5219 Upper Middle Road

Burlington, Ontario

Arborist Report

~~March 17, 2017~~

September 29, 2017

Bloomfield Homes

Property Agent

GEOMETRIC

5219 Upper Middle Road, Burlington, ON

Arborist Inventory and Report

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1.0 Background Information

1.1 Introduction

The following arborist report has been prepared in keeping with the expectations of the City of Burlington Forestry Services and the International Society of Arboriculture. This arborist report relates to the proposed subdivision development to be located at 5219 Upper Middle Road, Burlington, Ontario (See Key Map below).

Figure 1: Key Map



The study boundary is approximately 1.25 acres with an existing residential building, garage, shed, open lawn areas and an un-kept thicket. Furthermore, there are residential dwellings with rear lots and fences and Rome Crescent to the North, pathway and storm-water pond to the west, upper middle road to the east, and additional residential lots to the west that binds the study area.

All trees sampled within the study limits were surveyed utilizing an ISA Class 1 Visual Inspection from Ground Locations only, and as such, all trees were identified, measured, and assessed for physical and health condition.

1.2 Purpose of Assignment

Geometric Studio Inc. was retained by Bloomfield Homes to prepare a Tree Preservation Plan and Arborist Report toward a rezoning application (RZA)/ Site Plan Application (SPA) for this development site.

The purpose of this report is to:

1. Inventory and assess the current conditions of all trees:

    a. Measuring 10 cm diameter at breast (DBH) height or larger located on the subject site or within 6 m of the subject site; and,

    b. Trees of any diameter, located on the adjacent municipal lands within 6m of the subject site;

2. Prepare a Tree Preservation Plan and Arborist Report to identify trees to be removed, preserved or injures as required to facilitate the proposed site concept plan;

3. Prepare recommendations for retention, injury mitigation and tree removal based on tree condition and analysis of the proposed concept plan and existing site conditions. These recommendations will also provide information that will assist in the design development process. Final recommendations on removals, preservations and injuries can be provided when a final site plan and landscape plan with servicing and grading details is provided.

Furthermore, the report provides recommendations to ensure that the City of Burlington's urban forest is restored and improved during and after the redevelopment of this site.

1.3 Overview

In the context of this development it is anticipated that trees will be preserved, removed and injured as part of this redevelopment and that all trees adjacent to the site will be preserved with the exception of trees #8, 9, 20, 21 and 22 on adjacent municipal property.

This report is intended to highlight the existing tree conditions and rank the trees in terms of their health, present impediments to growth, and to identify the existing trees that will be removed based on the final design.

As this site approaches construction, the construction practices on site are required take the necessary steps to protect all specimens on and adjacent to the property designated for preservation utilizing the minimum tree protection zones provided in this report to protect the tree(s).

2.0 Methods

The following section outlines the processes used in the preparation of this report as well as information gathered during on-site field inventory.

The trees included in this report were inventoried on March 16, 2017. This included all trees greater than 10cm DBH on private property, within 6m of the proposed renovation activity (where accessible) and trees of all diameters anticipated to be within the City/ Town Right of Way (ROW).

It should be noted that there was no access to trees located on private property within 6 meters of the study boundary and as a result, DBH was approximated and visual assessment limited.

Each of these aforementioned trees were given a number, and the specimens were all individually assessed for their character, health, unique growing conditions and their potential for future contributions to the urban forest.

The following inventory and analysis data was collected and/ or assembled for each tree:

- **Tree #** - Each inventoried tree was assigned a tree number and corresponding number on the tree plan

- **Species**

- **DBH –** Diameter of tree steam measured at approximately 1.4m above ground level per accepted arboricultural standards. Tree(s) with DBH from 0-50cm were measured utilizing a forestry tree caliper. Tree(s) greater than 50cm DBH were measured utilizing tree diameter tape.

- **T.P.Z. –** Tree Protection Zone: The following is a chart shows minimum required distances for determining a Minimum Tree Protection Zone in the City of Burlington:

Trunk Diameter (DBH) [2]	Minimum Tree Protection Zone (MTPZ) Distances Required [3]	Critical Root Zone (CRZ) Distances Required [3&4]
< 10 cm	1.8 m	1.8 m
11 - 40 cm	2.4 m	4.0 m
41 - 50 cm	3.0 m	5.0 m
51 - 60 cm	3.6 m	6.0 m
61 - 70 cm	4.2 m	7.0 m
71 - 80 cm	4.8 m	8.0 m
81 - 90 cm	5.4 m	9.0 m
91 - 100+ cm	6.0 m	10.0 m

***NOTE:**

1. **The City/ Town reserves the right to adjust these distances depending on the tree, required construction activity and surrounding environment.**

2. Tree Protection Zone distances are to be measured from the outside edge of the tree base.

- **Condition –** Summarized as follows:

1. VG = Very Good
2. G = Good
3. F = Fair
4. P = Poor
5. VP = Very Poor

A generalized condition assessment system was employed to describe the overall condition of each inventoried tree. A 5 level scale of plant health and structure with descriptors of very good, good, fair, poor, and very poor was used to quantify the range of the tree's condition.

A Very Good condition was applied to a tree whose health, growth rate, crown closure and structural integrity was greater than eighty percent of a perfect specimen. Conversely, Very Poor condition was applied to a tree whose condition is less than twenty percent of a perfect specimen.

The table below provides a summary of factors and rating scale for assessed plant condition:

FACTORS ASSESSED		ASSESSED CONDITION	PERCENTAGE OF A PERFECT SPECIMEN
Roots Collar/flare Mechanical injury Girdling roots Insects/disease Decay/fungi **Trunk** Cavities Mechanical injury Cracks Swollen/sunken areas Insects/disease Fungi **Foliage/Buds** Size of foliage/buds Foliage colour Foliage injury Dieback of buds/foliage Insects/disease	**Scaffold Branches** Attachments/included bark Taper Distribution Decay/cavities Deadwood Insects/disease **Small Branches/Twigs** Vigour/growth rates Distribution Appearance Insects/disease Dieback (Adapted from the CTLA *Guide for Plant Appraisal, 9th Ed.)*	Very Good	100 – 81
		Good	80 – 61
		Fair	60 – 41
		Poor	40 – 21
		Very Poor	20 – 0

***NOTE: Trees were assessed using ISA Class 1 Visual Inspection from ground level only. As a result, internal rot or other hidden hazards may exist that are not reported here. There is no warranty or guarantee, expressed or implied by Geometric Studio Inc. that the tree(s) inventoried here or any of its parts will remain in standing or in stable condition. Trees should be re-assessed periodically to determine the level of risk for failure, inevitably a tree will always pose some level of risk.**

- **Comments –** Included in physical tree inventory.

