Arborist Report

Pre-Construction Assessment

Prepared For:

Niagara-on-the-Lake Museum
c/o Alexander Topps
25 & 43 Castlereagh St,
Niagara-on-the Lake, ON
L0S 1J0

Site Address:

43 Castlereagh St,
Niagara-on-the Lake, ON
L0S 1J0

March 26, 2026

Prepared By:
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Summary

The following Arborist Report is with respect to the planned construction of a 2-storey addition and associated servicing at the Niagara-on-the-Lake Museum at 25 & 43 Castlereagh St in Niagara-on-the-Lake, ON. Nearby trees are inventoried on private property at 25 & 43 Castlereagh St, on neighbour owned properties, and in Town of Niagara-on-the-Lake (NOTL) boulevards.

21 trees shall be preserved and shall not be injured.

- Tree Protection Fencing shall be installed in the locations shown in the Tree Preservation Plan (Appendix 2) and shall be built as 4-ft high orange plastic web snow fencing on a 2x4 wood frame or equivalent as approved by the Town (Appendix 3).
- No excavation or material/equipment storage shall occur within the TPZs of trees to be preserved.

11 trees have construction proposed within their TPZs and will likely be injured.

- **Trees #1, 5, 9, 15, 20, 22, 23, 24, 27, 29, and 33** have the excavation proposed within their TPZs. To mitigate the tree injuries, a Certified Arborist shall supervise low-impact excavation (hydro-vac, air-spade, or hand-digging) within their TPZs and shall prune roots where necessary. The trees are expected to survive the proposed work and maintain their current conditions following root pruning by the Arborist.
- **A tree injury permit is required for Trees #1, 5, 9, 15, 20, 22, 23, 27, 29, and 33**

5 trees are proposed for removal.

- **Trees #8, 10, 30, 31, and 34** are proposed for removal to accommodate proposed construction.
- **A tree removal permit is required for Trees #8, 30, 31, and 34.**

See Tree Inventory Table (Appendix 1) and Tree Preservation Plan (Appendix 2) for a full description of proposed construction, tree injuries, removals, injury mitigation, and protection.

11 replacement trees are expected to be requested by the Town to compensate for tree removals. Replacement tree species and locations shall be provided in a separate Landscape Plan. Accepted replacement tree species are noted in the Discussion section of this report.

It is imperative for all crew contracted to perform this construction to thoroughly understand this report and the recommendations stated within.

Introduction

Davey Resource Group (DRG) was retained by the client, Niagara-on-the-Lake Museum c/o Alexander Topps, to develop an Arborist Report and Tree Protection Plan (TPP) for the planned construction of a 2-storey addition, patio/walkway, and new drainage/water pipes at the Niagara-on-the-Lake Museum at 43 Castlereagh St in Niagara-on-the-Lake, ON.

An inventory and assessment of all the trees within the scope of the assignment was conducted. The Arborist was to document the current condition, size, and location of the trees as they relate to the proposed work. All trees within the scope of the survey were included in an inventory and assessed for protection or removal needs. Small shrubs were not surveyed for this report.

Recommendations for tree preservation or removal are to be provided.

This report must be accompanied by the following additional documents:

1. A full printing of the tree inventory performed by Davey Resource Group (DRG), otherwise known as the Tree Protection Action Key (TPAK). (Appendix 1)
2. The construction maps with the Arborist Comments, otherwise known as the Tree Protection Plan (TPP). (Appendix 2)

Limitations of the Assignment

It must be understood that DRG is the assessor of the trees in relation to tree preservation practices. The construction supervisors should incorporate the information and recommendations provided within this report into their construction methodology to complete their project in a reasonable manner.

This Arborist Report is based on the project scope and details for tree preservation as discussed. All proposed construction methods are limited to what was provided in the site plans and in discussions with the Project Leader. Estimates, measurements and comments regarding tree preservation were based on the proposed construction plans and field observations.

This Arborist Report was compiled from field data collected from the ground. A basic visual assessment of the tree was performed. No level of ISA Tree Risk Assessment was performed. More data on risk may be obtained through a basic or advanced ISA Tree Risk Assessment.

Methods

- Tools used to assess the trees included a metric DBH measuring tape, metric measuring tape, and camera.
- All trees on the property at 25 & 43 Castlereagh St. and within 6 meters of planned construction work were included in the inventory.
- Trees were studied for their proximity to existing and planned structures to determine recommendations or precautions for trees requiring removal or injury.

Observations

- The site was inspected on March 11, 2020, and again on August 6, 2021 by ISA Certified Arborist Jordan Barker (ON-2488A), as well as October 28, 2025 by ISA Certified Arborist Kait Simpson (ON-2642A).
- During the assessment, no evidence of construction was present, and work had not yet started.
- **39** trees were assessed for this report and labeled #1-#39 in the Tree Inventory Table and Tree Preservation Plan included within Appendices 1-2. No injuries to any trees, nor any material storage or soil compaction within Tree Protection Zones was noted during the assessment.

Discussion

To preserve and protect trees, proper recommendations must be followed and abided by the client for the duration of the project.

Regulatory context

The Town of Niagara-on-the-Lake By-law No. 5139-19 states that Property owners must apply for a Tree Removal Permit to Injure or Remove any tree measuring 12.5 cm or larger in diameter. Trees do not require a permit if they are a "Weed Tree" like Manitoba Maple or Norway Maple, or if the tree is infected by a lethal insect like emerald ash borer.

