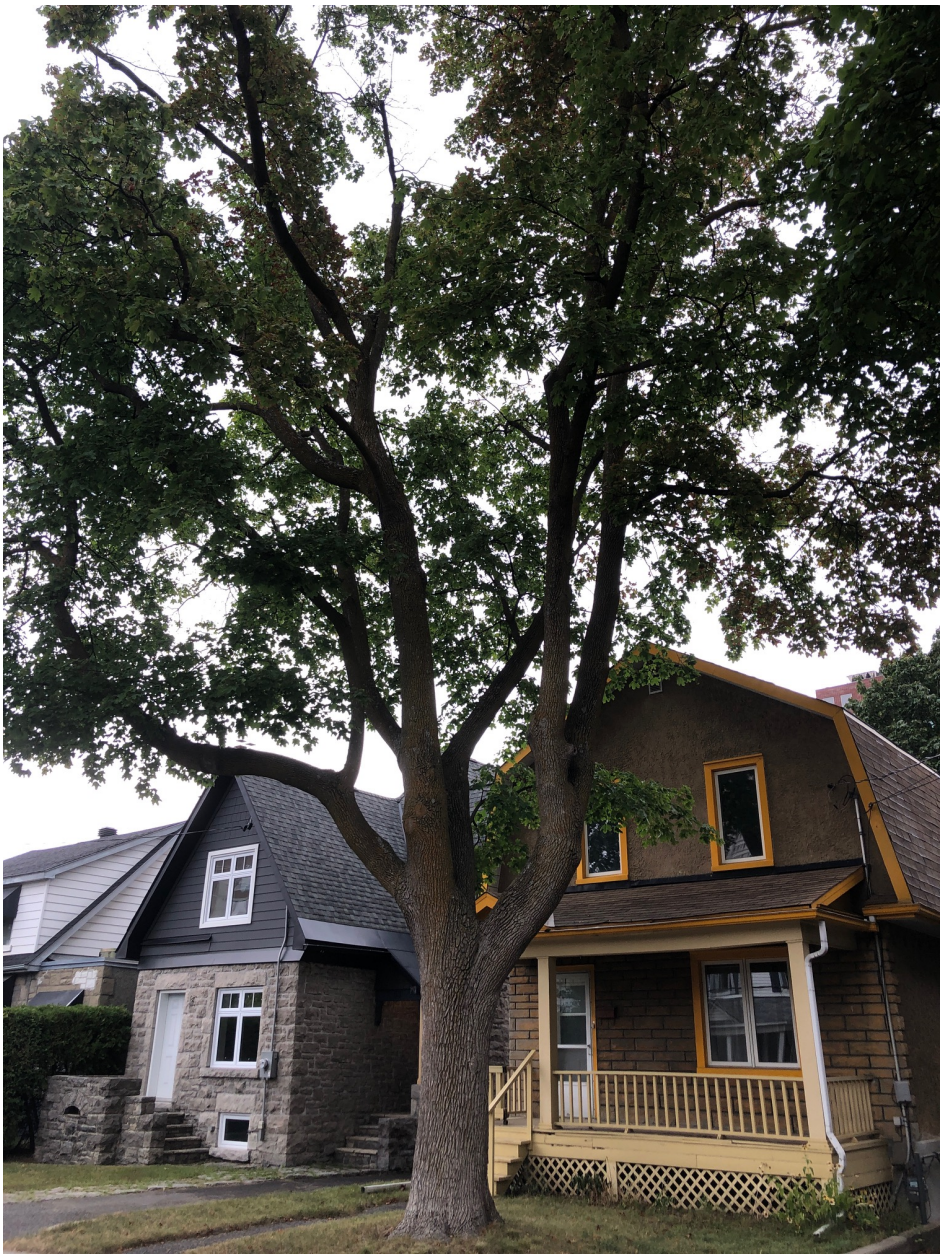
Tree 1: Municipal Norway Maple

There is a Norway maple[4] in the front yard of 61 Pinehurst. The site plan indicates that the tree is wholly owned by the city of Ottawa. The tree measures 70cm in diameter at breast height (DBH). According to the City of Ottawa's guidelines[5][6], the critical root zone (CRZ)[7] of this tree measures 700cm. It is important to note that this measurement is theoretical and does not necessarily reflect reality, as site conditions limit the expansion of roots. For example, the