- **Action –** Denotes the preliminary recommendation with regard to whether a tree is to be removed, preserved or injured based on existing site and tree conditions.

3.0 Results + Discussion

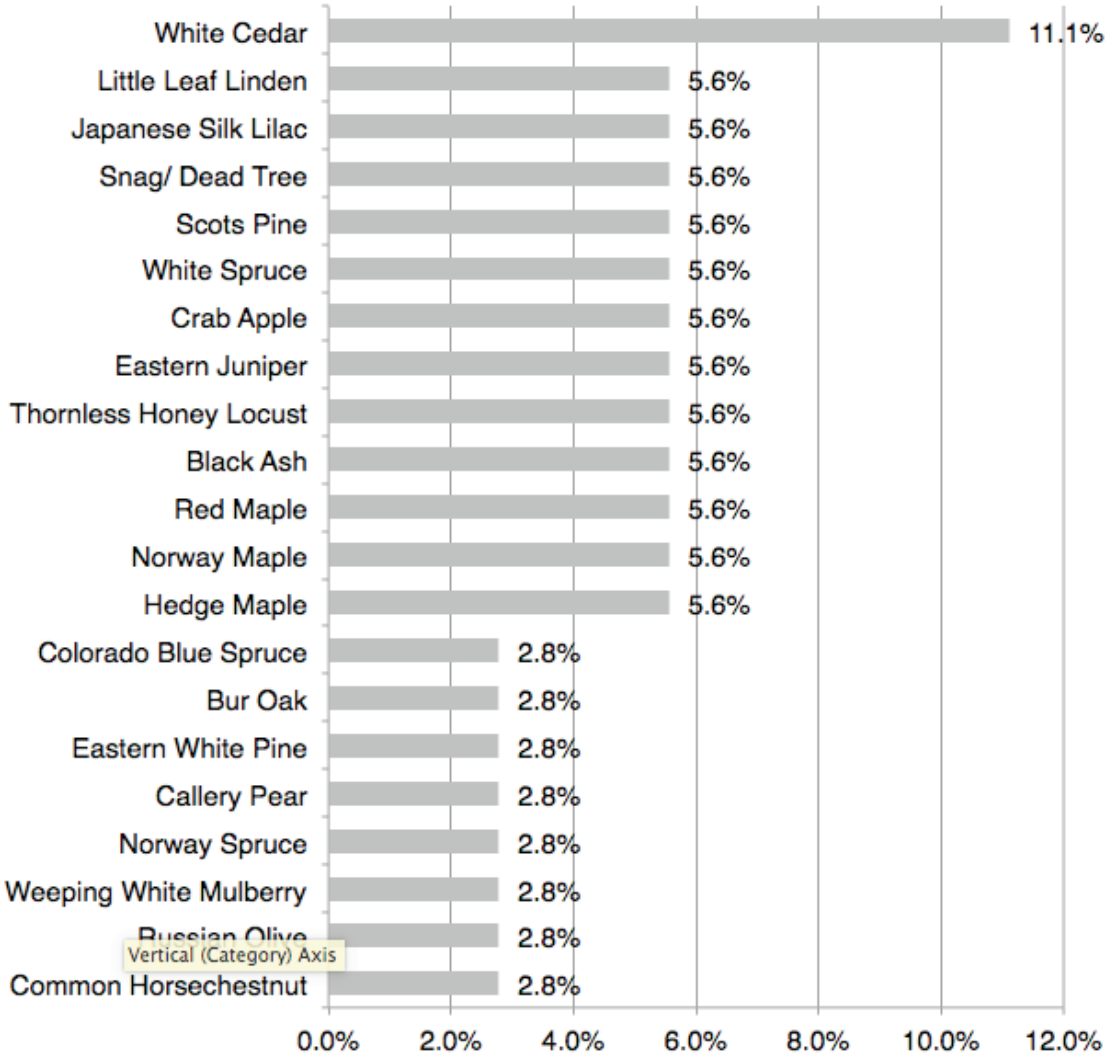
This tree inventory documented (36) trees greater than 10cm DBH within or adjacent to the study area where indicated on the Tree Preservation Plan.

The tree inventory revealed that the majority of the trees within or adjacent to the study site are Eastern White Cedar (*Thuja occidentalis*) composing approximately 11.1% of the specimens observed. The remainder of the specimens are relatively balanced in representation with one or two instances occurring within each species as noted (See Table 1 and Chart 1 below).