The Niagara Region Tree and Forest Conservation By-law No. 30-2008 protects trees in woodlands in the regional municipality of Niagara. As the trees assessed in this report are not part of a woodland, the bylaw does not apply.

Tree Protection Zones

Tree Protection Zones surrounding each tree are defined by the Critical Root Zone (DBH × 12) as per industry standards. Tree Protection Zones and must be kept free of all construction activity above and below ground. If work is proposed within 6 meters of a tree but not within its TPZ, it is in the best interest of the client to protect it using a Tree Protection Fence built to city standards (depicted in Appendix 3). This serves to prevent any incidental contact or harm to a protected tree that would constitute a contravention of a by-law and may result in fines or a stop-work order.

Tree Protection Hoarding (Appendix 3)

It is in the best interest of the client to take every precaution possible to minimize damage to trees where work is taking place, and to avoid any unnecessary injury to trees outside of work areas. On this construction site, hoarding (Tree Protection Fencing (TPF)) is recommended to protect all trees from soil compaction and root cutting. The distance from trees that hoarding is installed is typically defined by the dripline pursuant to a city by-law. However, it must be understood that sometimes this distance is not achievable due to infrastructure being too close. In most situations, hoarding does not need to be installed beyond the closest extent of impermeable and/or paved surfaces. It must be further understood the hoarding distance sometimes must accommodate a larger TPZ (than the typical MTPZ distance) due to a limited root growing area/volume (this area is typically defined by the project arborist).

On most landscapes within a private property, solid plywood hoarding best serves to protect tree trunks from inadvertent damage. However, along city streets and at driveway entrances, it is recommended that high-visibility snow fence be affixed to a wooden beam frame, which allows for proper tree protection while allowing vehicle and pedestrian traffic to maintain visibility through the tree protection zone.

Hoarding locations will be indicated on the Tree Protection Plan (Appendix 2) which has been included in this report but will be printed to-scale for use on-site and in permit applications. Within the scope of this project, hoarding is recommended to be established around all trees at variable distances indicated on the tree protection plan. These distances may be achieved across softscapes and hardscapes surrounding all trees, protecting their Tree Protection Zones.

Problems will arise for tree preservation efforts when anyone removes the hoarding, even temporarily. It takes one instance of soil compaction from a heavy machine for roots to suffer from air and water deprivation and for the tree to become stressed. It is imperative to install and maintain in good condition the hoarding to prevent this from happening by utilizing horizontal hoarding whenever necessary.

Root Pruning

Similar to pruning the upper canopy of the tree, roots are best removed (if needed) via target pruning practices and not by being torn off. Using mechanical tools or excavation equipment to remove or prune roots often leaves ragged edges, stripped bark, or splintered tissue. These surfaces are difficult for a tree to heal over and provide a high surface area for potential decay pathogens (bacteria, fungus, insects), to enter a tree. Minimizing the cross section of pruned roots allows for the most efficient recovery for the tree. Roots that are larger in diameter than 20% of its parent trunk's DBH are structurally integral to a tree and must be pruned with discretion. Root pruning is recommended to be carried out by a licensed professional, such as an ISA Certified Arborist.

Tree Protection Signage

It is recommended for the client to affix Tree Protection Signs to tree protection hoarding. The signage should remain in place and in good repair throughout construction. An example standard sign format is displayed in Appendix 4 within this report.

Staging Areas

All staging areas are understood to be outside the TPZ. At no time are materials, vehicles, traffic or debris to be stacked, staged, or piled inside the hoarding (Tree Protection Fencing).

Replacement Tree Species

The Town accepts replacement tree species selected from the below List of Preferred Trees for Replanting

List of Preferred Trees for Replanting

Alternate-Leaf Dogwood	Largetooth Aspen
American Beech	Northern Hackberry
American Chestnut	Pawpaw
American Elm	Peachleaf Willow
American Mountain-Ash	Pin Cherry
Balsam Poplar	Pin Oak
Basswood	Red Maple
Bitternut Hickory	Red Mulberry
Black Ash	Red Oak
Black Cherry	Sassafras
Black Oak	Serviceberries
Black Walnut	Shagbark Hickory
Black Willow	Silver Maple
Blue-Beech	Sugar Maple
Bur Oak	Swamp White Oak
Butternut	Sycamore
Cherry Birch	Tamarack
Chokecherry	Trembling Aspen
Eastern Hemlock	Tulip Tree
Eastern Redcedar	White Ash
Eastern White Cedar	White Birch
Eastern White Pine	White Oak
Green/Red Ash	Yellow Birch
Hawthorn	
Ironwood	

Conclusion

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- Tree Protection Fencing shall be installed in the locations shown in the Tree Preservation Plan (Appendix 2) and shall be built as 4-ft high orange plastic web snow fencing on a 2x4 wood frame or equivalent as approved by the Town (Appendix 3).
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11 trees have construction proposed within their TPZs and will likely be injured.

- **Trees #1, 5, 9, 15, 20, 22, 23, 24, 27, 29, and 33** have the excavation proposed within their TPZs. To mitigate the tree injuries, a Certified Arborist shall supervise low-impact excavation (hydro-vac, air-spade, or hand-digging) within their TPZs and shall prune roots where necessary. The trees are expected to survive the proposed work and maintain their current conditions following root pruning by the Arborist.
- **A tree injury permit is required for Trees #1, 5, 9, 15, 20, 22, 23, 27, 29, and 33**

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See Tree Inventory Table (Appendix 1) and Tree Preservation Plan (Appendix 2) for a full description of proposed construction, tree injuries, removals, injury mitigation, and protection.

