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APPENDIX A

Arborist Report Pre-Construction Assessment dated November 14, 2019 as prepared by Davey Resource Group

19

END OF SECTION



Arborist Report

Pre-Construction Assessment

Prepared For:

Watson MacEwen Teramura Architects c/o Allan Teramura

Site Address:

114 Division Street Cobourg, ON K9A 0B3

November 14th, 2019

Prepared by:

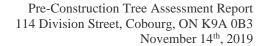
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Summary

The following Arborist Report is with respect to proposed demolition of 3 single-story buildings and construction of a new facility building at the Canadian Coast Guard Search and Rescue Station located at 114 Division Street in Cobourg, ON. The new facility will be built on a single foundation, which will be expanded somewhat from the footprints of the existing buildings. Recommendations for tree preservation, removal, and replanting are described within this report. Key information regarding the trees is listed below:

- 9 trees were assessed within and near the site of the proposed work
- No trees require removal to complete demolition and construction
- Tree Protection Fencing is recommended to enclose all trees assessed within this report
- Root protection surfaces (horizontal hoarding) is recommended to protect the roots of 2 large trees near the site of construction.

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, Allan Teramura of Watson MacEwen Teramura Architects to develop an Arborist Report and Tree Protection Plan (TPP) for the proposed demolition and construction of a new facility at the Cobourg Search and Rescue station for the Canadian Coast Guard.

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. To account for the spatial scope of work within the site, the location of the proposed demolition and construction as well as all trees within 6 meters of it, including any neighbouring lot areas within this scope were surveyed. All trees over 5cm within the scope of the survey were included in an inventory and assessed for protection or removal needs. Small ornamental trees and shrubs were not surveyed for this report.

Recommendations for tree preservation or removal are to be provided and follow City of Toronto by-laws (Municipal Code Chapter 813).

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.
- Photographs included in this report are labeled copies of their originals and may have been cropped for formatting.
- All trees over 5cm within 6 meters planned construction work as well as construction access points were collected and assessed for this report.
- Multi-stem trees were measured for their diameter using the sum-of-squares method, adding up each stem's squared diameter measurement, then taking the square root of that sum.
- 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 November 12th, 2019 by ISA Certified Arborist Joseph Steinfeld.
- Weather conditions were -8°C and mostly cloudy.
- 9 trees were assessed for this report and labeled #1-#9 in the inventory and Tree Protection 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.
- Trees were tagged with aluminum tags and numbers sequentially from #331-339 in accordance with the inventory numbers.
- Tree #1, a 52cm multi-stem White Birch (*Betula papyrifera*) in good condition is located at the south end of the site, at least 10m away from any construction activity. It may be fully protected during construction with no disturbance to its crown branches or root system.
- Tree #2, a 90cm Weeping Willow (*Salix bablyonica*) is located 6.8m from the corner of the existing house on the site which is to be removed with a new building established 8.5m away from it. It is in fair condition with multiple dead branches and hangers in its crown.
- Trees #3 and #4, 46cm and 56cm White Birch trees in good condition are located at the east side of the site, 2.6m away from an existing deck which is to be removed. New construction is planned 7m away from this tree. It may be fully protected during the work; however care must be taken when removing the deck.
- Tree #5, a 72cm White Birch in fair condition is located at the east side of the site, north of Trees #3 and #4. Due to its larger size and health defects, a greater area of roots must be protected with care during the work.
- Trees #6 and #7 consist of two semi-mature Freeman Maple trees (*Acer x freemanii*) located at the north end of the site. These trees are small enough to be fully protected during construction.
- Trees #8 and 9 consist of two semi-mature Black Walnut trees (*Juglans nigra*) located on either side of the driveway at the north end of the site. These trees were included in the inventory and are recommended for protection to avoid any unwarranted injury during movement of construction equipment and materials in and out of the site.



