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1.0 INTRODUCTION

MHBC was retained to prepare a tree assessment and arborist report for the site known as the Loon Avenue Lands located in the City of Barrie, Ontario ("the development site" or "the site"). The site is located east of Huronia Road and south of Loon Avenue, and will be accessed via the existing unopened road allowance on Loon Avenue. The developable land area of the site is approximately 2.04 hectares (5.0 acres) in size and is bounded by residential single family lots to the north, and additional proposed development lands to the west. The lands to the east and south will remain undeveloped. The location of the development site is shown in **Figure 1**.

The purpose of this report is to provide information on the trees on the development site and discuss potential impacts of the proposed subdivision development. This report provides information on the vegetation unit(s), identified by predominant tree species, size range in diameter, and the general condition of the trees.

The following report and the accompanying Tree Inventory Plan, and Tree Protection Details will delineate tree areas to be removed and retained, and show tree protection details and specifications.

2.0 FIELD OBSERVATIONS

The site and field observations were made in December, 2021, by Nick Miele, I.S.A. Certified Arborist ON-1251A and registered Landscape Architect with the OALA. There was no construction activity on the site during our site inspection.

The site is currently undeveloped and contains a dense population of predominantly coniferous (white cedar) tree species, and intermittent deciduous species in one solid vegetation unit. The estimated density of trees classifies this site as "woodlot" according to the City of Barrie's Private Tree By-law #2014-115 whereby a woodlot is classified as land of at least 0.2 hectares (0.5acres) in area and covered with a density of trees that is not less than:

(1) 1000 trees of any size per hectare;
(2) 750 trees, measuring over 5 centimetres in DBH per hectare;
(3) 500 trees, measuring over 12 centimetres in DBH per hectare;
OR
(4) 250 trees, measuring over 20 centimetres in DBH per hectare;

As illustrates on the City of Barrie's Official Woodlot Map, as amended from time to time.

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Most of the trees encountered on the development site were native species and there is little diversity, with the predominant species being White Cedar. The ratio of coniferous trees to deciduous trees in this woodlot is approximately 90% to 10%.

In addition to White Cedar, other species found on site include White Pine, Eastern Hemlock, Fir species, Maple species, American Elm, and White Poplar. Some introduced species, which occur near the existing residences include White Spruce, Colorado Spruce, and Apple species.

As with any natural woodland there are dead trees, deadfall, trees in poor condition and trees with major structural defects which are typical for trees competing for nutrients and sunlight in close proximity to one another. This woodlot, although containing predominantly native species with some mature Eastern White Pine indicates this is a mid-quality woodlot.

The topography of the site is generally mildly sloping with localized berms and depressions creating both moist and dry soil pockets throughout.

3.0 METHODOLOGY

Topographical information shown on the site survey was used to confirm existing grades. Aerial photograph GIS mapping from the City of Barrie and County of Simcoe along with site observations were used to assist in determining the canopy dripline of the woodland.

The trees were assessed in the woodland listing dominant tree species, species abundance, size range in diameter, and the general condition of the trees. A fixed area plot cruise was used to sample trees in the woodland to assist in determining species composition, density, abundance, and range of sizes present.

Where noted, the caliper (diameter) of each tree sampled was measured at 1.37 metres above existing grade using a caliper tape and recorded in centimetres (cm) as Diameter at Breast Height (DBH) to determine size ranges. No individual trees were inventoried or physically field tagged.

The other information gathered from field observations to aid in assessing the tree protection and/or preservation measures may have included any of the following, but not restricted to: tree height, crown spread, age, predicted longevity, health, form, proximity to construction activity, elevation of tree base, lowest elevation of crown branches, crown structure if trees are closely spaced, and overall landscape value.

The tree inventory is provided in chart form in Table 2.

A brief explanation of the assessment categories follows:

Vegetation Unit: This refers to the vegetation grouping and estimated limits/dripline of the grouping.

Species: The common name and botanical name is provided for each tree.

Size Range DBH: This refers to the Diameter at Breast Height of the tree (in centimetres) and is measured at 1.37 meters above the ground for each tree. The size range is estimated for each species within each unit.