Table 1: Species Composition

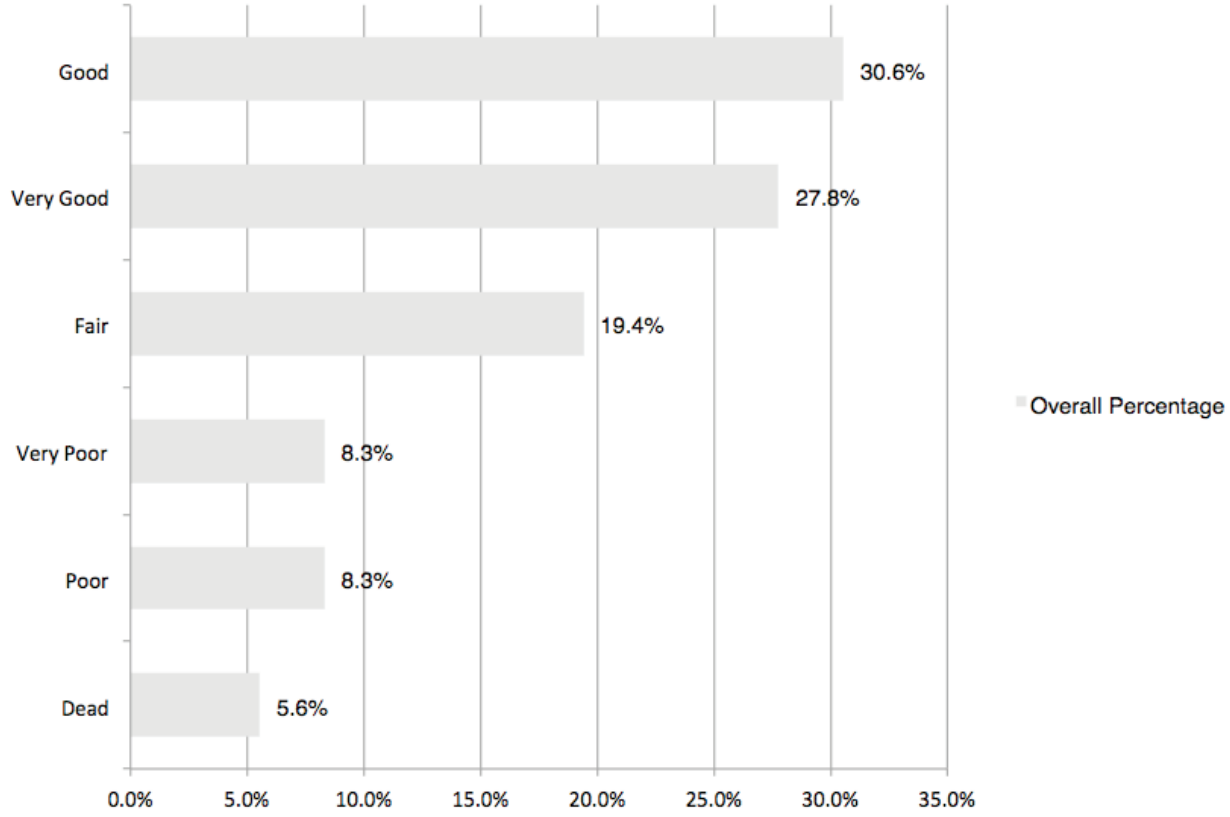
Key	Botanical Name	Common Name	Quantity	*Percentage*
To	*Thuja occidentalis*	White Cedar	4	11.1%
Ac	*Acer campestre*	Hedge Maple	2	5.6%
Ap	*Acer platanoides*	Norway Maple	2	5.6%
Ar	*Acer rubrum*	Red Maple	2	5.6%
Fn	*Fraxinus nigra*	Black Ash	2	5.6%
Gt	*Gleditsia triacanthos*	Thornless Honey Locust	2	5.6%
Jv	*Juniperus virginiana*	Eastern Juniper	2	5.6%
Ms	*Malus* spp.	Crab Apple	2	5.6%
Pg	*Picea glauca*	White Spruce	2	5.6%
Ps	*Pinus sylvestris*	Scots Pine	2	5.6%
Snn	Snag/ Dead Tree	Snag/ Dead Tree	2	5.6%
Sr	*Syringa reticulata*	Japanese Silk Lilac	2	5.6%
Tc	*Tilia cordata*	Little Leaf Linden	2	5.6%
Ah	*Aesculus hippocastanum*	Common Horsechestnut	1	2.8%
Ea	*Eleagnus angustifolia*	Russian Olive	1	2.8%
Ma	*Morus alba*'Pendula'	Weeping White Mulberry	1	2.8%
Pa	*Picea abies*	Norway Spruce	1	2.8%
Pc	*Pyrus calleryana*	Callery Pear	1	2.8%
Pss	*Pinus strobus*	Eastern White Pine	1	2.8%
Qm	*Quercus macrocarpa*	Bur Oak	1	2.8%
Pp	*Picea pungens*	Colorado Blue Spruce	1	2.8%

Chart 1: Species Composition



As outlined in the following Chart 2: Observed Tree Conditions, approximately 77.8% of the inventoried trees in the overall study are of fair to very good health, and the remaining 22.2% are in very poor to fair health, all of which can be thoroughly examined in the tree inventory.

Chart 2: Observed Tree Conditions



Zone 1: Municipal Trees

There are thirteen (13) municipal trees within the right-of-way along Upper Middle Road. The majority of these trees are in fair to good condition with a few exceptions. These tree's are inventoried #1-9 and #20-#23. Tree's #1-9 are planted within the boulevard condition with some minor salt damage to the crown of some trees and minor trunk wounds that are closing over. Tree's #20-#23 are likely privately planted in the ROW from the original residential owner and are in varying conditions. One of the largest stature specimens observed on site is tree #22 a Common Horsechestnut in good condition with a bark inclusion and minor deadwood but overall good vigor. Tree #20 is in poor condition exhibiting excessive sprouting and a large cavity with evidence of decay.

There are six (6) additional municipal trees (#27-#32) observed along the pathway at the top of the slope of the stormwater pond adjacent to the site. All of these trees are in good to very good condition.

The remaining municipal trees are located at the end of Georgina Court (#33-#35). These are newly planted and are in fair to good health.

Zone 2: Private Trees

There are a number of privately owned trees on the subject site including tree's #10-19 and #24-26. These specimens range in health from dead/ very poor to good as indicated in the tree inventory and assessment table comments. Seven (7) specimens are considered mature trees, tree's #12-14, #19 and #24-26. The majority of these trees are in fair to good condition; however, trees #25 and #26 are in poor condition with decay, cavities and ample deadwood. In particular, tree #26 is considered an **imminent hazard** due its lean east and large open cavity with visible decay on the opposite side of the lean.

There is a thicket of trees east of the existing dwelling and central to the development area that have a number of large, formerly mature trees, that have died and are standing snags. Due to the urban nature of the existing site these trees are also considered **imminent hazards.**

Zone 3: Adjacent Private Property Trees

One tree was documented on adjacent private property in the rear lot along the residences to the north-west of the study boundary. Tree #36 is a Weeping White Mulberry with 1/3 of the crown overhanging and flat against the existing fence.