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Appendix 1 – Tree Inventory Table

Tree Map Number	Species	Botanical	DBH (cm) @ 1.4 m	Tree Ownership	Minimum Tree Protection Distance (m) (MTPZ)	Health	Structure	Overall Condition	Tree Height (m)	Crown Width (m)	Live Crown Ratio (%)	Deadwood (%)	Construction Inside MTPZ? (Y/N)	Construction Impact (None, Low, Medium, High)	Action	Regulated Tree? (Y/N)	Permit Required? (Y/N) Y for trees >12.5cm DBH to be removed or injured	Number of Replacement Trees Required	Notes and Observations	Recommendations	Address
1	Sugar Maple	*Acer saccharum*	80	City	4.8	Good	Fair	Good	15	8	90	10	Y	Low	Injure	Y	Y		Trenching within TPZ for watermain	Low-impact root excavation (hydro-vac or air-spade) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	
2	London Plane Tree	*Platanus x. acerifolia*	70	City	4.2	Good	Good	Good	16	10	80	10	N	None	Preserve	Y	N				
3	London Plane Tree	*Platanus x. acerifolia*	58	City	3.6	Good	Good	Good	16	10	80	<5	N	None	Preserve	Y	N				
4	Norway Maple	*Acer platanoides*	33	City	2.4	Good	Fair	Good	9	5	65	20	N	None	Preserve	Y	N				
5	Basswood	*Tilia americana*	67	City	4.2	Good	Good	Good	18	9	60	15	Y	Low	Injure	Y	Y		Excavation in TPZ for Underground Storm Water Tank	Low-impact root excavation (hydro-vac or air-spade) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	
6	Colorado Blue Spruce	*Picea pungens*	12	Private	2.4	Good	Good	Good	7	4	90	10	N	None	Preserve	N	N				43 Castlereagh St
7	Hedge Maple	*Acer campestre*	9	Private	1.8	Good	Good	Good	4	3	70	0	N	None	Preserve	N	N				43 Castlereagh St
8	Hedge Maple	*Acer campestre*	22	Private	2.4	Poor	Poor	Poor	6	4	75	15	Y	High	Remove	Y	Y	2	TBD possible removal due to excavation to remove/relocate existing sanitary connection to the High School building	Remove tree to accommodate excavation	43 Castlereagh St
9	Black Locust	*Robinia pseudoacacia*	84	Private	4.8	Good	Good	Good	21	10	75	10	Y	Low	Injure	Y	Y		Excavation within TPZ for storm sewer	Low-impact root excavation (hydro-vac or air-spade) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	43 Castlereagh St
10	Venus Flowering Dogwood	*Cornus x 'Venus'*	2	Private	1.8	Good	Good	Good	3	1	80	0	Y	High	Remove	N	N		Located within the footprint of the Underground Storm Water Tank	Remove tree to accommodate excavation	43 Castlereagh St
11	Viburnum species	*Viburnum sp.*	4	Private	1.8	Good	Good	Good	3	2	80	0	N	None	Preserve	N	N				43 Castlereagh St
12	Magnolia species	*Magnolia species*	4	Private	1.8	Good	Good	Good	4	2	95	0	N	None	Preserve	N	N				43 Castlereagh St