Abundance: This is an estimated percentage of a species occurring within a unit.

Condition (Cond.): This is an assessment of both the structure and heath of the tree(s). This is measured on a scale of poor (P), fair (F), good (G).

Structure: This component of condition is an assessment of the roots (visual above ground), trunk, scaffold branches, and canopy of the tree for any defects or weaknesses. The presence of any fruiting bodies is also considered in this category.

Health: This component of condition is an assessment of the canopy vigour, and assesses the amount of deadwood and live growth in the crown as compared to a 100% healthy tree. Other considerations in this category are the size, colour, amount of foliage, insects, disease and any pathological concerns.

Comments: These are specific and relevant comments related to the tree species and related field observations.

4.0 VEGETATION UNITS

There is one solid mass of trees in the woodlot on the development site without any major discernible differences in tree species composition and distribution. As such, there is one (1) vegetation unit observed within the development site. We completed a total of ten (10) plot cruises of 10m x 10m ($100m^2$) in order to accurately capture the nature and minor nuances of each area, and these are described in the table below:

Area Number	Predominant Species	Other Species Observed
1	White Cedar *(Thuja occidentalis)*	White Pine *(Pinus strobus)* Eastern Hemlock *(Tsuga Canadensis)*
2	White Cedar *(Thuja occidentalis)*	Poplar sp. *(Populus spp.)* White Pine *(Pinus strobus)*
3	White Cedar *(Thuja occidentalis)*	American Elm *(Ulmus americana)* Apple sp. *(Malus spp.)*
4	White Cedar *(Thuja occidentalis)*	Apple sp. *(Malus spp.)* Scots Pine *(Pinus sylvestris)* Ash sp. *(Fraxinus spp.)*
5	White Cedar *(Thuja occidentalis)*	American Elm *(Ulmus americana)* Apple sp. *(Malus spp.)* Sugar Maple *(Acer saccharum)* Ash sp. *(Fraxinus spp.)*
6	White Cedar *(Thuja occidentalis)*	Poplar sp. *(Populus spp.)*

		White Pine *(Pinus strobus)* Poplar sp. *(Populus spp.)* Yellow Birch *(Betula alleghanensis)*
7	White Cedar *(Thuja occidentalis)*	White Pine *(Pinus strobus)* Poplar sp. *(Populus spp.)*
8	White Cedar *(Thuja occidentalis)*	White Pine *(Pinus strobus)*
9	White Cedar *(Thuja occidentalis)*	White Pine *(Pinus strobus)* Eastern Hemlock *(Tsuga Canadensis)*
10	White Cedar *(Thuja occidentalis)*	American Elm *(Ulmus americana)* Birch sp. *(Betula spp.)* Maple sp. *(Acer spp.)* Fir sp. *(Pseudotsuga spp.)*

In addition to conducting an inventory of vegetation units, an inventory of individual trees along the north property line was also conducted. The information of these trees is summarized below:

Tree #	Common Name	Botanical Name	DBH (CM)	Canopy (M)	Condition	Ownership	Comments	Recommendation
1	Sugar Maple	Acer saccharum	14	11	F/G	Private		Retain
2	Norway Maple	Acer platanoides	27	14	F/G	Neighbour		Retain
3	Colorado Blue Spruce	Picea pungens var. glauca	12	4	F/G	Boundary		Retain
4	White Spruce	Picea glauca	24	6	F/G	Neighbour		Retain
5	White Spruce	Picea glauca	21	6	F/G	Boundary		Retain
6	White Spruce	Picea glauca	20	6	F/G	Private		Retain
7	White Spruce	Picea glauca	14	5	F/G	Private		Retain
8	Cedar Sp.	Thuja Sp.	10	3	F/G	Boundary		Retain
9	Red Maple	Acer rubrum	13	4	F/G	Neighbour		Retain
10	Red Maple	Acer rubrum	17	5	F/G	Private		Retain
11	Cherry Sp.	Prunus Sp.	~35	12	F/P	Neighbour	Co-dominant stems @ 1.0m	Retain
12	Scots Pine	Pinus sylvestris	36	12	P	Private	Very sparse canopy, moderate / significant deadwood in canopy	Retain
13	Flowering Crabapple Tree	Malus Sp.	23	9	F/P	Private	Moderate/significant lean towards resident's back yard	Retain
14	Scots Pine	Pinus sylvestris	21	7	F/P	Neighbour	Co-dominant leaders, sparse canopy, signs of past limb failure	Retain

