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Memorandum

Date: October 23, 2019

Project #: 1400343

To: Marko Paranosic, Associated Engineering

From: Austin Adams, Erin Donkers, Palmer Environmental

cc:

Re: Denison Avenue EA Study – Tree Evaluation Report and Natural Heritage Features Assessment

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Palmer Environmental Consulting Group Inc. (Palmer) was retained by Associated Engineering to assess the ecological conditions as part of the proposed extension of Denison Avenue in the City of Brampton, Ontario. It is our understanding that Denison Avenue will be to connect Park Street to Mill Street and will include three associated paved entrances to adjacent lots.

This Technical Memo is prepared in support of the municipal road extension design prepared by Associated Engineering for submission as part of the EA approval and permitting process. Towards this objective, a review of applicable policy has been provided. This memo also describes the background review and field investigations undertaken to support the characterization of existing natural environmental conditions, identifies potential impacts and provides recommendations for general and site-specific mitigation. Palmer's assessment or "study area" was scoped to focus on the lands located immediately adjacent to the proposed development works (**Figure 1**).

The objectives of this study are to inventory and evaluate the existing natural heritage features and ecological functions within the study area, including Ecological Land Classification (ELC) mapping, a Species at Risk (SAR) habitat screening and assessment, evaluation of sensitive natural features, and an assessment of wildlife habitat. A Tree Evaluation Report and Tree Protection Plan (TPP) were also prepared based on the results of a tree inventory of the study area. This information has been used to support the development of the proposed road extension design and provide guidance on natural heritage mitigation recommendations and implementation.

As part of this Technical Memo the following supporting Figures and Attachments have been provided:

- **Figure 1** – Site Location
- **Figure 2** – Existing Environmental Conditions
- **Figure 3** – Tree Preservation Plan

LEGEND:

Study Area

Imagery (2018) provided by City of Brampton web map service.

0 10 20 30 40

metres

N

PROJECT NO.	1400343	REVISION:	1-1
DATE:	Sep 12, 2019	SCALE:	1:1000
DRAWN:	BE	DATUM:	NAD 1983
CHECKED:	ED	PROJECTION:	UTM zone 17

CLIENT: Associated Engineering

PREPARED BY: PALMER ENVIRONMENTAL CONSULTING GROUP INC.

PROJECT:

Denison Ave Natural Heritage Features Assessment

TITLE:

Site Location

Figure 1

Document Path: C:\Egnyte\Shared\Projects\Active\14003 - Associated Engineering\1400343 - Denison Ave EA Study\Mapping\Figures\5_ArcGIS\1400343_1-1-1_Site Location.mxd

- **Attachment A** –Tree Inventory Data
- **Attachment B** – City of Brampton Engineering Standard L110

1. Environmental Policy

1.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) provides direction to regional and local municipalities regarding planning policies for the protection and management of natural heritage features and resources (OMMAH, 2014). Section 2.1 of the PPS defines eight natural heritage feature (NHF) types and adjacent lands and provides planning policies for each. Of these NHF, development is not permitted in:

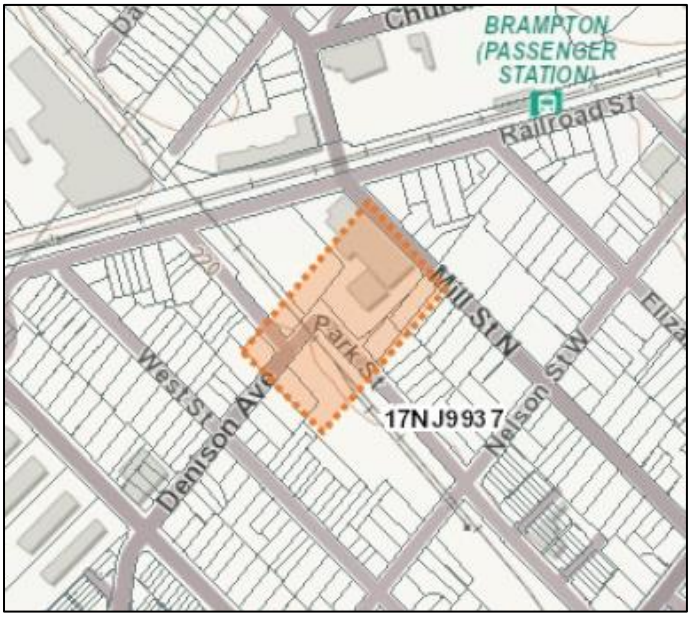
- Significant Coastal Wetlands;
- Significant Wetlands in Ecoregions 5E, 6E and 7E;
- Fish Habitat, except in accordance with provincial and federal requirements; or
- Habitat of species designated as Endangered and Threatened, except in accordance with provincial and federal requirements.

Additionally, unless it can be demonstrated through an EIS that there will be no negative impacts on the natural features or their ecological functions, development and site alteration are also not permitted in:

- Significant Wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;
- Significant Woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River);
- Significant Valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River);
- Significant Wildlife Habitat;
- Significant Areas of Natural and Scientific Interest;
- Other Coastal Wetlands in Ecoregions 5E, 6E and 7E; and
- Lands defined as *Adjacent Lands* to all the above natural heritage features.