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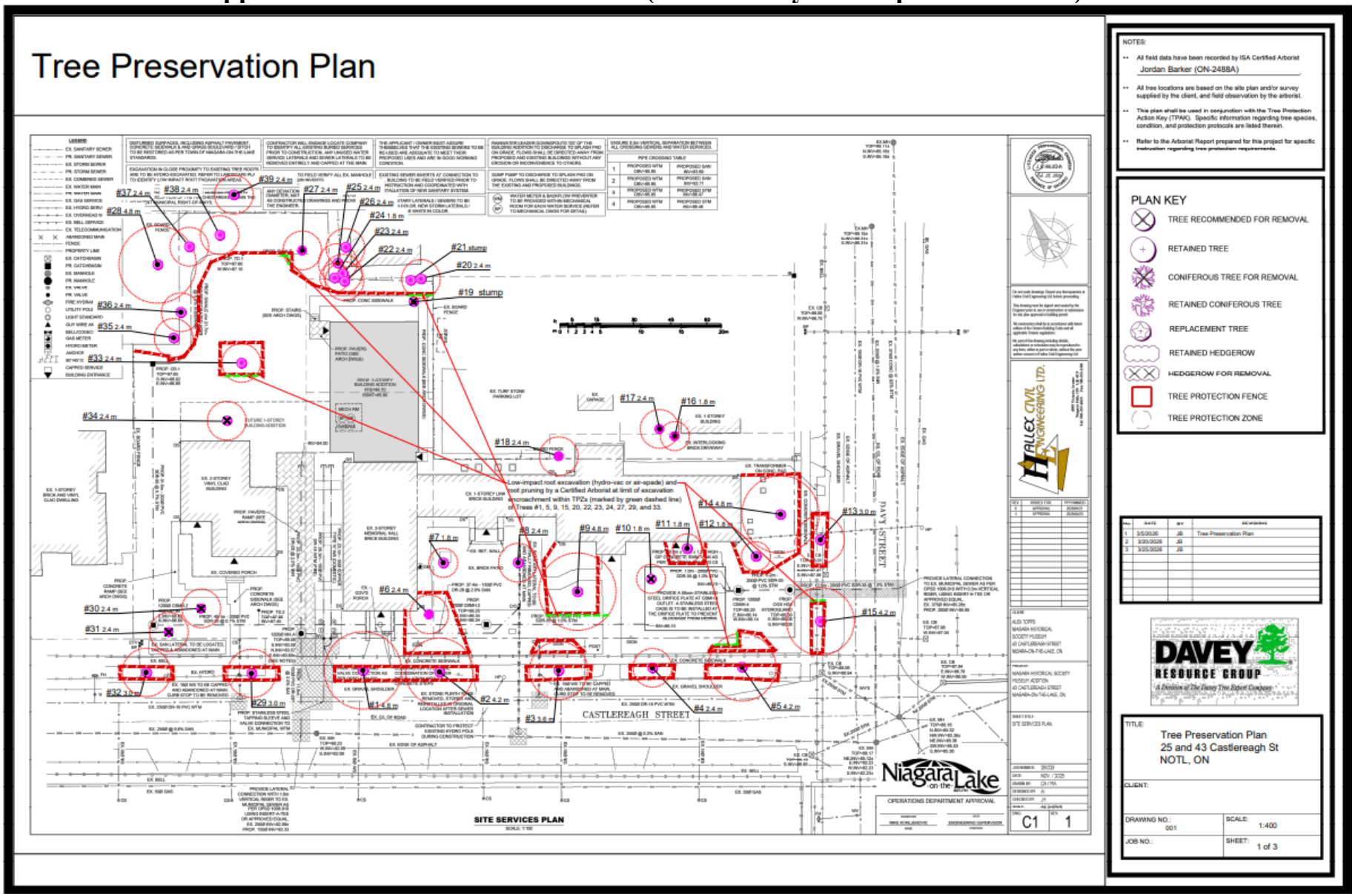
13	Norway Maple	*Acer platanoides*	42	City	3.0	Good	Good	Good	12	7	90	10	N	None	Preserve	Y	N				
14	Silver Maple	*Acer saccharinum*	75	Private	4.8	Fair	Fair	Good	20	9	60	15	N	None	Preserve	Y	N				43 Castlereagh St
15	Norway Maple	*Acer platanoides*	65	City	4.2	Good	Good	Good	17	9	80	1	Y	Low	Injure	Y	Y		Excavation within TPZ for storm sewer	Low-impact root excavation (hydro-vac or air-spade) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	
16	Eastern White Cedar	*Thuja occidentalis*	5	Neighbour	1.8	Good	Good	Good	3	3	95	5	N	None	Preserve	N	N				287 Davy St
17	Eastern White Cedar	*Thuja occidentalis*	23	Neighbour	2.4	Good	Good	Good	9	4	95	<5	N	None	Preserve	Y	N		Estimated DBH		287 Davy St
18	False Cypress species	*Chamaecyparis sp.*	19	Neighbour	2.4	Good	Good	Good	9	3	85	5	N	None	Preserve	Y	N				287 Davy St
19	Manitoba Maple	*Acer negundo*		Private				Stump								N			Stump	Grind stump	43 Castlereagh St
20	White Ash	*Fraxinus americana*	24	Boundary	2.4	Poor	Poor	Poor	16	3	30	50	Y	Low	Injure	Y	Y		Phase One foundation excavation within TPZ	Low-impact root excavation (hydro-vac or air-spade) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	43 Castlereagh St, 279 Davy St
21	Manitoba Maple	*Acer negundo*		Boundary				Stump								N			Stump	Grind stump	43 Castlereagh St, 279 Davy St
22	Norway Maple	*Acer platanoides*	15	Boundary	2.4	Good	Good	Good	8	3	30	5	Y	High	Injure	Y	Y		Phase One foundation excavation within TPZ	Low-impact root excavation (air-spade, hydro-vac, or hand-digging) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	43 Castlereagh St, 279 Davy St
23	Manitoba Maple	*Acer negundo*	36	Neighbour	2.4	Good	Fair	Good	10	7	70	5	Y	Medium	Injure	Y	Y		Phase One foundation excavation within TPZ	Low-impact root excavation (air-spade, hydro-vac, or hand-digging) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	279 Davy St
24	Norway Maple	*Acer platanoides*	7	Boundary	1.8	Good	Good	Good	6	1	75	5	Y	High	Injure	N	N		Phase One foundation excavation within TPZ	Low-impact root excavation (air-spade, hydro-vac, or hand-digging) and root pruning by a Certified Arborist at limit of excavation encroachment	43 Castlereagh St, 279 Davy St