5.0 FEDERALLY AND PROVINCIALLY PROTECTED TREE SPECIES

There were no endangered or protected tree species listed under the Canadian Species At Risk Act or the Ontario Endangered Species Act observed within the areas included in our scope of work. We understand that some Butternut trees were found within the site and have been studied under a different report.

6.0 POTENTIAL IMPACTS OF DEVELOPMENT AND MITIGATION

The proposed residential development involves the construction of 13 town house blocks, and includes an amenity area.

While the majority of the trees on the developable area of the property will have to be removed to accommodate the proposed development, there is opportunity to retain some of the trees contained in the amenity space area, and buffer areas. The final limits of tree protection in these areas will be dependent on proposed grading and servicing.

The following is a discussion of potential construction related impacts and proposed mitigation measures for the proposed development.

6.1 Damage to Vegetation from Construction

There is a potential for erosion into adjacent vegetation and vegetation areas that are remaining on the subject property beyond the development limits. Tree roots in adjacent wooded areas or areas where trees are recommended to be protected can become damaged and exposed due to grading activities. Soil compaction and disturbance of vegetation in protected tree areas would most likely result from vehicle traffic, stockpiling of construction materials, equipment, or worker activity. These impacts could continue into the long term if soils are heavily disturbed in the retained tree areas, as there could be damage to tree root systems or an invasion of non-native species (weeds and/or woody materials). Surface or groundwater contamination can arise from refueling of construction vehicles on site. Mitigation is proposed to limit the potential for impacts to proliferate beyond the immediate construction area as tree root systems are extensive.

Mitigation

- Impacts from construction should be limited to the site footprint (limits of development) as much as is feasible, and should avoid all trees and vegetation that are scheduled to remain in the proposed buffer areas, amenity area, and adjacent private properties.
- Vegetation to be protected from construction should be clearly fenced to ensure no construction traffic of any kind, storage of equipment or materials, or grade changes occur in these areas.
- Silt fencing should be attached to the tree protection fencing to assist in erosion control throughout construction.

- Turn-around areas and areas for stockpiling equipment and materials should be well outside the remaining vegetation areas, and confined to areas that will be future roads.
- If soils within the protected vegetation areas must be disturbed, the area of soil disturbance should be kept as small as possible. A temporary 200mm (8") depth of mulch should be used to overlay any disturbed areas for the duration of construction activities. Once all construction activities have been completed, then the mulch is to be removed from the site.
- Disturbed vegetation areas adjacent to construction should be restored as quickly as possible with native plant species similar to the surrounding vegetation.
- Refueling should be carried out at suitable locations away from the vicinity of tree areas to be protected, using appropriate precautions to prevent or contain spillage.
- At a minimum, treed areas to be retained will be fenced 5m offset from the development site limit.

6.2 Removal of Trees and Edge Trees

Removal of trees and edge trees within the woodlot would create new tree edges and increase the environmental effects on these edge trees in terms of amount of sunlight, wind exposure, dust, and road salt. These new edge trees may decline in health and become hazardous as they may be accustomed to being protected from the elements by other trees. Ambient light levels and drying winds may increase drying of the existing soils particularly within 25 meters of vegetation unit edges. Edge effects may decrease the organic component in soils by the increase in oxidation of leaf litter, increase compaction of soils, and contribute to the increased invasion of non-native species.

There is potential for affecting the remaining tree cover, directly through removal of trees, and indirectly through causing increased tree mortality by damaging root systems, potential increase in blow down of trees formerly protected by the existing edge trees and possible changing hydrology.