Each of these natural heritage features is afforded varying levels of protection subject to guidelines, and in some cases, regulations. The project area is located in Ecoregion 7E (Crins, Gray, Uhlig, & Wester, 2009). The NHF definitions are used in this report to guide the identification and protection of ecological elements in the project area.

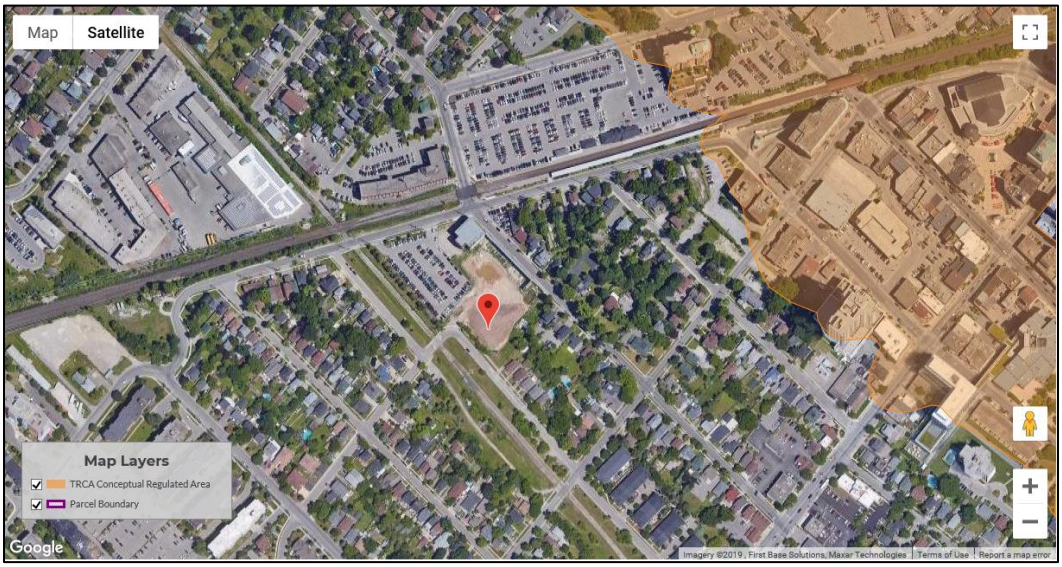
As identified upon a review of the Ministry of Natural Resources and Forestry (MNRF) online "Make-A-Map: Natural Heritage Areas" mapping application (**Map A**), no provincially significant environmental features are identified within the study area.



Map A. MNRF mapping for the general vicinity of the study area.

1.2 TRCA Regulations and Policies

Although the study area is located within the Toronto and Region Conservation Authority (TRCA)'s overall jurisdiction, no components of the TRCA Regulated Area exist within the immediate study area (**Map B**). As such, a development permit from the TRCA is not required. The study area is located just east outside of Credit Valley Conservation (CVC)'s watershed boundary; as such, authorization from CVC is also not required.



Map B. TRCA Conceptual Regulated Area (source: www.trca.on.ca)

1.3 Region of Peel Official Plan (December 2018 Consolidation)

The Region of Peel's Official Plan (OP) was adopted by Regional Council on July 11, 1996. It was approved with modification by the Ontario Ministry of Municipal Affairs and Housing (OMMAH) in 1996. Portions of the OP are under appeal at the Ontario Municipal Board (OMB). The Region's new OP was most recently consolidated in December 2018.

Natural heritage features in the Region of Peel are protected by its Greenlands System, which consists of Core Areas, Natural Areas and Corridors, and Potential Natural Areas and Corridors. Core Areas are designated on *Schedule A* of the OP and are intended to represent the most important natural features in the Region, providing the best uninterrupted natural systems and highest biodiversity as identified through the OP. Core Areas include provincially significant wetlands, core woodlands (criteria provided), Environmentally Sensitive Areas, Areas of Natural and Scientific Interest, significant habitats of threatened and endangered species, and core valley and stream corridors (criteria provided). Development is generally prohibited within Core Areas. Natural Areas and Corridors and Potential Natural Areas and Corridors are to be identified and protected in lower tier municipal official plans in accordance with the policies outlined in the Region of Peel OP.

As depicted on Schedule A (**Map C**), the study area is located entirely outside of the Regional Greenlands System. As such, no Greenlands System related policies will apply to the proposed development.

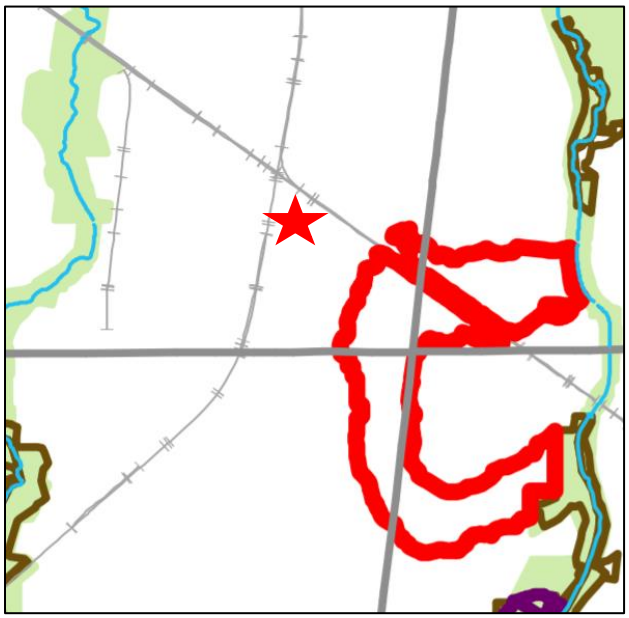
Map C. Regional Greenlands System mapping (Official Plan Schedule A).