Tree Map Number	Species	Botanical	DBH (cm) @ 1.4 m	Tree Ownership	Minimum Tree Protection Distance (m) (MTPZ)	Health	Structure	Overall Condition	Tree Height (m)	Crown Width (m)	Live Crown Ratio (%)	Deadwood (%)	Construction Inside MTPZ? (Y/N)	Construction Impact (None, Low, Medium, High)	Action	Regulated Tree? (Y/N)	Permit Required? (Y/N) Y for trees >12.5cm DBH to be removed or injured	Number of Replacement Trees Required	Notes and Observations	Recommendations	Address
																				within TPZ.	
25	Manitoba Maple	*Acer negundo*	14	Neighbour	2.4	Good	Good	Good	9	4	50	10	N	None	Preserve	Y	N				279 Davy St
26	White Ash	*Fraxinus americana*	13	Neighbour	2.4	Poor	Poor	Poor	10	3	30	60	N	None	Preserve	Y	N		Emerald ash borer present (invasive insect)		279 Davy St
27	Colorado Blue Spruce	*Picea pungens*	14	Private	2.4	Good	Good	Good	5	5	90	5	Y	Low	Injure	Y	Y		Shallow excavation for French Drain	Low-impact root excavation (hydro-vac or air-spade) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	25 Castlereagh St
28	Black Walnut	*Juglans nigra*	65	Neighbour	4.8	Good	Good	Good	14	10	40	15	N	None	Preserve	Y	N				280 King St
29	Norway Maple	*Acer platanoides*	41	City	3.0	Good	Fair	Good	9	6	50	15	Y	Low	Injure	Y	Y		Localized excavation to terminate domestic water service to 25 Castlereagh St.	Low-impact root excavation (hydro-vac or air-spade) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	
30	Colorado Blue Spruce	*Picea pungens*	36	Private	2.4	Good	Good	Good	9	6	65	10	Y	High	Remove	Y	Y	4	Excavation within TPZ for storm sewer	Remove tree to accommodate storm sewer construction	25 Castlereagh St
31	Colorado Blue Spruce	*Picea pungens*	34	Private	2.4	Fair	Good	Good	8	6	60	10	Y	High	Remove	Y	Y	3	Excavation within TPZ for storm sewer	Remove tree to accommodate storm sewer construction	25 Castlereagh St
32	Ginkgo	*Gingko biloba*	44	City	3.0	Good	Good	Good	10	6	45	<5	N	None	Preserve	Y	N				
33	Cherry	*Prunus spp.*	19	Private	2.4	Good	Fair	Good	6	6	45	10	Y	Low	Injure	Y	Y		Phase Two foundation excavation within TPZ	Low-impact root excavation (hydro-vac or air-spade) and root pruning by a Certified Arborist at limit of excavation encroachment within TPZ.	25 Castlereagh St
34	Eastern Redbud	*Cercis canadensis*	22	Private	2.4	Good	Good	Good	10	7	60	10	Y	High	Remove	Y	Y	2	Located within the footprint of future Phase 2 foundation3	Remove tree to accommodate addition construction.	25 Castlereagh St
35	European Beech	*Fagus sylvatica*	15	Neighbour	2.4	Good	Good	Good	9	6	50	10	N	None	Preserve	Y	N				280 King St
36	Tulip Tree	*Liriodendron tulipifera*	30	Boundary	2.4	Good	Good	Good	11	7	45	10	N	None	Preserve	Y	N				280 King St
37	Manitoba Maple	*Acer negundo*	14	Private	2.4	Fair	Fair	Fair	7	6	60	10	N	None	Preserve	Y	N				25 Castlereagh St

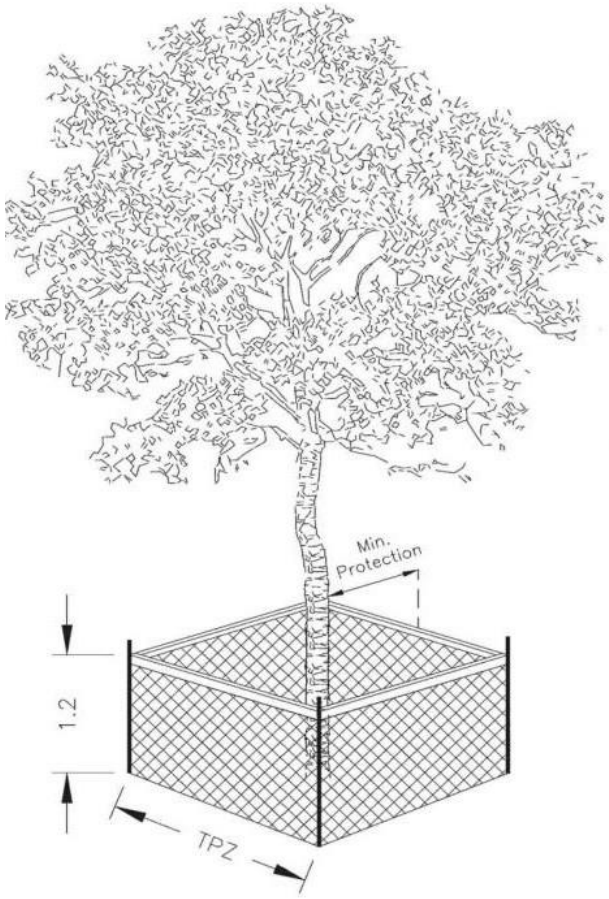
Tree Map Number	Species	Botanical	DBH (cm) @ 1.4 m	Tree Ownership	Minimum Tree Protection Distance (m) (MTPZ)	Health	Structure	Overall Condition	Tree Height (m)	Crown Width (m)	Live Crown Ratio (%)	Deadwood (%)	Construction Inside MTPZ? (Y/N)	Construction Impact (None, Low, Medium, High)	Action	Regulated Tree? (Y/N)	Permit Required? (Y/N) Y for trees >12.5cm DBH to be removed or injured	Number of Replacement Trees Required	Notes and Observations	Recommendations	Address
38	Silver Maple	*acer saccharinum*	30	Private	2.4	Fair	Fair	Fair	10	6	50	10	N	None	Preserve	Y	N				25 Castlereagh St
39	Basswood	*Tilia americana*	17	Neighbour	2.4	Good	Good	Good	9	6	45	10	N	None	Preserve	Y	N				272 King St
																	Total Number of Replacement Trees Required:	**11**			

Appendix 2 – Tree Preservation Plan (Preview only – to be printed to scale)



Appendix 3 – Tree Protection Fence Detail

Tree Protection and Preservation



Detail TP-1 – Tree Protection Detail.