Mitigation

- Tree removals should take place at minimum one half year prior to commencement of construction activities. This will ensure the new tree edges have been 'pre-stressed' before construction begins.
- Ensure any tree injuries or removals/destruction are in accordance with good forestry practices.
- Tree protection fencing is to be installed between areas of proposed development and new tree edge boundaries as shown on the approved Tree Protection and Removals Plan. This will reduce the potential for physical damage to remaining trees and their root systems. Tree protection fencing should be installed before construction commences, and should be removed after the threat of tree and root damage effects have ceased.
- Inside the established tree protection fencing areas on newly created tree edges only, removal of trees leaving stumps within 150mm of existing grades is recommended for the following: (a) all sizes of trees within 1.0m of the tree protection fence; and (b) all trees 20cm DBH and larger in size within 5.0m of the tree protection fence.

- After tree removals, a Certified Arborist should be engaged on site to review the remaining new edge trees and report on which trees are potentially hazardous that should also be removed.
- Proposed grading should be designed to meet existing grades a minimum of 1.0m outside the tree protection fencing areas to prevent suffocation or damage to tree roots.
- A mixture of fast and slow growing native tree and shrub species should be planted within the new tree edges and in gaps within the remaining tree areas to replace the function of the edges in protecting against environmental effects such as drying winds, higher sunlight levels, dust and road salt.
- All plantings should be done by hand to reduce mechanical compaction of soils and damage to existing vegetation. Plantings should be performed by a qualified and knowledgeable contractor to ensure plantings are placed in suitable moisture regimes and sun exposures.
- Plantings should be completed in the spring or fall seasons to ensure maximum survivability.
- Plantings should range in size from saplings to 60cm caliper trees to emulate the size variability present within the existing woodland.
- A monitoring plan should be established to ensure the new tree edges, new plantings and remaining tree areas have continued health and normal growth. Monitoring should continue until the newly planted trees grow above surrounding competition. New plants that do not survive should be replaced with other appropriate, native species to ensure future sustainability.

7.0 CONCLUSION

Generally, the development site contains native species that are desirable, however, given the predominance of White Cedar, the cover is of lesser quality. The impacts of constructing the proposed residential development will result in the removal of the majority of tree cover within the proposed development area. Proposed tree protection measures are shown on the Tree Inventory, Protection and Removals Plan, TP-1, and Tree Protection Details, TP-2.