1.4 City of Brampton Municipal Policies

Official Plan (Office Consolidation September 2015)

The City of Brampton identifies "Natural Heritage Features and Areas" on *Schedule D* of its OP. These features include Valleylands/Watercourse Corridors, Woodlands, Wetlands (Provincially Significant Wetlands and Other Wetlands), Environmentally Sensitive/Significant Areas, Areas of Natural and Scientific Interest and the Provincial Greenbelt Plan area.

These features, along with "Fish and Wildlife Habitat" are considered the components of the City's natural heritage system Natural Heritage System. Development and site alteration are generally not permitted in significant natural heritage features. A review of the study area indicates that it does not contain any of the above listed components of the City's Natural Heritage System, such as those mapped on Schedule D (**Map D**). As such, no natural heritage policies of the OP pertain to the proposed development.



Map D. City Natural Heritage System mapping (Official Plan Schedule D) (Valleyland/Watercourse Corridor = green polygon, Special Policy Area = red outline, Woodland = brown outline)

Tree Policies

Tree Preservation By-Law (317-2012)

The City's Tree Preservation By-Law (317-2012) is intended to conserve and protect trees on private land within the City of Brampton (City of Brampton, 2012). This by-law applies to all inventoried trees ≥30 centimetres (cm) of diameter at breast height (DBH) proposed to be removed.

Tableland Tree Assessment Guidelines (2018)

"All trees throughout Brampton on public and private lands constitute its urban forest" (City of Brampton, 2018). The City of Brampton developed the *Tableland Tree Assessment Guidelines* (2018) to help coordinate technical report requirements for planning applications. In this document, the City provides

tableland tree compensation ratios, tree replacement size and recommended planting locations. The compensation requirements of these *Guidelines* have been applied to this project.

1.5 Endangered Species Act (2007)

Species designated as Threatened or Endangered by the Committee on the Status of Species at Risk in Ontario (COSSARO), otherwise known as Species at Risk in Ontario (SARO), and their habitats (e.g. areas essential for breeding, rearing, feeding, hibernation and migration) are afforded legal protection under the *Endangered Species Act* (ESA) (Government of Ontario, 2007).

The protection provisions for species and their habitat within the ESA apply only to those species listed as endangered or threated on the SARO list. Special Concern species may be afforded protection through policy instruments respecting significant wildlife habitat as defined by the Province or other relevant authority, or other protections contained in OP policies.

1.6 Migratory Birds Convention Act (1994)

The *Migratory Birds Convention Act* (MBCA) (1994) and Migratory Birds Regulations (MBR) (2014) protect most species of migratory birds and their nests and eggs anywhere they are found in Canada. General prohibitions under the MBCA and MBR protect migratory birds, their nests and eggs and prohibit the deposition of harmful substances in waters / areas frequented by them. The MBR includes an additional prohibition against incidental take, which is the inadvertent harming or destruction of birds, nests or eggs.

Compliance with the MBCA and MBR is best achieved through due diligence, which identifies potential risk based on a site-specific analysis in consideration of the Avoidance Guidelines and Best Management Practices information on the Environment Canada website.

2. Study Approach

2.1 Background Review and Agency Consultation

Palmer has reviewed relevant background material to provide a focus to field investigations and ensure compliance with regulations and policy. Background review included the following:

- Collection and review of relevant mapping and reports, including Natural Heritage Information Centre (NHIC) make-a-map application for species occurrences and designated area mapping.

2.2 Ecological Survey Methods

Palmer ecologists undertook a field investigation on August 19, 2019 to inventory existing vegetation communities, conduct a tree inventory, assess physical terrain characteristics, and to provide an assessment of the ecological features and functions within the study area. Survey methods are described below.

2.2.1 Vegetation and Flora

Vegetation communities were mapped and described following the ELC System for Southern Ontario (Lee

et al., 1998) and the 2008 ELC update tables. Information collected during ELC surveys includes dominant species cover, community structure, as well as level of disturbance, presence of indicator species, and other notable features. Searches for Butternut (*Juglans cinerea*), an Endangered tree under the ESA, were also completed during the botanical surveys and tree inventory.

2.2.2 Tree Inventory

A tree inventory was completed within the vicinity of the proposed development footprint by a Certified Arborist on August 19, 2019. The tree inventory was completed for all trees ≥15 cm DBH. Information collected during the inventory includes species name, tree tag number, DBH, location, a health assessment and notes on tree truck and canopy conditions. The attributes of trees located on private properties

The Tree Inventory was completed through guidance from the following documents:

- City of Brampton *Tree Preservation By-law* (317-2012)
- City of Brampton *Tableland Tree Assessment Guidelines* (2018)

2.2.3 Species at Risk

Prior to field work, existing SAR records were queried through correspondence with the NHIC database. The background review revealed records for Redside Dace (*Clinostomus elongatus*) within the general study area. This species is designated as 'Endangered' under the ESA. Habitats on and adjacent to the study area were characterized and screened for evidence of or potential use by this species.