[4] It is worth noting that Norway maples are considered an invasive species. Through rapid growth, aggressive self-propagation and heavy shading of understory trees, they are suppressing and supplanting native species. The species also has brittle wood, is prone to structural defects such as included bark and overextended lateral branches, leading to frequent failures of large branches. Therefore, specimens of this species should be considered to be of a lower value than native species, which tend to be better adapted for local conditions, less prone to failure, and of greater conservation value.
[5] Tree Protection (By-law No. 2020-340), Part 1 – General, Section 1.
[6] It should be noted that the above is not consistent with ISA guidelines as it does not account for tree species or tree age. Tree species differ in their tolerance of root pruning. Tree age impacts resilience to root pruning and other stressors; mature trees are less vigorous and therefore less able to recover from construction damage and other stressors. For more information, see Kelby Fete and E. Thomas Smiley (2016). *Managing Trees During Construction: Part 1*. Pg. 61.
[7] Critical root zone is measured as radius from the trunk.

distance from the trunk to the foundation of the house is 539cm, much shorter than the extrapolated value of 700cm.

The tree is in good condition, with a full canopy and no evident dieback. The tree has a strong trunk flare, which is unusual for a Norway maple of this age, as they typically girdle as they age. The tree has a sound structure with no evidence of included bark. The only structural flaw is that of the branches has a poor aspect ratio with the trunk, and predictably some cracking is evident at this union due to excessive side-loading. This defect can be addressed with structural supports as well as reduction pruning. In absence of pruning and structural supports, the branch is at moderate to high risk of failing in an extreme load event, such as a storm. Most pruning cuts are completely occluded, indicating good vigour and compartmentalization. There were no evident fruiting bodies or other signs of wood-decaying fungi.



Tree 2 & 3: Norway Maples

There is a Norway maple in the back yard of 61 Pinehurst, next to the eastern edge of the property. It measures 46cm DBH[8], meaning the critical root zone CRZ) measures 460cm.