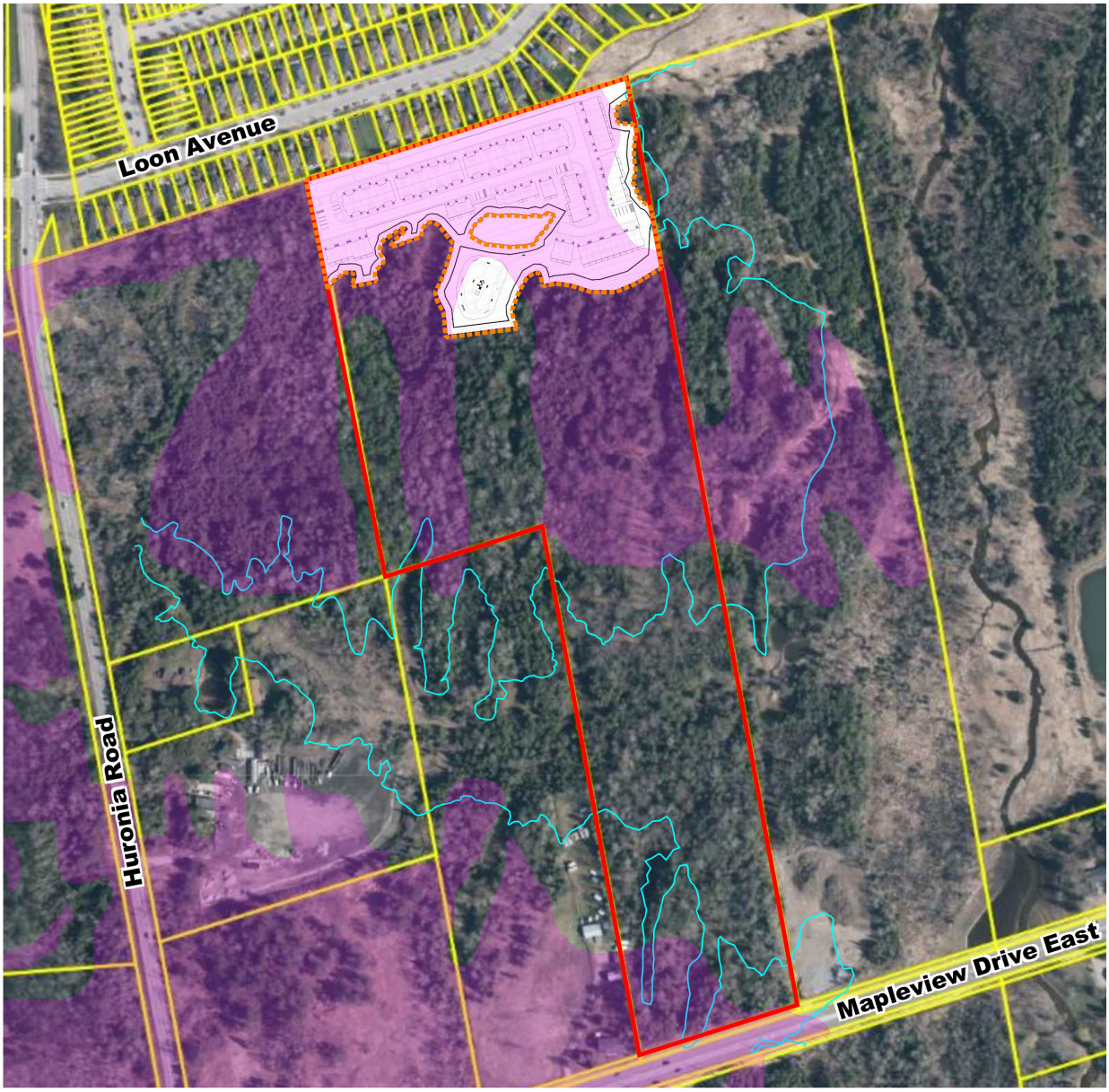
The majority of the tree removal will create new tree edges which will be susceptible to environmental effects. Larger groups of trees proposed for protection will have a better chance of surviving than retaining small stands or narrow widths of mature trees which are more susceptible to structural failure and decline along new tree edges. Measures for protecting trees to be retained have been listed so the impacts of construction related activities on the trees are minimized. It is also recommended that any dead trees or stumps in remaining treed areas that will not be in striking range of any people or property be left untouched to act as wildlife habitat.

The inspection of the trees was made using accepted arboriculture practices and is limited to visual examination. There was no climbing, probing, coring, dissection and detailed root examination involving excavation. While reasonable efforts have been made to assess trees in this report, there is no guarantee offered, or implied that these trees or any of their parts may have problems or deficiencies that may arise in the future. Trees are living organisms and their health and vigour change over time and are subject to changes in site and weather conditions. As such, trees should be re-assessed periodically. The assessments made in this report are valid at the time of inspection.

Respectfully submitted,
MHBC Planning, Urban Design & Landscape Architecture

Nick A. Miele BLA, OALA, CSLA, ISA
Partner | Landscape Architect | Arborist
ISA Certified Arborist No. ON-1251A

Figure 1 – Location Map



Gross Site Area	115,712 sqm	28.59 ac	
Existing Developable Area	60,353 sqm	(14.91 ac)	52.1% of Net Site Area
Proposed Developable Limit	26,675 sqm	(6.59 ac)	23.0% of Net Site Area
Existing lands designated General Industrial in OP	60,353 sqm	(14.91 ac)	52.1% of Net Site Area
Proposed residential designation in application	26,675 sqm	(6.59 ac)	23.0% of Net Site Area
Existing lands designated EP in OP	55,359 sqm	(13.67 ac)	47.8% of Net Site Area
Proposed lands designated EP in application	90,107 sqm	(22.26 ac)	77.8% of Net Site Area
Proposed increase in EP designation	33,704 sqm	(8.32 ac)	37.8% increase

LEGEND

- Subject Lands
- Flood Plain Boundaries
- General Industrial Land Use Designation
- Development Limit

Location Map

338 Mapleview Drive East, Barrie, Ontario

DATE: January 28, 2022

SCALE 1:4000

north

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