3. Existing Conditions

3.1 Vegetation and Flora

The overall study area is characterized by past and current disturbance and is dominated by culturally influenced communities. The majority of the study area is currently under construction for future high-density residential use (**Photo 1**). ELC community boundaries of the remaining study area lands are illustrated on **Figure 2,** with descriptions based on field investigations provided below (**Table 1**). Although two area of open water appear within the current active construction portions of the study area in the aerial imagery used for the report figures, these features no longer exist on-site (**Photo 1**).

Table 1. ELC Communities identified in Study Area

ELC Community	ELC Community Description
CVI_1: Transportation	These lands are associated with municipal roadways, railway line and associated constructed sidewalks and boulevards (**Photo 2**). Boulevard areas support mainly mowed lawn with occasional planted trees. This classification also includes a portion of an existing parking lot currently used by GO Transit users, located immediately northwest of the study area.
CVR: Residential	Detached residential homes with typical landscaped gardens, manicured lawn and scattered planted trees (**Photo 3**). As per the tree inventory, tree species mainly include Manitoba Maple (*Acer negundo*).

TAGM5 - Fencerow	Planted fencerows exist within two locations within the study area: along the eastern side of Park Street (**Photo 4**) and extending north out of the study area along the western boundary of the existing GO Transit parking lot.

Photo 1. Active construction lands within the study area.

Photo 2. General view of railway line located immediately west adjacent to the study area.

LEGEND:

Study Area

ELC Community

ELC Communities

CVI_1: Transportation

CVR: Residential

TAGM5: Fencerow

Imagery (2018) provided by City of Brampton web map service.

0 10 20 30 40

metres

PROJECT NO.	1400343	REVISION:	1-1
DATE:	Sep 12, 2019	SCALE:	1:900
DRAWN:	BE	DATUM:	NAD 1983
CHECKED:	ED	PROJECTION:	UTM zone 17

CLIENT: Associated Engineering

PREPARED BY: PALMER ENVIRONMENTAL CONSULTING GROUP INC.

PROJECT:

Denison Ave Natural Heritage Features Assessment

TITLE:

Existing Environmental Conditions

Figure 2

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Photo 3. View of residential lands comprising the southern portion of the study area.

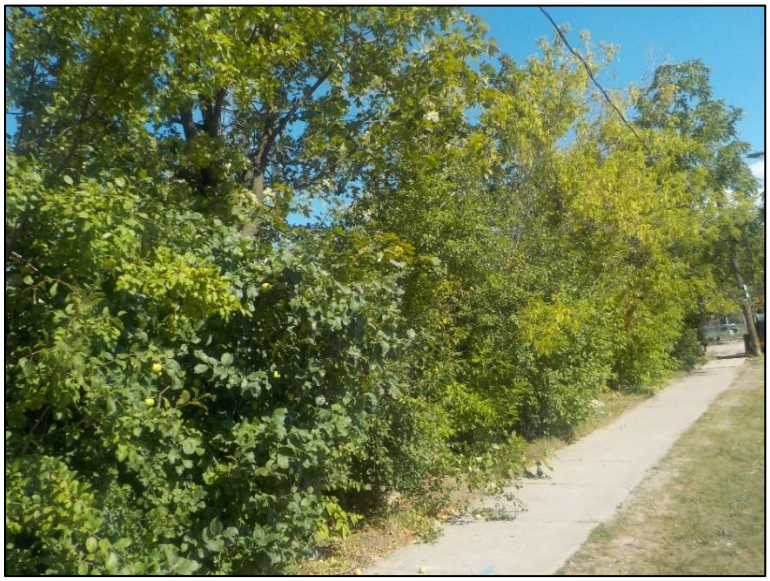


Photo 4. General southern view along treed fencerow on east side of Park Street.

3.2 Tree Inventory

The tree inventory comprised 32 individual trees, including 19 (59%) native and 13 (41%) non-native species (**Table 2**). All are trees commonly planted in southern Ontario landscapes. The most common species was Manitoba Maple, with 17 trees (53%) inventoried. There were no Species at Risk (SAR) trees observed, such as Butternut (*Juglans cinerea*). A single White Ash (*Fraxinus americana*) was recorded that demonstrated signs of extensive infestation by Emerald Ash Borer (*Agrilus planipennis).* The full tree inventory is provided in **Attachment A.** The locations of inventoried trees are shown on **Figure 3.**

Table 2. Summary of Tree Inventory Results

Scientific Name	Common Name	Total Number
*Acer negundo**	Manitoba Maple	17
Acer platanoides	Norway Maple	3
*Fraxinus americana**	White Ash	1
*Juglans nigra**	Black Walnut	2
Malus sp.	Crabapple	3
Picea pungens	Blue Spruce	1
Pyrus sp.	Pear	1
*Tilia americana**	American Basswood	1
Tilia tomentosa	Silver Linden	1
Tilia x *europaea*	European Linden	1
Ulmus pumila	Siberian Elm	1
Total		**32**

*Native species

3.3 Species at Risk

Based on the absence of surface water features, no suitable habitat for the aquatic SAR Redside Dace is available within the immediate study area lands. It is further identified that due to the existing highly developed conditions and absence of naturalized lands, the study area is not expected to provide abundant suitable habitat for other SAR species or non-urban adapted wildlife .