Discussion

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

Tree Protection

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. To accomplish this, hoarding (Tree Protection Fencing (TPF)) is to be used on this construction site. The distance from trees that hoarding is installed is typically defined by the extent of the Critical Root Zone (CRZ). The CRZ is a radial distance around each tree defined by the DBH of the tree multiplied by 12 (e.g. 50cm tree has a 6m radius CRZ). However, it must be understood that sometimes this distance is not achievable due to infrastructure or required construction activity being too close. In most situations, hoarding does not need to be installed beyond the closest extent of impermeable and/or paved surfaces and should be installed as close to construction activity as need be. It must be further understood the hoarding distance sometimes must accommodate a larger area (than the typical CRZ 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, steel chain-link fence may also be used, though it must be staked into the ground using fenceposts or anchoring devices attached to temporary chain-link fence.

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 completely surrounding all trees on site, attaching to existing fences to be retained where applicable. Removal of the existing deck must take place prior to demolition to allow for installation of the tree protection fencing.

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 throughout the entire construction

Root Protection

During construction, it is critical to protect soft surfaces below which roots of trees grow. Compaction by movement of construction equipment or vehicles compresses pockets of air and water within the soil that roots use for metabolism and transpiration. It is important to provide a protective surface above the roots of each tree when working inside their Critical Root Zones.

An adequate root protective surface consists of a woven geotextile fabric laid atop the existing soft surface, above which a thick layer (>30cm) of wood mulch can be laid, which is topped with two

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layers of plywood (at least ³/₄" thick) or a single layer of half-inch steel plate. These hard surfaces distribute the weight of heavy construction equipment throughout the mulch surface, which may be easily removed following completion of the work thanks to the barrier created by the geotextile.

It is recommended that root protection be utilized within the CRZ's of Trees #2 and #5, which extend further from their respective trees than all other trees on-site. These surfaces are recommended to be installed following demolition.

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.

Tree Protection Signage

It is recommended for the client to create Tree Protection Signs to affix to tree protection hoarding. A sign should be displayed on the tree protection fencing notifying crew and passersby that no storage of equipment or materials, nor any movement of foot traffic or vehicles be permitted within the tree protection fencing. Signage informs the public and reminds the contractors the significance of the TPZs and the efforts put forward by the client in tree preservation.

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).



Conclusion

For the planned construction of a new facility at the Cobourg Search and Rescue Station, no trees require removal. It is recommended that each tree be protected behind fencing comprised of steel/chain-link fence or plywood boards on wooden frame, which is to be established prior to beginning of construction. Recommendations for tree protection are provided below.

Recommendations

In accordance with the numbering of trees in the inventory listed on the Tree Protection Action Key (Appendix 1), we have provided the following recommendations.

- Preserve all trees on site. No trees are recommended for removal
- We recommend the client establish chain-link steel fence or plywood board fencing at no less than 1.2m in height surrounding each tree in accordance with the Tree Protection Plan (TPP).
- The fencing is recommended to be staked into the ground to prevent movement during construction and be installed following removal of the existing deck but prior to demolition of the existing buildings.
- We recommend any areas where foundation is to be removed during demolition and replaced with soft landscaping surfaces utilize native topsoil within the upper 60cm below grade to aid in root regrowth of the nearby trees.
- We recommend that no heavy equipment be utilized in the backyard removal of the existing deck, to avoid compaction of soil within critical root zones.
- We recommend horizontal root protection surfaces be laid down up to the edge of Tree Protection Fencing near Trees #2 and 5 to protect their Critical Root Zones. The root protection surface is to consist of at least 30cm deep mulch laid atop geotextile fabric with double-layer 3/4" plywood or single-layer steel plates installed atop the mulch. This will allow for movement of heavy equipment and materials without risking harmful compaction or breakage of roots.
- We recommend the crown of Tree #2 be pruned to clean out deadwood and hanging broken branches. This work is to be done by a qualified arborist.