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

NOTES:

[1] The roots of a tree can extend from the trunk to approximately 2-3 times the distance of the dripline.

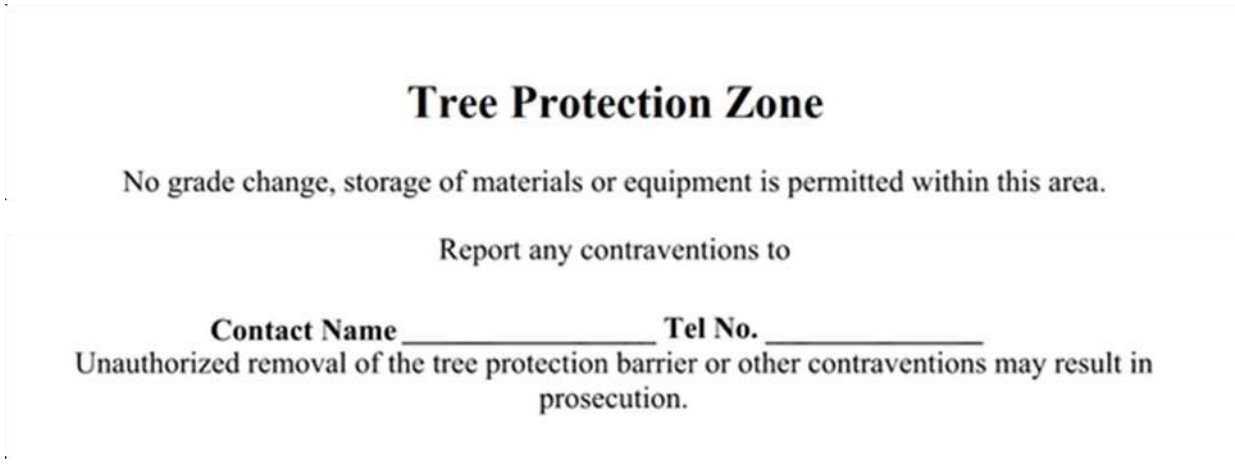
[2] Diameter at breast height (DBH) is the measurement of tree trunk taken at 1.4 meters above ground.

[3] MTPZ and CRZ distances are to be measured from the outside edge of the tree base towards the drip line and may be limited by an existing paved surface, provided the existing paved surface remains intact throughout the construction work and is subject to Section 6 of this Standard.

TREE PROTECTION BARRIER

1. The required barrier is a 1.2 metre (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.
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 Town's Director of Operations or designate.
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.
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. No materials or fill may be stored within the MTPZ.
6. Equipment or vehicles shall not be operated, parked, repaired, or refueled within the MTPZ.
7. No construction activity, grade changes, surface treatment or excavations of any kind is permitted within the MTPZ without written authorization from the Town's Director of Operations or designate.

Appendix 4 – Tree Protection Zone Sign Detail Example



Appendix 5 – References

1. ISA, 2001-2011. Best Management Practices, Books 1-9, Companion publications to ANSI A300 Standards for Tree Care
2. Dujesiefken, Dr. Dirk, 2012. Director of the Institute for Tree Care in Germany, The CODIT Principle, research presented on cambial regrowth on trees after injury at the Annual ISA Conference in Kingston Ontario
3. Sinclair and Lyon, 2005. Diseases of Trees and Shrubs, Second Edition
4. ISA, 2010. Glossary of Arboricultural Terms
5. Neely and Watson, ISA, 1994 and 1998. The Landscape Below Ground 1 and 2
6. Matheny and Clark, ISA, 1994. A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, 2nd Edition
7. Matheny and Clark, ISA 1998. Trees and Development, A Technical Guide to Preservation of Tree During Land Development
8. PNW-ISA, 2011. Tree Risk Assessment in Rural Areas and Urban/Rural Interface, Version 1-5
9. Todd Hurt & Bob Westerfield, 2005.Tree Protection During Construction and Landscaping Activities

Appendix 6 – Glossary of Common Arboricultural Terms

Arborist	A professional who possesses the technical competence gained through experience and related training to provide for or supervise the management of trees and other woody plants in residential, commercial, and public landscapes.
ANSI A300	Acronym for American National Standards Institute. In the United States, industry-developed, national consensus standards of practice for tree care.
Bark Tracing	Cutting away torn or injured bark to leave a smooth edge.
Branch Bark Ridge	Raised strip of bark at the top of a branch union, where the growth and expansion of the trunk or parent stem and adjoining branch push the bark into a ridge.
Callus wood	Undifferentiated tissue formed by the cambium, usually as the result of wounding.
Clinometer	A device used to calculate the height of trees.
Consulting Arborist	An Arboricultural consultant is one of the following: ● American Society of Consulting Arborists, Registered Consulting Arborist (ASCA RCA#___) ● International Society of Arboriculture, Board Certified Master Arborist (ISA BCMA #_____B) ● ISA Certified Arborist/Municipal Specialist in good standing for a minimum of 6 years with 6 years of proven experience in a management role related to arboriculture, and has attested and signed to a code of ethics related to arboriculture (ISA#_____)
Compartmentalization	Natural defense process in trees by which chemical and physical boundaries are created that act to limit the spread of disease and decay organisms
Critical Root Zone – (CRZ)	Area of soil around a tree where the minimum amounts of roots considered critical to the structural stability or health of the tree are located. CRZ determination is sometimes based on the drip line or a multiple of dbh (12:1, 12cm of ground distance from the trunk for every cm of dbh) but because root growth is often asymmetric due to site conditions, on-site investigation is preferred.
Daylighting	Also known as Hydro-vac, this is the process by which soil is vacuumed up. In the context of tree care this allows workers to access the soil below the roots without mortal damage to significant roots.
DBH	Acronym for tree diameter at breast height. Measured at 1.4m above ground.
Decurrent	Rounded or spreading growth habit of the tree crown.
Directional Pruning	Providing clearance by pruning branches that could significantly affect the integrity of utility facilities or other structures, and leaving in place branches that could have little or no effect.
Dripline	Imaginary line defined by the branch spread of a single parent or group of plants