4. Impact Assessment

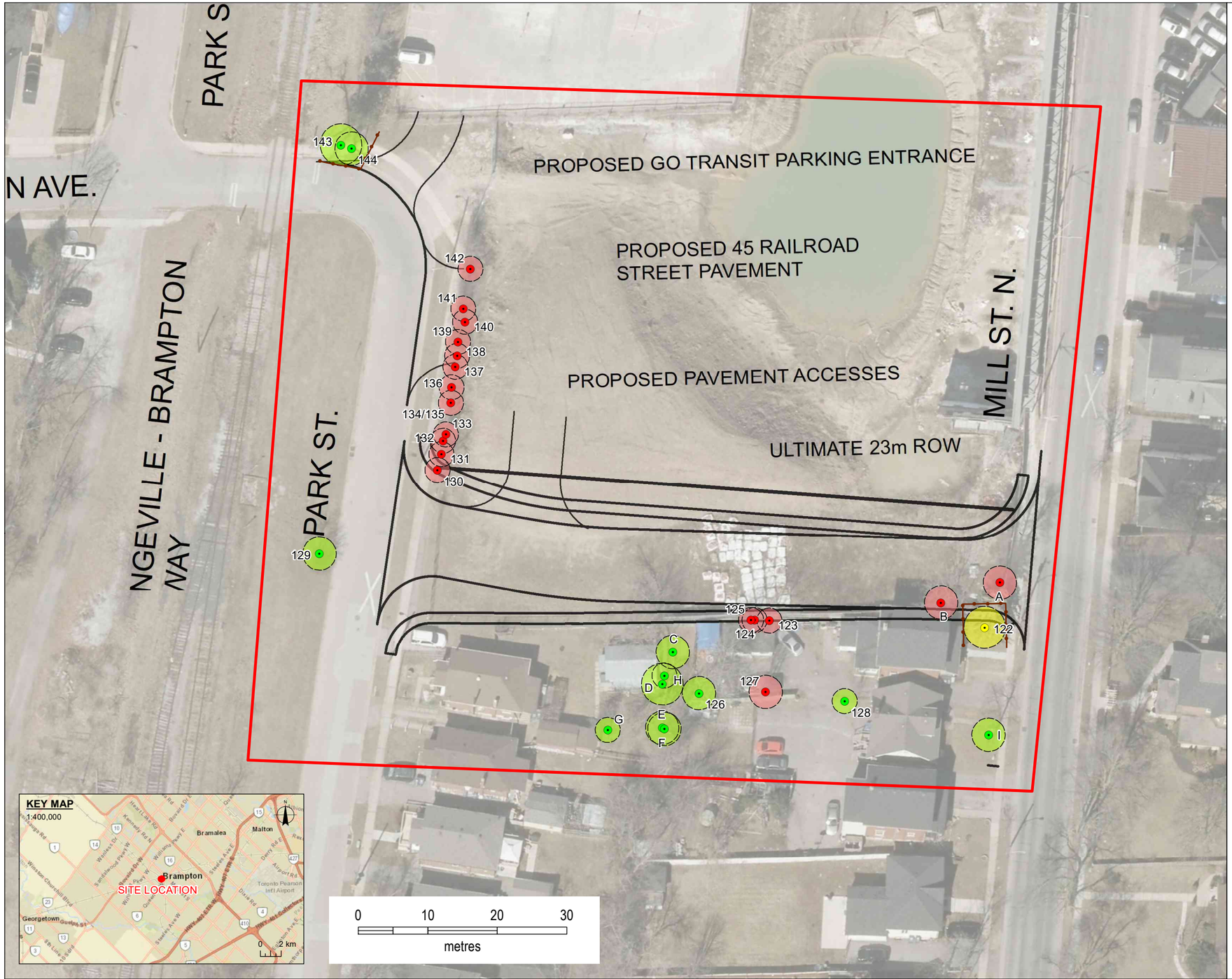
4.1 Potential Impacts to Wildlife

Potential impacts to urban wildlife due to construction activity, such as vegetation removal, grading, use of machinery and nearby disturbances (i.e. noise), should be avoided and/or minimized to the greatest extent feasible, specifically in regard to the protection of breeding birds which may be utilizing trees for nesting purposes. Impacts to wildlife are associated with the construction works and are therefore considered short-term.

4.2 Tree Removals and Tree Damage

A total of 18 inventoried trees are proposed to be removed to accommodate the current proposed development (**Table 3**). Although not expected to be impacted by the proposed development, one additional tree (Tree #127, White Ash) is recommended for removal due to the extensive impacts of Emerald Ash Borer. Trees for removal include 14 (74%) native species (mainly comprised of Manitoba Maple) and 5 (26%) non-native tree species.

It should be noted that a total of 13 individuals (Tree #130 to 142) are located along an existing chain-link fence comprising a fencerow community (**Figure 3**). Although about 46% (6 total) of the fencerow trees



TREE PRESERVATION SPECIFICATIONS

GENERAL NOTES
- THIS TREE PROTECTION PLAN IS DESIGNED TO WORK IN CONCERT WITH THE TREE EVALUATION REPORT FOR THE PROJECT.
- PRIOR TO COMMENCEMENT OF ANY SITE ACTIVITY, THE TREE PROTECTION FENCING AND/OR BARRIERS SPECIFIED ON THIS PLAN MUST BE INSTALLED.
- TREE PROTECTION FENCING AND/OR BARRIERS MUST REMAIN IN EFFECTIVE CONDITION UNTIL ALL SITE ACTIVITIES INCLUDING LANDSCAPING ARE COMPLETE. IT MUST NOT BE REMOVED WITHOUT THE WRITTEN AUTHORIZATION OF THE CONSULTING LANDSCAPE ARCHITECT OR ARBORIST.