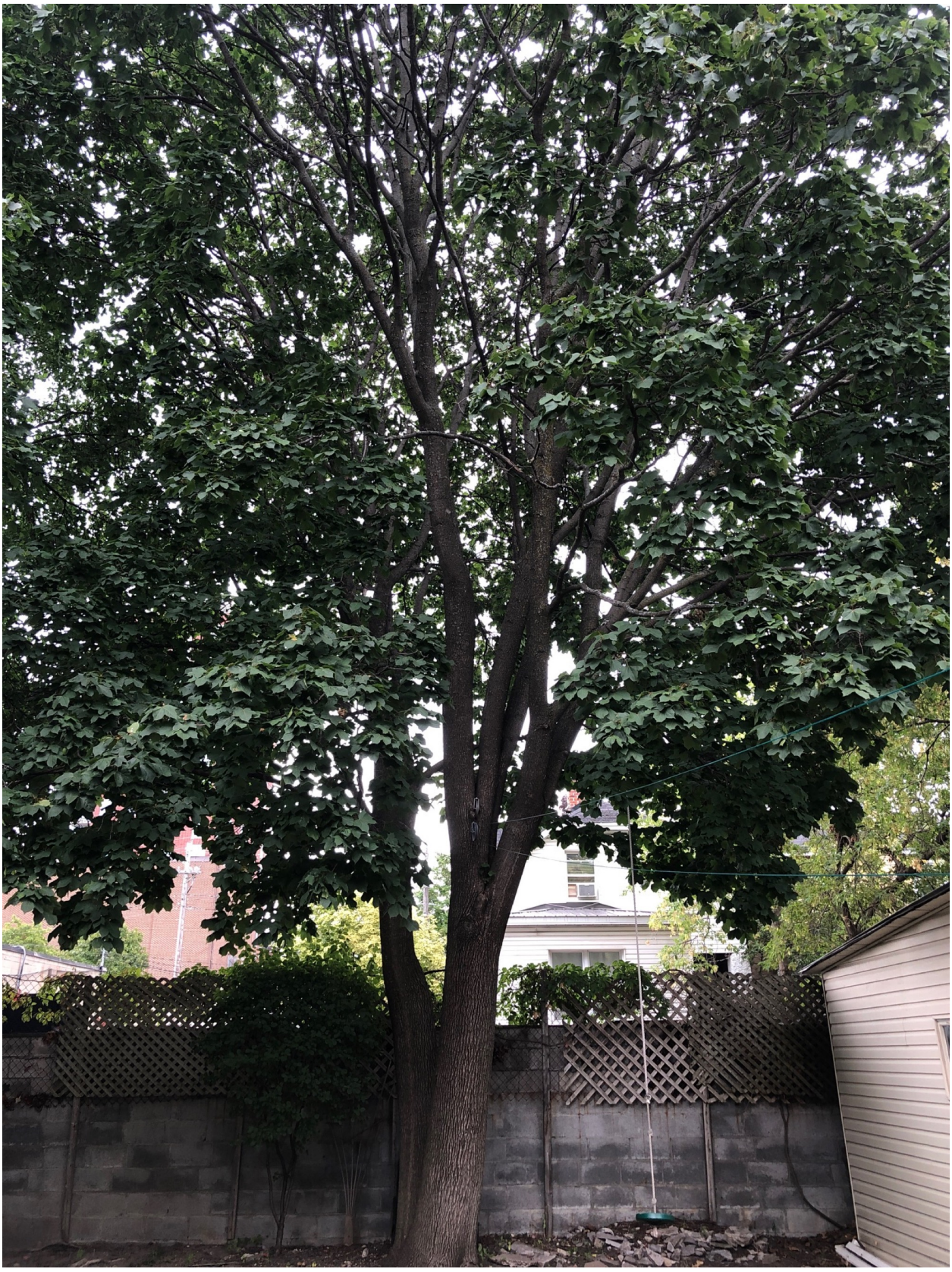
[8] The trunk of this tree is pressed up against the trunk of another Norway maple, but no inosculation between the two stems is evident, so they are most likely two separate trees rather than two stems of a single tree. Therefore, the stems have been measured individually, at 1.2m

The tree is in fair condition. It has a full canopy with few dead branches. It has multiple stems, some with included bark, but no signs of rot or tearing in these unions. The largest codominant stem has an included union with the trunk, but this inclusion is beginning to occlude via inosculation and this occlusion may progress, mitigating the mechanical weakness of the inclusion. The roots of the tree are likely girdled by the tree pressed up against its trunk, which reduces the structural stability of the buttress roots, but not enough to pose a significant hazard. There are two clothesline wheels embedded within the tree, at least one of which is too far gone to retrieve. While this poses a stress for the tree and interferes with potential occlusion of an included union, they do pose enough of a stress to the tree to affect its viability.

The smaller of the two trees measures 38cm DBH, meaning its CRZ is 380cm. The tree is in good condition, with a full canopy, a dominant central trunk and no signs of fungal infection. The tree's root structure is likely impeded by the presence of the adjacent Norway maple, but this does not pose a significant risk.

According to the site plan, at its closest, the foundation will be about 690cm from the trunks of these trees. That is well outside the CRZs of both trees.

above the ground, rather than below the union, as with a single tree with multiple stems diverging below 1.2m



Tree 4 & 5: Norway Maples

In the adjacent back yard of 63 Pinehurst, there are three Norway maples. The smallest of these trees measures 24cm DBH and is therefore not distinctive. The middle tree measures 32cm, meaning its CRZ measures 320cm. The tree farthest to the south (right in photo below) measures 38cm, meaning its CRZ is 380cm.

The excavation, at its closest, will be well outside the CRZs of these trees. No root pruning will be necessary.