Excurrent	Tree growth habit characterized by a central leader and a pyramidal crown.
Included bark	Bark that becomes embedded in a crotch (union) between branch and trunk or between codominant stems. Causes a weak structure.
Lion's Tailing	Poor pruning practice in which an excessive number of branches are thinned from the inside and lower part of specific limbs or a tree crown, leaving mostly terminal foliage. Results in poor branch taper, poor wind load distribution, and higher risk of branch failure.
MTPZ	Acronym for Minimum Tree Protection Zone, also known as the Structural Root Zone (SRZ), which is the distance from the tree equal to 6 times the dbh, within which the likelihood of encountering roots that are structural supports for the tree.
Moment	Rotational force that is created by any line force on a body. The magnitude of a moment is defined as the product of the force magnitude and perpendicular distance from the line of action of the force to the axis of which the moment is being calculated.
Mortality Spiral	A sequence of stressful events or conditions causing the decline and eventual death of a tree.
Mulch	Material that is spread of sometimes sprayed on the soil surface to reduce weed growth, to retain soil moisture and moderate temperature extremes, to reduce compaction from pedestrian traffic or to prevent damage from lawn-maintenance equipment, to reduce erosion or soil spattering onto adjacent surfaces, to improve soil quality through its eventual decomposition, and/or to improve aesthetic appearance of the landscape. Mulch can be composed of chipped, ground, or shredded organic material such as bark, wood, or recycled paper; unmodified organic material such as seed hulls; organic fiber blankets or mats; or inorganic material such as plastic sheeting.
Organic Matter	Material derived from the growth (and death) of living organisms. The organic components of the soil.
CRZ	Acronym for Critical Root Zone, also known as the Critical Root Zone (see definition above), within which there is a high likelihood of encountering roots that are necessary for the survival for the tree.
Project Arborist	The consulting arborist retained to provide all tree preservation recommendations to the project manager or contractors on a given construction project.
Qualified Arborist	An arborist who has documented related training (i.e. ISA, MTCU, or equivalent) and on-the-job experience (minimum of 5 years)
Radial trenching	Technique for aerating the soil or alleviating compaction around a tree by removing and replacing soil (which may be amended) in trenches (typically 300mm deep and 150mm wide) made in a spoke like pattern (radially from the trunk) in the root zone to

	improve conditions for root growth.
Reaction Wood	Wood formed in leaning or crooked stems or on lower or upper sides of branches as a means of counteracting the effects of gravity.
Removal Cut	A cut that removes a branch at its point of origin. Collar cut.
Reduction Cut	A pruning cut that reduces the length of a branch or stem back to a lateral branch large enough to assume apical dominance.
Resistograph®	A brand name of a device consisting of a specialized micro-drill bit that drills into trees and graphs density differences that are used to detect decay.
Soft-Scaped	Landscaping practices that do not involved solid or deeply-dug foundations. Patios consisting of slab rocks laid on-top of the soil with minimal excavation and base (less than 10cm) and causing minimal damage to existing tree roots.
Static Support System	Cabling system that utilizes rigid materials such as rods and steel cables to limit movement and provide constant support of limbs.
Structural cells	Modular system consisting of units of soil and integrated support structures that serve both as a foundation for paved surfaces and a hospitable environment for tree root growth,
Structural pruning	Pruning to establish a strong arrangement or system of scaffold branches.
Structural Soil™	Pavement substrate that can be compacted to meet engineering specifications yet remains penetrable be tree roots in the urban environment. Composed of angular crushed stone, clay loam, and hydrogel mixed in a weight ratio of 100:20:0.03. Developed at the Urban Horticulture Institute, Cornell University, Ithaca, NY.
Supersonic Air Excavation Techniques (SSAT)	A methodology using a device that directs a jet of highly compressed air to excavate soil. Used within the root zone of trees to avoid or minimizing damage to the roots, or near underground structures such as pipes and wires to avoid or minimize damage to them.
Tree Protection Zone (TPZ)	Defined area within which certain activities are prohibited or restricted to prevent or minimize potential injury to designated trees, especially during construction. TPZ is sometimes based on a minimum multiple of dbh (e.g. 6:1, 6cm of ground distance from the trunk for 1cm of dbh)
Walls	Trees have 4 walls in a process known as compartmentalization. ● Wall 1 prevents decay moving up and down in a tree ● Wall 2 prevents decay moving inward in a tree ● Wall 3 prevents decay moving laterally in a tree ● Wall 4 is the new growth formed on the outside of the tree, callus growth.
Woundwood	Lignified, differentiated tissues produced on woody plants after wounding.

Appendix 7 – Arborist Qualifications

Jordan Barker is a Consulting Arborist with Davey Resource Group. His formal education includes a Bachelor of Science in Biology from Western University and a Master of Science in Biology with a focus in Forest Ecology from McMaster University. Mr. Barker has five years of varied work experience in the forestry, arboriculture, and ecological assessment fields. Mr. Barker has worked with DRG as an Inventory Arborist and Consulting Arborist.