The specific attributes and assessment of each tree can be examined in further detail in the inventory and assessment table and the locations of each tree can be examined on the Tree Preservation Plan. There were no tree species encountered on site that were listed under the Canadian Species At Risk Act, 2002 or the Ontario Endangered Species Act, S.O. 2007.

Section 4: Tree Inventory and Assessment Data

Date of Field Review: March 17, 2017

The following key is to be used when reviewing the table below:

Action Key	
P	Preserve
Pi	Preserve with injury
R	Remove
Ownership Key	
P	Privately Owned on subject site
N	Privately Owned on adjacent private property
BT	Boundary Tree (Shared Ownership)*
M1	Municipal Owned tree in boulevard
M2	Municipal Owned tree in park, stormwater pond or open space

**__Boundary trees__ are approximately identified. No guarantee is express or implied that a tree identified as a "Boundary Tree" is same as defined by the Forestry Act. In all instances, it is highly recommended that the client/ owner obtain written consent to injure, remove or maintain trees on the property line or near adjoining property from the adjoining land owner prior to doing any work(s).*

The Forestry Act, R.S.O. 1990, c. F.26 defines boundary trees as follows. "An owner of land may, with the consent of the owner of adjoining land, plant trees on the boundary between the two lands. 1998, c. 18, Sched. I, s. 21."

Tree #	Key	Botanical Name	Common Name	D.B.H. (cm)	Condition	M.T.P.Z. (m)	C.R.Z. (m)	Action	Ownership	Comments
1	Ac	*Acer campestre*	Hedge Maple	10.5	Fair	1.8	1.8	P	M1	salt damage, minor deadwood, balanced canopy, apical tip dieback, low vigor
2	Ac	*Acer campestre*	Hedge Maple	12.5	Poor	2.4	4.0	P	M1	salt damage, apical tip dieback, balanced canopy, low vigor
3	Gt	*Gleditsia triacanthos*	Thornless Honey Locust	13.5	Very Good	2.4	4.0	P	M1	codominant, balanced canopy, healthy
4	Gt	*Gleditsia triacanthos*	Thornless Honey Locust	12.5	Very Good	2.4	4.0	P	M1	strong single leader, callus closing trunk wound at base, healthy
5	Sr	*Syringa reticulata*	Japanese Silk Lilac	10.5	Good	1.8	1.8	P	M1	bark inclusion @1.7m, broken branch, healthy

6	Sr	*Syringa reticulata*	Japanese Silk Lilac	10.5	Fair	1.8	1.8	P	M1	lean west, minor deadwood
7	Fn	*Fraxinus nigra*	Black Ash	21.5	Fair	2.4	4.0	P	M1	emerald ash borer exit holes present, balanced canopy, codominant
8	Ap	*Acer platanoides*	Norway Maple	16.5	Very Good	2.4	4.0	R	M1	prior frost crack, balanced canopy
9	Pp	*Picea pungens*	Colorado Blue Spruce	12.0	Very Good	2.4	4.0	R	M1	balanced canopy, healthy
10	Snn	*Snag/ Dead Tree*	Snag/ Dead Tree	34.0	DEAD	2.4	4.0	R	P	dead
11	Snn	*Snag/ Dead Tree*	Snag/ Dead Tree	65.0	DEAD	4.2	7.0	R	P	dead
12	Pc	*Pyrus calleryana*	Callery Pear	35.0	Fair	2.4	4.0	R	P	pruning stubs, healing wound, twisting trunk, broken branches, unbalanced canopy
13	Ps	*Pinus sylvestris*	Scots Pine	40.0	Fair	2.4	4.0	R	P	multiple stems @ 40, 35, 24, Fused leaders @ 1.0m, crossing branches, broken branches, deadwood
14	Ps	*Pinus sylvestris*	Scots Pine	49.5	Fair	3.0	5.0	R	P	excessive vine throughout canopy, deadwood, broken branches, unbalanced canopy
15	Qm	*Quercus macrocarpa*	Bur Oak	11.0	Good	2.4	4.0	R	P	crowded, healthy, near fence
16	Jv	*Juniperus virginiana*	Eastern Juniper	13.5	Good	2.4	4.0	R	P	healthy, near fence, crowded
17	Jv	*Juniperus virginiana*	Eastern Juniper	11.0	Good	2.4	4.0	R	P	healthy, near fence, crowded
18	Fn	*Fraxinus nigra*	Black Ash	23.0	Very Poor	2.4	4.0	R	P	vine, ample deadwood, emerald as borer, epicormic shoots, ~80% canopy dead
19	Tc	*Tilia cordata*	Little Leaf Linden	39.0	Good	2.4	4.0	R	P	deaddwood, pruning stubs, crossing branches
20	Ms	*Malus spp.*	Crab Apple	25.0	Poor	2.4	4.0	R	M1	MS(25, 20, 22,18), Diameter @300mm = 45, deadwood, sprouting, large cavity/ hollow @ base
21	Tc	*Tilia cordata*	Little Leaf Linden	39.0	Good	2.4	4.0	R	M1	codominant, included bark, minor deadwood, good vigor
22	Ah	*Aesculus hippocastanum*	Common Horsechestnut	67.5	Good	4.2	7.0	R	M1	included bark, healthy, near sidewalk
23	Pss	*Pinus strobus*	Eastern White Pine	10.0	Poor	1.8	1.8	R	M1	chlorortic, sparse canopy, low vigor