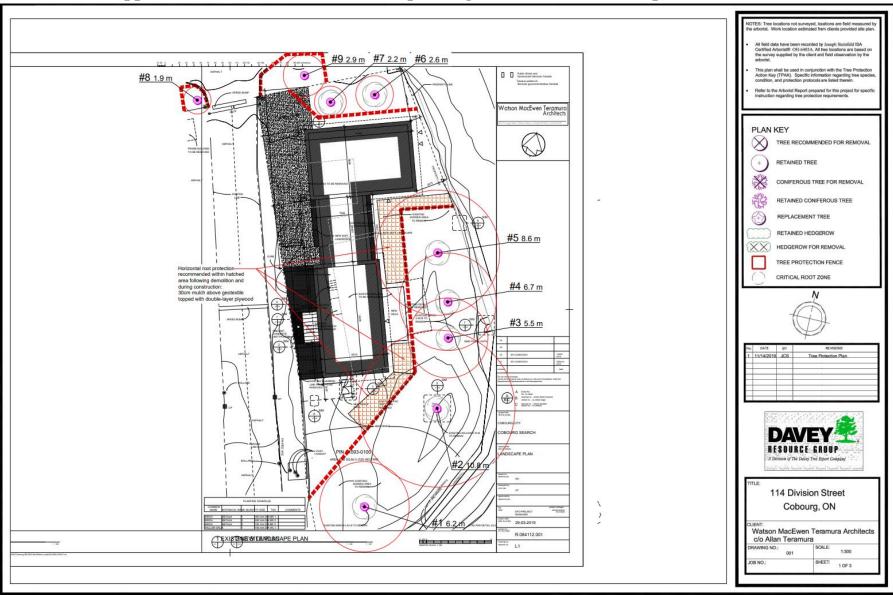


Appendix 1 – Tree Protection Action Key (TPAK)

	Appendix 1 – Tree Frotection Action Rey (11 AR)														
Tree Map Number	Species	DBH (cm) @ 1.4 m	Tree Category	Critical Root Zone Distance (m)	Health	Structure	Overall Condition	Live Crown Ratio (%)	Deadwood (%)	Crown Width (m)	Tree Height (m)	Construction Impact (None, Low, Medium,	Hoarding Required (Y/N)	Removal (Y/N)	Observations and Recommendations
1	White Birch	52	Private	6.2	Good	Good	Good	75	0	11	8	N	Υ	N	No disturbance to CRZ expected; full protection recommended
2	Weeping Willow	90	Private	10.8	Good	Fair	Good	80	10	15	14	N	Υ	N	Recommend fencing around tree w/root protective surface installation inside CRZ recommended outside of tree protection fencing
3	White Birch	46	Private	5.5	Good	Good	Good	75	5	8	13	Н	N	N	Recommend fencing around tree w/root protective surface installation inside CRZ recommended outside of tree protection fencing
4	White Birch	56	Private	6.7	Good	Good	Good	65	5	8	12	N	Υ	N	Recommend fencing around tree w/root protective surface installation inside CRZ recommended outside of tree protection fencing
5	White Birch	72	Private	8.6	Fair	Fair	Fair	70	15	11	13	N	Y	N	Recommend fencing around tree w/root protective surface installation inside CRZ recommended outside of tree protection fencing
6	Freeman Maple	22	Private	2.6	Good	Good	Good	75	0	5	8	N	N	N	Full protection of CRZ recommended
7	Freeman Maple	18	Private	2.2	Good	Good	Good	75	0	5	8	N	N	N	Full protection of CRZ recommended
8	Black Walnut	16	Private	1.9	Good	Good	Good	85	0	7	5	N	Υ	N	Next to driveway entrance; protection recommended to avoid damage by equipment
9	Black Walnut	24	Private	2.9	Good	Fair	Good	85	0	8	7	N	Y	N	Co-dominant leaders; well protected behind boundary fence; protect to avoid piling of construction debris in CRZ