TREE PROTECTION AND FENCING
- ALL EXISTING TREES, THAT ARE DESIGNATED TO REMAIN, MUST BE FULLY PROTECTED WITH SOLID WOOD HOARDING OR TREE PROTECTION FENCING IN ACCORDANCE WITH CITY OF BRAMPTON DETAIL L110, WHICH IS TO BE ERECTED BEYOND THE DRIP LINE AND/OR CRITICAL ROOT ZONE (CRZ), WHICHEVER IS GREATER. THE CONSULTING LANDSCAPE ARCHITECT OR ARBORIST IS TO PROVIDE WRITTEN CONFIRMATION TO THE CITY OF BRAMPTON STATING THAT ALL TREE PRESERVATION MEASURES HAVE BEEN PERFORMED PRIOR TO THE ISSUANCE OF A TOPSOIL STRIPPING AND GRADING PERMIT. TREE PRESERVATION MEASURES MUST BE REVIEWED AND VERIFIED ON-SITE ACCORDING TO DETAIL L110 CITY OF BRAMPTON, BY PLANNING AND INFRASTRUCTURE SERVICES.
- TREE PROTECTION ZONES ARE TO INCLUDE SIGNS (AS PER BELOW) AT REGULAR INTERVALS ON THE FENCING. THE SIGNS ARE TO BE 40 CM X 60 CM AND MADE OF WHITE CORRUGATED PLASTIC BOARD OR EQUIVALENT MATERIAL.

TREE PROTECTION ZONE (TPZ)

ALL CONSTRUCTION RELATED ACTIVITIES, INCLUDING GRADE ALTERATION, EXCAVATION, SOIL COMPACTION, ANY MATERIALS OR EQUIPMENT STORAGE, DISPOSAL OF LIQUID AND VEHICULAR TRAFFIC ARE NOT PERMITTED WITHIN THIS TPZ.

THIS TREE PROTECTION BARRIER MUST REMAIN IN GOOD CONDITION AND MUST NOT BE REMOVED OR ALTERED WITHOUT AUTHORIZATION OF CITY OF BRAMPTON PLANNING AND INFRASTRUCTURE SERVICES. CONCERNS OR INQUIRIES REGARDING THIS TPZ CAN BE DIRECTED TO 3-1-1 OR DEV-CONSTRUCTION@BRAMPTON.CA.

- NO CONSTRUCTION EQUIPMENT OR MOTORIZED VEHICLES ARE PERMITTED WITHIN THE TREE PROTECTION ZONE AND ALL TREE PROTECTION ZONES MUST REMAIN UNDISTURBED AT ALL TIMES. THE FOLLOWING ACTIVITIES ARE ALSO PROHIBITED WITHIN THE TREE PROTECTION ZONES:
  - ANY CONSTRUCTION;
  - ALTERING OF GRADE BY BACKFILLING, ADDING FILL, EXCAVATING, TRENCHING OR DISTURBANCE OF ANY KIND;
  - TOPSOIL STORAGE OR STOCKPILING OF MATERIALS, EQUIPMENT, SOIL, CONSTRUCTION WASTE OR DEBRIS; AND
  - DISPOSAL OF ANY LIQUIDS.
- IN THE EVENT THAT ANY WORK BE REQUIRED WITHIN THE TREE PROTECTION ZONES, THE CONSULTING LANDSCAPE ARCHITECT MUST ADVISE THE CITY OF BRAMPTON OPEN SPACE DEVELOPMENT SECTION A MINIMUM OF 48 HOURS PRIOR TO COMMENCING ANY SPECIFIED WORK.
- TREE PROTECTION FENCING IS TO BE INSPECTED REGULARLY TO ENSURE IT IS PERFORMING ITS INTENDED FUNCTION. IF ANY SECTION IS FOUND TO BE DAMAGED OR NON-FUNCTIONAL, IT SHOULD BE REPLACED IMMEDIATELY.

TREE AND ROOT PRUNING
- TREES WILL BE GIVEN AN OVERALL PRUNING AS REQUIRED, TO THE SATISFACTION OF THE CITY OF BRAMPTON URBAN FORESTRY SECTION. PRUNING IS TO BE COMPLETED BY A QUALIFIED ARBORIST AND MUST BE PERFORMED IN ACCORDANCE WITH GOOD ARBORICULTURE PRACTICES.
- ANY ROOT PRUNING REQUIRED TO ACCOMMODATE DEVELOPMENT (E.G. TREE 365) IS TO BE COMPLETED BY A QUALIFIED ARBORIST AND MUST BE PERFORMED IN ACCORDANCE WITH GOOD ARBORICULTURE PRACTICES.
- ANY ROOTS OR BRANCHES THAT EXTEND BEYOND THE TREE PROTECTION ZONE, WHICH REQUIRE PRUNING, MUST BE PRUNED BY A QUALIFIED ARBORIST AND MUST BE PERFORMED IN ACCORDANCE WITH GOOD ARBORICULTURE PRACTICES. THE CONSULTING LANDSCAPE ARCHITECT MUST ADVISE THE CITY OF BRAMPTON OPEN SPACE DEVELOPMENT SECTION A MINIMUM OF 48 HOURS PRIOR TO COMMENCING ANY SPECIFIED WORK.
- IF ANY DAMAGE OCCURS TO TREES, INCLUDING BROKEN LIMBS, DAMAGE TO ROOTS, OR WOUNDS TO THE MAIN TRUNK, IT MUST BE REPORTED TO THE CONSULTING ARBORIST IMMEDIATELY SO THAT MITIGATION MEASURES CAN BE PROMPTLY IMPLEMENTED.
- AREAS FOR STOCKPILING EQUIPMENT AND MATERIALS SHOULD BE WELL OUTSIDE THE REMAINING VEGETATION AREAS, AND CONFINED TO ROAD AREAS.
- TO AVOID SOIL COMPACTION, MACHINERY OPERATION IS TO STAY WITHIN THE WORK AREA AND AVOID THE AREA DELINEATED BY THE TREE PROTECTION FENCING.