24	Pa	*Picea abies*	Norway Spruce	57.0	Good	3.6	6.0	R	P	lean south, minor deadwood, healthy
25	Ms	*Malus spp.*	Crab Apple	31.0	Very Poor	2.4	4.0	R	P	cavity, 1/2 dead, significant deadwood, hollow @ base
26	Ea	*Eleagnus angustifolia*	Russian Olive	57.0	Very Poor	3.6	6.0	R	P	leaning east, deadwood, broken branches, hollow, **potential hazard**
27	Pg	*Picea glauca*	White Spruce	18.0	Very Good	2.4	4.0	P	M2	healthy, balanced canopy, top of slope
28	Pg	*Picea glauca*	White Spruce	18.5	Very Good	2.4	4.0	P	M2	healthy, balanced canopy, top of slope
29	To	*Thuja occidentalis*	White Cedar	8.0	Very Good	1.8	1.8	P	M2	healthy, balanced canopy, top of slope
30	To	*Thuja occidentalis*	White Cedar	8.0	Very Good	1.8	1.8	P	M2	healthy, balanced canopy, top of slope
31	To	*Thuja occidentalis*	White Cedar	9.0	Very Good	1.8	1.8	P	M2	healthy, balanced canopy, top of slope
32	To	*Thuja occidentalis*	White Cedar	8.0	Very Good	1.8	1.8	P	M2	healthy, balanced canopy, top of slope
33	Ar	*Acer rubrum*	Red Maple	5.0	Fair	1.8	1.8	P	M1	sparse canopy, near road, codominant
34	Ap	*Acer platanoides*	Norway Maple	5.0	Good	1.8	1.8	P	M1	single leader, healthy
35	Ar	*Acer rubrum*	Red Maple	9.0	Good	1.8	1.8	P	M1	codominant, healthy
36	Ma	*Morus alba'Pendula'*	Weeping White Mulberry	8.0	Good	1.8	1.8	P	N	grown over fence

Section 5: Recommendations + Tree Preservation

The recommendations in this section were determined after analysis of the existing site conditions and proposed concept plan within the study area.

In all instances, it is recommended tree injuries, removals or preservation measures be carried out by or under the supervision of a qualified ISA Certified Arborist.

Trees To Be Removed:

There are nineteen (19) trees recommended for removal including thirteen (13) privately owned trees on the subject site and six (6) city owned trees adjacent to the subject site.

City/ Town Trees:

The original property owner likely planted trees #8, 9, 20, 21, 22 and 23. However, these trees were planted within the City right-of-way; therefore, it is understood these trees are owned and assumed as City trees unless the City indicates otherwise. Trees #8, 9, 20, 21, 22 and 23 are recommended for removal as follows:

1. Tree #8 (Norway Maple) and #9 (Colorado Blue Spruce): These trees are in very good condition; however, they are in direct conflict with the proposed development. Expected compaction and excavation within 25% of the critical root zone (crz) and into the minimum tree protection zone (mtpz).

2. Tree #20 (Crab Apple): This tree is in poor condition and is in direct conflict with the proposed development. Expected compaction and excavation within the critical root zone (crz) and minimum tree protection zone (mtpz).

3. Tree #21 (Littleleaf Linden): This tree is in direct conflict with the requirement to remove the existing building and the proposed construction of a new building. Extensive grading, compaction and excavations are expected within 50% of the critical rooting zone.

4. Tree #23 (White Pine): This is a small stature tree in poor condition exhibiting symptoms consistent with chlorosis and is in a state of low vigor. This tree is recommended for removal due to its poor health. A more suitable tree should be planted in place of this tree that is tolerant of salt spray and saline soils.

5. Tree #22 (Common Horsechestnut): This tree is in good condition; however, it is in direct conflict with the proposed development. Expected compaction and excavation affecting over 40% of the critical root zone (crz) and the minimum tree protection zone (mtpz) to accommodate pathways, buildings and associated foundations shoring.

Private (Subject Site) Trees:

The following potential hazard trees should be removed immediately to greatly reduce the risk of damage to persons or property:

1. Tree's #10, #11 (large dead snags)
2. Tree #26 – large hollow at base and lean across existing roadway/ sidewalk

In general, trees identified as dead or hazardous pose safety issues to users and property and should be evaluated with immediacy. Although some trees are identified as hazards and are recommended for removal or treatment, it is ultimately a function of the discretion of the property owner to remove trees.

Trees #12-#20 and #23-25 will be in direct conflict with the proposed residential buildings, removal of existing buildings and/ or associated grading and landscape work.

Trees To Be Preserved:

There are eighteen (18) trees to be preserved, seventeen (17) of which are on city owned lands and one (1) of which is on adjacent private property.

Adjacent Private Property:

Tree #36 (Weeping White Mulberry) is approximately located on plan. Provided the existing fence is to remain and the tree protection hoarding is maintained as indicated on the plan this tree can be preserved with no injury. It is recommended that the owner be alerted to the potential for injury and an agreement be reached between the two property owners in the event of injury.

City Owned Trees:

Trees #1-7, 22 and 27-35 are to be preserved and protected by hoarding per City of Burlington standards and as shown on an Urban Forestry approved Tree Protection Plan to ensure successful preservation.

For Trees #1-7, 27-32 and 33-35:

These eighteen (18) trees are recommended for preservation. There are no anticipated encroachments to occur within the critical root zones of these trees and tree protection hoarding is to be erected per City of Burlington requirements and maintained for the duration of construction. If encroachment within the critical root zone is required than Schedule 8 of Burlington's *Specifications index for Tree Protection and Preservation (SPEC NO. SS12A)* will apply **and a revision to this report will be required.**

5.0 General Tree Preservation and Protection Recommendations:

The following preservation and protection recommendations are provided to aid in the design decision-making process and are recommended to eliminate or greatly reduce project phase-related impacts to trees.

All of the following tree preservation and protection measures are required for trees to be preserved or injured. The Tree Preservation and Removals plan is prepared by thinc design based on recommendations contained in this report. The site supervisor and/ or attending arborist must maintain a copy of both the approved plan and approved report on site for the duration of construction activities.

5.1. Design Development Phase

5.1.1. New trees should include a variety of large growing deciduous shade trees to meet Forestry Requirements, increase biodiversity and avoid potential problems with future disease or insect infestation. The International Society of Arboriculture suggests that, **where possible**, a common-sense approach to a healthy urban forest means that a community should:

5.1.1.1. Plant no more than 10% of any species
5.1.1.2. Plant no more than 20% of any genus
5.1.1.3. Plant no more than 30% of any family

5.1.2. New trees should be planted at least 4.0m away from new or existing paved pathways or other paved areas to limit both the effects of compaction and salt damage on root zones and cracking of pathways by roots. However, if constrained growing conditions persist and this cannot be accommodated, an appropriate tree with a high tolerance for urban stressors may be utilized.