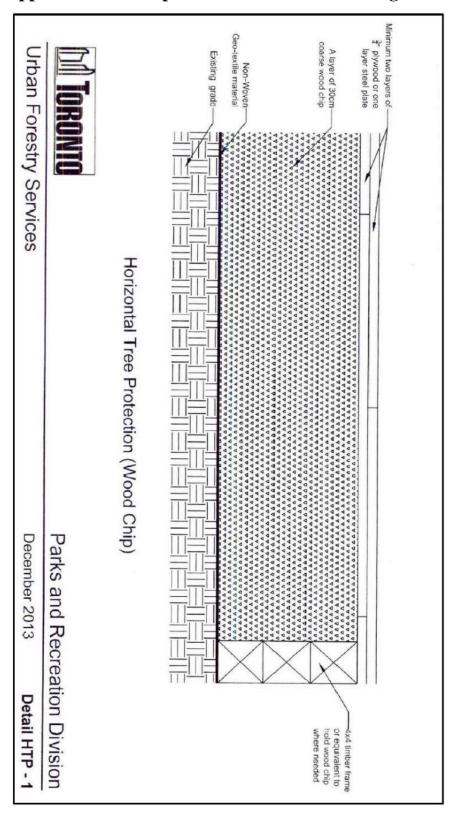


Appendix 2 – Tree Protection and Replanting Plan (Preview – to be printed to scale)





Appendix 3 – Example Root Protection Hoarding Detail





Appendix 4 – References

- ISA, 2001-2011. <u>Best Management Practices</u>, <u>Books 1-9</u>, <u>Companion publications to ANSI</u> A300 Standards for Tree Care
- Dujesiefken, Dr. Dirk, 2012. Director of the Institute for Tree Care in Germany, <u>The CODIT</u>
 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. <u>A Photographic Guide to the Evaluation of Hazard Trees in</u> Urban Areas, 2nd Edition
- 7. Matheny and Clark, ISA 1998. <u>Trees and Development, A Technical Guide to Preservation</u> of Tree During Land Development
- 8. PNW-ISA, 2011. <u>Tree Risk Assessment in Rural Areas and Urban/Rural Interface, Version</u>
 1-5
- 9. Todd Hurt & Bob Westerfield, 2005. <u>Tree Protection During Construction and Landscaping</u>
 <u>Activities</u>



Appendix 5 – Glossary of Common Arboricultural Terms

11	•					
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.					
	An Arboricultural consultant is one of the following:					
	American Society of Consulting Arborists, Registered Consulting Arborist (ASCA RCA#)					
Consulting Arborist	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					
<u> </u>	•					



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						



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	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 (let 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, onear 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)					
	Trees have 4 walls in a process known as compartmentalization.					
	Wall 1 prevents decay moving up and down in a tree					
Walls	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 6 – Arborist Qualifications



Joseph Steinfeld is a Consulting Arborist with Davey Resource Group. His formal education includes a Bachelor of Science in Ecology, Evolution, and Natural Resources with a focus in Forest and Landscape Ecology from Rutgers, the State University of New Jersey. Mr Steinfeld has over ten years of varied work experience in the forestry, arboriculture, and ecological assessment fields. Mr. Steinfeld has worked with DRG for over six years as an Inventory Arborist, Asian Longhorned Beetle Damage Surveyor, Urban Forester, Site Manager, and Consulting Arborist.

Certifications

International Society of Arboriculture Certified Arborist (OH-6403A) ISA Tree Risk Assessment Qualification (TRAQ)



Appendix 7 – Photographs



Figure 1 – View of trees #1 and #2 viewed from the south end of the site looking north. Tree protection fencing is recommended to surround both trees. Trees #3, 4, 5 in background



Figure 2 – View of Trees #3, 4, and 5, with #2 in background. Trees #2 and #5 will require root protection during demolition and construction to preserve their root systems.





Figure 3 – View of trees #6 and 7, looking east. Both trees are small in stature and far enough away from the construction work to be fully protected.



Figure 4 – View of Trees #8 and 9 on either side of the driveway to the site. These trees are recommended to be protected to avoid injury during movement of equipment/materials.

Pre-Construction Tree Assessment Report 114 Division Street, Cobourg, ON K9A 0B3 November 14th, 2019

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:	