TREE REMOVAL
- TREES ARE TO BE FELLED INTO THE CONSTRUCTION AREA TO REDUCE THE POTENTIAL FOR INJURY/DAMAGE TO PROTECTED AREAS.
- TREES THAT WERE DESIGNATED FOR PRESERVATION BUT HAVE DIED OR HAVE BEEN DAMAGED BEYOND REPAIR WILL BE REMOVED AND REPLACED BY THE DEVELOPER WITH TREES OF A SIZE AND SPECIES AS APPROVED BY THE CITY OF BRAMPTON OPEN SPACE DEVELOPMENT SECTION.
- TO AVOID INTERFERENCE WITH THE EGGS, NESTS OR YOUNG OF BIRDS PROTECTED UNDER THE FEDERAL MIGRATORY BIRDS CONVENTION ACT (GOVERNMENT OF CANADA, 1994), REMOVALS SHOULD NOT OCCUR FROM APRIL 1 TO AUGUST 1 OF ANY GIVEN YEAR. IDEALLY, REMOVAL SHOULD OCCUR FROM AUGUST THROUGH DECEMBER TO AVOID INTERFERENCE WITH ALL NESTING BIRDS. SHOULD REMOVAL BE REQUIRED WITHIN THE APRIL 1 TO AUGUST 1 BREEDING PERIOD, A QUALIFIED AVIAN BIOLOGIST SHOULD CONDUCT A THOROUGH SURVEY IMMEDIATELY PRIOR TO THE DESIRED TREE REMOVAL DATE TO CONFIRM PRESENCE OR ABSENCE OF PROTECTED SPECIES. IF PROTECTED SPECIES ARE PRESENT, REMOVAL CANNOT OCCUR WITHOUT A PERMIT FROM THE CANADIAN WILDLIFE SERVICE.
- NO BRANCHES OR BRUSH FROM CLEARING IS TO BE STORED ON THE SITE. CUTTING, BRUSH AND CHIPPING CLEANUP ARE TO BE COMPLETED OUTSIDE OF THE MIGRATORY BIRD NESTING SEASON.

Imagery (2018) provided by City of Brampton web map service.

PREPARED BY: PALMER ENVIRONMENTAL CONSULTING GROUP INC.

PROJECT NO.	1400343	REVISION:	1-2
DATE:	Oct 23, 2019	SCALE:	1:600
DRAWN:	BE	DATUM:	NAD 1983
CHECKED:	ED	PROJECTION:	UTM zone 17

LEGEND:
- Tree to be retained
- Tree to be removed
- Potential future removal

Critical Root Protection Zone
- Retain
- Remove
- Potential Remove

- Tree Protection Fencing
- Study Area

CLIENT: Associated Engineering

PROJECT: Denison Ave Arborist Report

Fig. 3 - Tree Preservation Plan

Document Path: W:\Egnyte\Shared\Projects\Active\14003 - Associated Engineering\1400343 - Denison Ave EA Study\Mapping\Figures\5_ArcGIS\Ecology\1400343_3-1-2_TPP.mxd

were noted as being in fair health condition, extensive girdling of trunks was noted in most of them. Such girdling is expected to result in health declines consistent with the poor health condition observations recorded for remaining seven fencerow trees.

Table 3. Trees Proposed to be Removed

Scientific Name	Common Name	Good Health	Fair Health	Fair but Declining Health	Poor Health	Total Count
*Acer negundo**	Manitoba Maple	1	0	3	6	10
Acer platanoides	Norway Maple	0	1	2	0	3
*Fraxinus Americana**	White Ash	0	0	0	1	1
*Juglans nigra**	Black Walnut	2	0	0	0	2
Malus sp.	Crabapple	0	2	0	0	2
*Tilia Americana**	American Basswood	0	1	0	0	1
Total trees to be removed		**3**	**4**	**5**	**7**	**19**

*Native species

Furthermore, it is understood that a 23 m wide right of way (ROW) may be instated into future road designs. Although based on current proposed development plans, impacts to Tree #122 are not expected, future installation of this reported 23 m ROW would likely result in required removal of this individual as well.

4.3 Trees to be Retained

A total of 13 trees are proposed to be retained (**Table 4**). Approximately 54% (7 total) of the inventoried trees to be retained are native species (Manitoba Maple). The remaining 46% (6 total) are comprised of planted non-native landscape species. Most of the trees proposed to be retained are in good to fair health (69%). Most of the trees to be retained are located within hedgerows located within private residential properties (**Figure 3**).