5.1.3. It is recommended that written approval from adjacent landowners to remove trees on adjacent land (if required) and/ or boundary trees sharing a property line with private or public land ownership be acquired prior to proceeding with any construction.

5.2. Pre-Construction Maintenance

5.2.1. ***Tree Protection Hoarding:*** Trees indicated for preservation shall have their critical root zones (CRZ) and/ or minimum tree protection zones (MTPZ) protected with the installation of robust tree protection hoarding per City of Burlington requirements as follows:

5.2.1.1. The required barrier is a 1.2 meter (4 ft) high orange plastic web snow fencing on 2” x 4” frame. Where orange plastic web snow fencing creates a restriction to sightlines, page wire fencing with reflective tape can be used.

5.2.1.2. Tree protection barriers are to be erected prior to the commencement of any construction or grading activities on the site and are to remain in place throughout the entire duration of the project. The barriers shall be maintained erect and in good repair throughout the duration of construction operations with breaks and unsupported sections repaired immediately. Tree protection may be not be removed prior to the completion of construction without written authorization from the City Arborist.

5.2.1.3. All supports and bracing used to safely secure the barrier should be located outside the MTPZ. All supports and bracing should minimize damage to roots.

5.2.1.4. Where some fill or excavated material must be temporarily located near a MTPZ, a wooden barrier with silt fencing must be used to ensure no material enters the MTPZ.

5.2.1.5. No materials or fill may be stored within the MTPZ.

5.2.1.6. Equipment of vehicles shall not be operated, parked, repaired or refueled within the MTPZ.

5.2.1.7. No construction activity, grade changes, surface treatment or excavations of any kind is permitted within the MTPZ without written authorization from the City Arborist.

5.2.1.8. A laminated Minimum Tree Protection Zone sign must be attached to the most visible side of the Tree Protection, where it will be visible by those persons entering the site. Minimum size must be 10” x 14”.



5.1.1. Any area(s) designated for stockpiling of excavated soil must be outside of tree protection zones and be enclosed with sediment control fencing.

5.1.1.1. Sediment control fencing is to be indicated on the Tree Preservation and Removals Plan and must be installed to Ontario Provincial Standards OPSD-219.130 and to the satisfaction of Urban Forestry.

5.1.2. **Canopy Pruning:** Where noted specifically in the report, trees that were identified for crown cleaning are to have their crowns cleaned prior to the commencement of construction. Crown cleaning is to be done per accepted arboricultural standards to encourage healthy and vigorous growth. No pruning of live healthy branch is permitted unless for the explicit purpose of balancing or improving crown health or safety.

5.1.3. ***Exploratory Digs:***

5.1.3.1. Hand Digging

Roots to be pruned are to be exposed by use of hand digging with extreme care only. No use of machinery or heavy equipment to excavate other than air knife or hydro-vac is permitted. Roots are to be pruned as follows:

5.1.3.1.1. Hand-digging is to be done to the depth specified for each specific tree as noted prior in the report.

5.1.3.1.2. The attending arborist in the field must approve roots of significant size in diameter or number for root pruning in agreement with the City of Burlington representative. Roots encountered larger than 5 cm in diameter are to be left intact and undamaged (notably - buttress roots) unless approved as noted above;

5.1.3.1.3. Exposed roots approved to be severed will be cleanly pruned flush to the soil surface by the attending arborist according to proper arboricultural standards, however;

5.1.3.1.4. If the extent of injury is deemed unacceptable by the attending arborist or City of Burlington Urban Forestry Representative, or will compromise the structural stability of the tree, these roots will not be pruned and removal permits must be obtained prior to proceeding with construction activities.

5.1.3.2. Air Spade or Hydro-Vac

This procedure is to be completed using an Air-Spade or Hydrovac per City of Burlington specifications as follows:

5.1.3.2.1. The exploratory dig will occur on the tree side of each open pit. The trench will be a minimum of 1ft (300mm) wide and 3ft (1000mm) deep along the length of the tree side of each of the pits (see Tree Preservation Plan).

5.1.3.2.2. Exposed roots approved to be severed will be cleanly pruned flush to the soil surface by the attending arborist according to proper arboricultural standards, however;

5.1.3.2.3. If the extent of injury is deemed unacceptable by the attending arborist, or will compromise the structural stability of the tree, these roots will not be pruned and removal permits must be obtained prior to proceeding with construction activities.

5.1.4 **Root Pruning:**

5.4.6.1 Some roots may be located in the construction area. Where possible, these roots should not be cut. If cutting is necessary, roots should be severed cleanly by a clean sharp implement (not with construction machinery) by or under the supervision of a qualified tending Arborist.

5.4.6.2 If roots of retained trees are exposed, damaged, or severed by construction work a qualified tending arborist will undertake proper root pruning in accordance with acceptable arboriculture practices.

5.1.5 **Root Zone Protection:**

5.1.5.1 In the event the tree protection fencing cannot be maintained as it will limit access to the site or impede development activities, low impact construction measures are required for trees to be preserved only once approved by the attending arborist and City of Burlington Arborist.

5.1.5.2 At a minimum, this will include temporary installation of large 1-inch thick steel plates (or approved alternate) placed within the root zone installed over filter fabric and 30 cm of woodchip mulch in all areas within tree protection zones that cannot be protected. This will greatly reduce soil compaction over tree roots and increase the chance of survival for trees to be preserved.

5.2. During Construction Maintenance

5.2.1. The tree protection zone is not to be breached/ moved or altered once it is in place without approval from the City/ Town. The tree protection zone shall not be used for the storage or mixing of any construction materials eg:

5.2.1.1. Concrete must not be mixed near tree protection zones and any wash water from concrete mixing must be directed away from root zones of any trees or downward slopes.

5.2.2. Some roots located outside the Tree Protection Zones may be located in the construction area. Where possible, these roots should not be severed, broken or damaged. If roots are encountered, it is recommended these roots are severed cleanly (not with construction machinery), by a qualified ISA Certified Arborist.