Fencing

All distinctive trees described above require protective fences to be erected around their CRZs for the duration of construction. Construction activities—such as excavation, use of heavy machinery, storage of tools and/or supplies—are not permitted within the CRZs[9]. The fencing

[9] Technically, there will be excavation within the CRZ (700cm from trunk) of the municipal black maple in the front yard. However, realistically there are no roots present in this area as the new foundation will not be any closer to the tree than that of the current house. Therefore, even

must be constructed in accordance with Section 74 of the Tree Protection Bylaw as well as the Tree Protection Specification.

Fencing for the trees in the back yard can be erected in accrodance with bylaws without unduly inhibiting construction, however, some variances from guidelines are necessary for the municipal maple in the front yard. The official CRZ calculation of 700cm is not valid for the area between the trunk and foundation of the house, as the distance here is only 539cm and no roots have extended beyond the foundation of the existing dwelling. The value of 700cm also encompasses driveways to the north and south of the yard as well as a sidewalk and part of the road. Fencing off these areas is not practical and is not likely to impact the health of the tree, as these areas are already subject to many of the conditions that fencing is meant to prevent, such as soil compaction, lack of available nutrients, and excavation. The tree has already adapted to these conditions and is unlikely to suffer further adverse affects from activities in these areas.

Therefore, it is appropriate to erect fencing at a shorter distance than the official CRZ measurement of 700cm. To the west of the tree, fencing should be erected along the edge of the sidewalk, as erecting it beyond this distance would unduly restrict pedestrian traffic with no benefit to the tree. To the south, fencing should be erected along the curb, which places it at a distance of 230cm[10]. To the north, the fencing will be erected along the curb, at a distance of 400cm from the trunk. To the east, the fencing should be erected at a distance of 417cm from the trunk. This will allow a buffer of 121cm (approximately 4ft) between the fencing and foundation,

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though excavation will occur closer than 700cm from the trunk of the tree, this excavation will not involve root pruning.

[10] Industry guidelines indicate that root pruning is appropriate on one side of the tree as close as one third of the CRZ, which for this tree is approximately 233cm. Given that this distance is broadly considered appropriate as a minimum distance for *excavation*, using it as a minimum distance for *fencing* is not only appropriate, but indeed conservative.

which is necessary for a construction crew to work on the foundation and siding of the house. There will be no excavation beyond the current foundation, so there will be no root pruning in the buffer zone—the entirety of the tree's roots in this area will be preserved. This buffer zone should be padded with wood chips at least 3 inches in depth to mitigate soil compaction from construction activities in this area.

The driveway to the south of the tree will be used as primary access route for construction activities. It is sufficient for construction crews to access the property by foot and with heavy machinery. It is recommended that the asphalt driveway remain intact for the majority of construction, as it will provide some protection to the soil from further compaction and potential root damage by heavy machinery. Removal of the current asphalt driveway is contemplated in the site plan and this should be done as late in the process as possible. Once it is removed, construction activities will have a more significant impact on the soil and the tree's critical roots.

New services will have to be routed from the road to the south-west corner of the house. These services are approximately 180cm from the trunk, which is below the threshold for root pruning (230cm). According to engineers working for the client, routing the services farther from the trunk is infeasible as it will increase the complexity of the plumbing and could increase the risk of a rupture. Therefore, the services will need to be routed under the root structure of the tree, which likely doesn't go any deeper than 12 inches (30cm). In order to give the tree the best chance of survival, installation of these services should be completed via air excavation and

burrowing under the root structure of the tree at a minimum depth of 30cm and a recommended depth of 50cm .[11] Excavating through roots in this area and pruning roots is not advisable.

Conclusion

In reviewing the site plan, measuring the trees on and surrounding lot, and considering industry-standard arboricultural practices, I feel that it is feasible to proceed with construction as planned without causing undue harm to distinctive trees.

Mason Hanrahan

ISA Certified Arborist, ON-2491A

Qualified Tree Risk Assessor

Owner and President, Tim-O-Tree

[11] This is based on established industry guidelines on excavation and burrowing under trees. See Fite, K., & Smiley, E.T. (2016). *Managing trees during construction: Part* 2.