Certifications
ISA Certified Arborist (ON-2488A)
ISA Tree Risk Assessment Qualification
Butternut Health Assessor (#663)

Appendix 8 – Photographs

Figure 1: Tree #1

Figure 2: Tree #2

Figure 3: Tree #3

Figure 4: Tree #4

Figure 5: Tree #5

Figure 6: Tree #6

Figure 7: Tree #7

Figure 8: Tree #8

Figure 9: Tree #9

Figure 10: Tree #10

Figure 11: Tree #11

Figure 12: Tree #12

Figure 13: Trees #13 (middle) and #14 (right)

Figure 14: Tree #15

Figure 15: Trees #16 (right) and #17 (left)

Figure 16: Tree #18

Figure 17: Trees #22-27 from right to left

Figure 18: Tres #19-21 (bottom left, from right to left).

Figure 19. Trees #30-32 from right to left.

Figure 20. Tree #29

Figure 21. Trees #38 (foreground) and #39 (background).

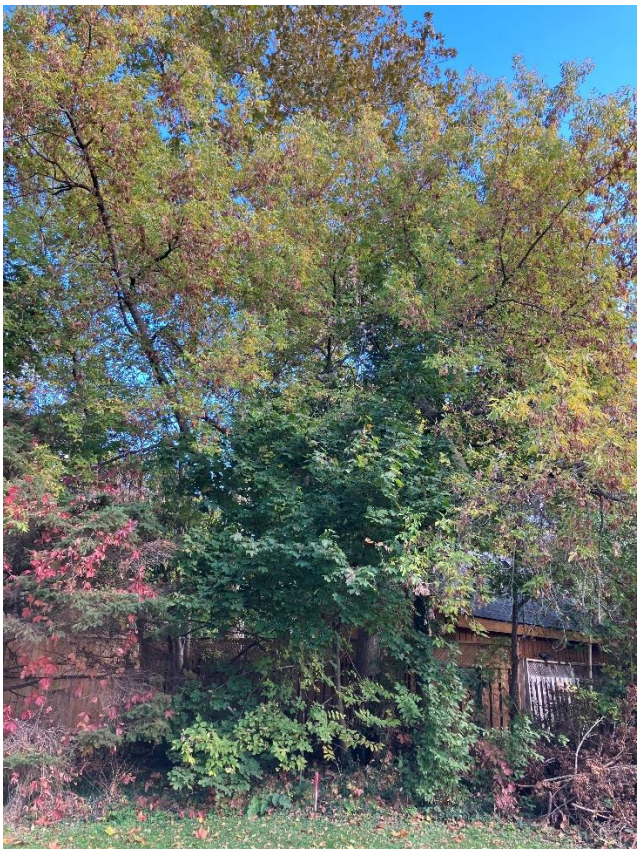


Figure 22. Trees #28, 35, 36, and 37.

Figure 22. Tree #33 and 34.

Conditions of Assessment Agreement

This Conditions of Assessment Agreement is made pursuant to and as a provision of Davey Resource Group, a division of The Davey Tree Expert Co. of Canada, Limited ("Davey"), providing tree assessment services as agreed to between the parties, the terms and substance of which are incorporated in and made a part of this Agreement (collectively the "Services").

Trees are living organisms that are subject to stress and conditions and which inherently impose some degree or level of risk. Unless a tree is removed, the risk cannot be eliminated entirely. Tree conditions may also change over time even if there is no external evidence or manifestation. In that Davey provides the Services at a point in time utilizing applicable standard industry practices, any conclusions and recommendations provided are relevant only to the facts and conditions at the time the Services are performed. Given that Davey cannot predict or otherwise determine subsequent developments, Davey will not be liable for any such developments, acts, or conditions that occur including, but not limited to, decay, deterioration, or damage from any cause, insect infestation, acts of god or nature or otherwise.

Unless otherwise stated in writing, assessments are performed visually from the ground on the above-ground portions of the tree(s). However, the outward appearance of trees may conceal defects. **Therefore, to the extent permitted by law, Davey does not make and expressly disclaims any warranties or representations of any kind, express or implied, with respect to completeness or accuracy of the information contained in the reports or findings resulting from the Services beyond that expressly contracted for by Davey in writing, including, but not limited to, performing diagnosis or identifying hazards or conditions not within the scope of the Services or not readily discoverable using the methods applied pursuant to applicable standard industry practices.** Further, Davey's liability for any claim, damage or loss caused by or related to the Services shall be limited to the work expressly contracted for.

In performing the Services, Davey may have reviewed publicly available or other third- party records or conducted interviews, and has assumed the genuineness of such documents and statements. Davey disclaims any liability for errors, omissions, or inaccuracies resulting from or contained in any information obtained from any third- party or publicly available source.

Except as agreed to between the parties prior to the Services being performed, the reports and recommendations resulting from the Services may not be used by any other party or for any other purpose. The undersigned also agrees, to the extent permitted by law, to protect, indemnify, defend and hold Davey harmless from and against any and all claims, demands, actions, rights and causes of action of every kind and nature, including actions for contribution or indemnity, that may hereafter at any time be asserted against Davey or another party, including, but not limited to, bodily injury or death or property damage arising in any manner from or in any way related to any disclaimers or limitations in this Agreement.

By accepting or using the Services, the customer will be deemed to have agreed to the terms of this Agreement, even if it is not signed.

Acknowledged by:

Name of Customer: _____

Authorized Signature: _____

Date: _____