5.2.3. An ISA Certified arborist or project landscape architect must be present for the establishment of tree protection, and provide bi-weekly reviews during the construction period to ensure that tree protection remains in place, OR;

5.2.4. The acting site supervisor will be required to inspect the condition of the tree protection measures outlined on the tree protection plan and per City of Burlington requirements prior to any construction activity every day. No disturbance to the barriers is permitted. Tree protection hoarding is to be in place or reinstated (if disturbed) prior to any work commencing.

5.2.5. In all instances, trees to be preserved with exposed root systems or in close proximity to construction activity should be watered within the trees entire dripline and not permitted to dry out.

5.2.6. Trees that are accidentally damaged beyond the point of recovery during construction should be replaced per as required and to the satisfaction of the City of Burlington.

5.2.7. Only minor grading is permitted at the edge of tree preservation hoarding when required to correct/ adjust localized areas. This work to be undertaken under the direct supervision qualified attending arborist.

5.2.8. **Excavation Monitoring:** During construction if any excavation is required within the tree protection zones outlined in this report an ISA certified arborist shall be commissioned to monitor excavations. The monitoring arborist will prescribe remediation measures as required to address tree injuries per accepted arboricultural standards.

5.3. Post Construction Maintenance

5.3.1. **Planting & Landscaping*:*** Any landscape work (planting or re-sodding etc.) to be down within tree protection zones is to be done at the end of all other construction activity. Extreme care, and hand digging only is to be used when preparing holes for shrub or perennial plant material.

5.3.1.1. No grade changes are permitted including the addition or excavation of soil.
5.3.1.2. Only individual planting holes carefully hand-dug for new planting of trees and shrubs is permitted.
5.3.1.3. No heavy equipment can be used within the TPZ to place planting material or sod. This will prevent soil compaction.

5.3.2. At the completion of all site work a City of Burlington representative must approve removal of tree protection hoarding.

5.3.3. **New Plantings*:*** Minimal pruning should be undertaken in the first two (2) to three (3) years after planting of new trees. Foliage should be retained to allow for roots to get established and for the tree to overcome transplant shock. Only crossing branches or competing leaders should be pruned per proper arboricultural standards.

5.3.3.1. Minimal pruning should be undertaken in the first two (2) to three (3) years after planting of new trees. Foliage should be retained to allow for roots to get established and for the tree to overcome transplant shock. Only crossing branches or competing leaders should be pruned per proper arboricultural standards.

5.3.4. Fertilizing can help improve the post-construction vigor of trees. Prior to fertilizing, a soils analysis should be performed to ensure there is proper soil function. Upon confirmation of soils analysis a post construction fertilization of 8-20-30 (By Plant Prod or approved alternative) may be applied through high-pressure injection using water as a medium throughout the entire root zone of affected trees at the manufacturers recommended application rate. This high phosphorous fertilizer will aid in the tree re-establishing its feeder root system.

5.3.4.1. Additionally, a mycorrhizal inoculant, such as Myke Pro® or an approved alternate, is recommended be incorporated into the high-pressure mix. Application rate is to follow manufacturer's recommendations.

5.3.5. Regular monitoring two (2) times per year (May/June and August/September) is recommended to observe for indications of stress following construction. Stress as a result of construction may not be apparent for several years following disturbance and can make trees more susceptible to secondary stressors including insects, disease, water stress etc. If trees are observed to decline, the most appropriate prescription to address the decline is to be performed by an ISA Certified Arborist.

5.4. Tree Protection and Removals Plan

5.4.1. The recommendations above for preservation and protection are based on the condition of the trees, existing site conditions and the ability to maintain the required tree protection zones. Should tree protection zones require encroachment for site servicing, grading or other design considerations, recommendations in this report will need to be revised as well as the Tree Protection and Removals Plan.

5.5. Tree Replacement/ Compensation

The following outlines tree replacement requirements based on the City of Burlington's aggregate caliper replacement requirements outlined in the Site Plan Application document Section 9.0 Tree Saving Plan sub-section 9.4 Tree Replacement Requirements (Private Trees)

5.5.1. **Methodology:** Trees that are removed to facilitate site plan development should be replaced with shade or large canopy trees as follows:

5.5.1.1. Replacement of dead trees or Ash species (*Fraxinus spp.*) will not be required.

5.5.1.2. Replacement of private trees measuring under 10cm DBH will not be required.

5.5.1.3. Town/ City Owned and Private Trees at the discretion of the City Forestry or Planning staff (deemed to be serving a purpose), are to be replaced using the City of Burlington's aggregate calliper replacement method:

5.5.1.3.1. Each centimeter of caliper removed the same caliper will be replaced such that over all calliper loss/gain is net 0.

Example: 2 Town/ City trees measuring 20cm each = 40cm total.
40cm = 400mm
400mm / 50mm = 8

Therefore, eight (8) 50mm calliper nursery stock trees would be required as replacements.

5.5.2. **Tree Compensation Totals:**

Tree replacement requirements based on the proposed concept plan are as follows:

5.5.2.1. Total Town/ City Trees: 1700mm / 60mm nursery stock = 12

5.5.2.1.1. 28 Replacement Trees are required for City/ Town

5.5.2.2. Total Private Trees*: 3300mm / 60mm = 55

5.5.2.2.1. 55 Replacement Trees are required to replace private tree removal

*All trees are assumed serve a "purpose" with the exception of very poor or dead trees. City Forester/ Planner to reserve the right to adjust the final requirements.

The City of Burlington reserves the right to request cash-in-lieu in the event tree compensation totals are unable to be fulfilled on the subject site or an approved alternate solution may be amenable to the municipality for tree replacement.

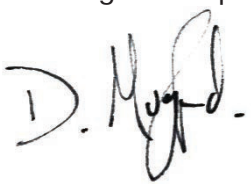
5.6. New Tree Plantings

5.6.1. It is recommended that all new tree planting commence once all other construction works have been completed or at the discretion of the acting Landscape Architect based on project specific requirements.

5.6.2. Replacement trees are recommended to be 60mm minimum in caliper. Nursery materials are to be removed from the tree including the entire wire basket(s), rope/ twine and burlap.

5.6.3. Root zones should be watered to maintain a moisture regimen suitable to the planted tree species. This will promote the successful establishment of these trees. At a minimum, during the summer months (July and August), watering should be twice per week.

Queries for additional information related to this Arborist Report can be directed to the undersigned via phone or email.



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Enclosed

Arborist Report	22 pages
Appendix 1: Assumptions & Limiting Conditions	1 page
Appendix 2: Image Gallery	8 pages
Appendix 3: AR-1 Tree Preservation Plan	1 page

APPENDIX A

Assumptions and Limiting Conditions

(1 page)

ASSUMPTIONS & LIMITING CONDITIONS

1. Trees were assessed using ISA Class 2 Visual Inspection from ground level only. As a result, internal rot or other hidden hazards may exist that are not reported here. There is no warranty or guarantee, expressed or implied by Geometric Studio Inc. ('the consultant') that the tree(s) inventoried here or any of its parts will remain in standing or in stable condition under any or all circumstances. Trees should be re-assessed periodically to determine the level of risk for failure; inevitably a tree will always pose some level of risk.

2. Any legal description provided to the consultant is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matter as legal in character. Any and all property is appraised or evaluated though free and clear, under responsible ownership and competent management.

3. Loss or alteration of any part of this report invalidates the entire report.

4. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person/ agent to whom it is addressed, without prior expressed written or verbal consent of the consultant.

5. Neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without prior expressed written consent of the consultant, particularly as to the value conclusions, identity of the consultant, or any reference to any professional society or institute or to any initialed designation conferred up the consultant as sates in his/her qualifications.

6. This report and values expressed herein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated results, the occurrence of a subsequent event, nor upon any finding to be reported.

7. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineered or surveyed.

8. The consultant does not guarantee or warranty that the recommendations made in this report will categorically result in the tree(s) being made safe or healthy. It is understood that trees are living organisms and as such subject to forces and influences out of the control of the consultant. Recommendations are made in this report based on what can be reasonably identified at the time of inventory.

APPENDIX B

Image Gallery

(7 pages)



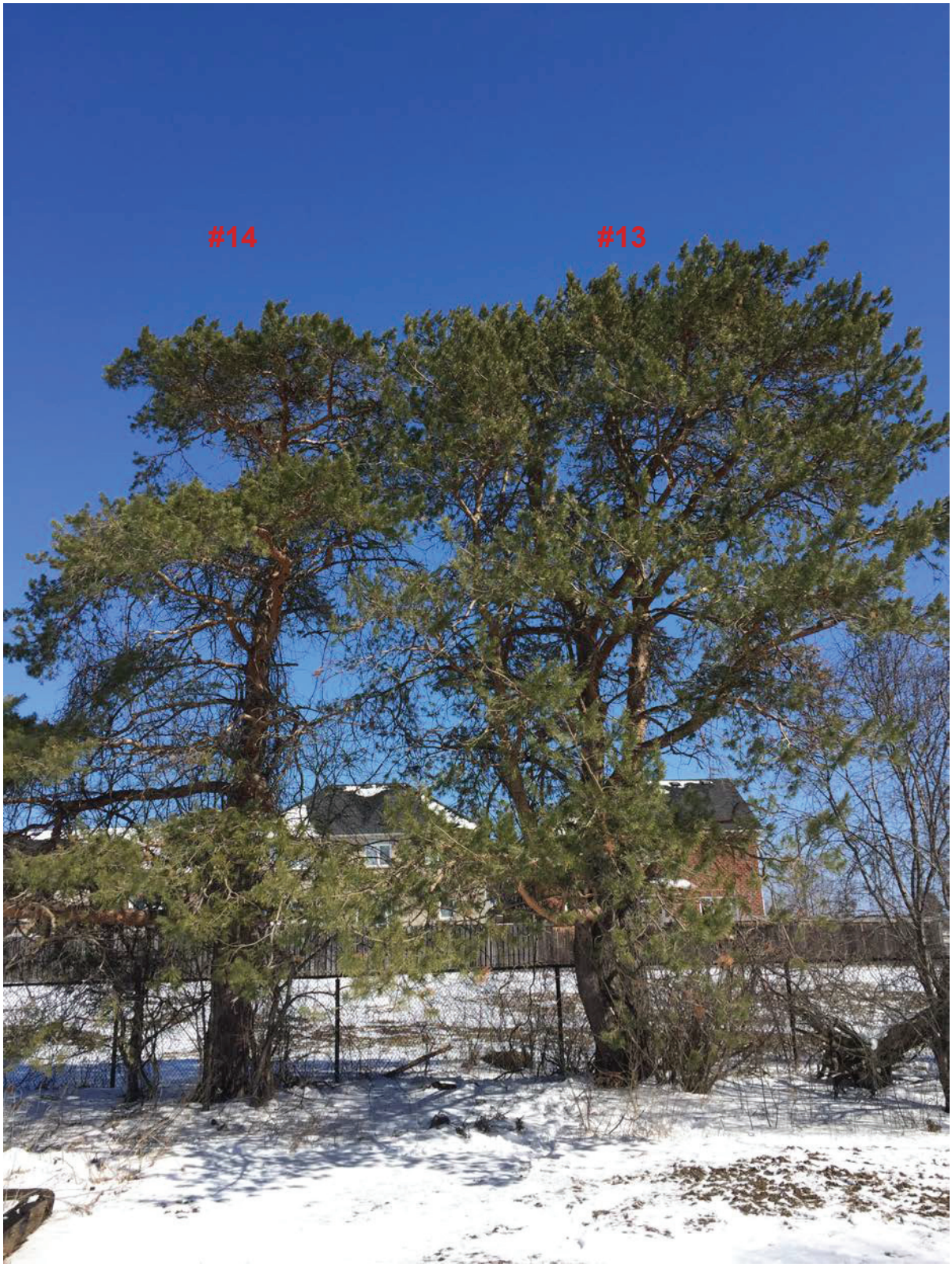
Tree(s) #1, 2, 22



Tree(s) #10-14



Tree(s) #25, 27-32



Tree(s) #13, 14



Tree(s) #19, 20, 24



Tree(s) #20, 21



Tree(s) #26



Tree(s) #34, 35



Tree(s) #104, 115, 116, 117