Table 4. Trees Proposed to be Retained

Scientific Name	Common Name	Good to Fair Health	Poor Health	Total Count
*Acer negundo**	Manitoba Maple	5	2	7
Malus sp.	Crabapple	0	1	1
Picea pungens	Blue Spruce	1	0	1
Pyrus sp.	*Pyrus* sp.	1	0	1
Tilia x *europaea*	European Linden	1	0	1
Tilia tomentosa	Silver Linden	1	0	1
Ulmus pumila	Siberian Elm	0	1	1
Total trees to be retained		**9**	**4**	**13**

*Native species

Impacts to retained trees located immediate adjacent to the development works (Tree #122, 143, 144, and C) must also be considered. Impacts may include damage to root zones and mechanical damage to overhanging branches. Measures to mitigate such impacts are included in the Tree Preservation Plan, further detailed in Section 5.2.

4.4 Air Quality, Groundwater and Surface Water Considerations

It is not expected that any measurable impacts to air quality will occur as a result of the proposed development works. Although such impacts are expected to be minor and low volume, planting of compensation trees (as discussed in Section 5, below) is expected to assist in the offsetting the impacts on air quality associated with the existing and project related vehicular traffic. Overall reduction in area traffic congestion as a result of the proposed Denison Avenue extension is also expected to result in a reduction of air quality emissions. Furthermore, it is expected that the proposed high-density residential development (approximately 380 units) on the former 45 Railroad Street development will potentially have a much more significant impact on area air quality, compared to the current proposed road extension.

The proposed Denison Avenue extension is expected to create new hard surface area of approximately 850 square metres. This would represent a relatively minor increase to the overall locally existing hard-surface runoff area. With regards to impacts on groundwater and surface water as a result of salt use for winter maintenance of the proposed Denison avenue extension, this is difficult to quantify. It is recommended that the City or Region's Winter Salt Management plans be consulted for current best practices to minimize impacts of road salt use.

5. Mitigation

5.1 Tree Compensation Planting

The criteria regarding the tree removal compensation ratios, tree species planting selection, and plantings locations provided in the subsections below was obtained from the *Tableland Tree Assessment Guidelines* (City of Brampton, 2018).

5.1.1 Tree Removal and Compensation

Compensation for trees >15 cm DBH are required for development plans (City of Brampton, 2018). The compensation ratios for *healthy trees* >15 cm DBH are outlined in the City's *Tableland Tree Assessment Guidelines* (2018). For the purposes of this report, *healthy trees* are defined as those that were evaluated with a Good to Fair health rating. The following ratios must apply:

- 1:1 for trees 15 to 20 cm DBH;
- 2:1 for trees 21 to 35 cm DBH;
- 3:1 for trees 36 to 50 cm DBH;
- 4:1 for trees 51 to 65 cm DBH; and
- 5:1 for trees greater than 65 cm DBH.

Of the 19 trees proposed to be removed, seven (7) trees fit the criteria for development compensation requirements under the *Tableland Tree Assessment Guidelines*, being healthy trees >15 cm DBH to be

removed for development (City of Brampton, 2018). Based on these criteria, 12 replacement trees are required to be planted (**Table 5**).

Table 5: Recommended Tree Removal and Compensation

	Trees 15-20 DBH (1:1)	Trees 21-35 DBH (2:1)	Trees 36-50 DBH (3:1)	Trees 51-65 DBH (4:1)	Trees >65 DBH (5:1)	Total
Total number of tree removals	2	5	0	0	**0**	**7**
Total number of replacement trees	2	10	0	0	**0**	**12**

5.1.2 Compensation Tree Species

To maintain the overall deciduous and coniferous ratio of the study area, the following tree species and composition are proposed to be planted in compensation (**Table 6**). While other species can be considered, another planting criterion should be selecting only native trees to increase the quality and character of the overall natural heritage system. The planting plan also considers those trees commonly planted in residential areas by the City. Selecting Ash species should be avoided due to the advance of Emerald Ash Borer (EAB) in Ontario; the presence of this species within the study area has already been confirmed as evident in Tree #127.

Table 1: Proposed Compensation Tree Species

Tree Species	Quantity	Recommended Size
White Spruce (*Picea glauca*)	2	150 – 200 cm wire basket
Black Walnut (*Juglans nigra*)	5	70 mm caliper
Sugar Maple (*Acer saccharum*)	5	70 mm caliper

The *Tableland Tree Assessment Guidelines* state that to reduce the impact of the removal of mature trees to the urban tree canopy, compensation trees are to be 70 mm DBH caliper trees, unless otherwise approved by the City.

5.1.3 Planting Location

The replacement trees are proposed to be planted within the study area to the degree feasible. As per the City's *Guidelines*, required spacing between boulevard and street tree plantings is 8 to 10 m. It is recommended that replacement trees be planted along the new Denison avenue boulevard, to the degree feasible. It is expected that remaining trees can also be planted along existing municipal boulevard areas within the general study area. This tree planting plan should be incorporated into the landscaping plan for the Project. Trees are to be planted a minimum of 8.0 m from each other and any proposed development structure or feature.

5.2 Tree Preservation Plan

5.2.1 Tree Protection

The specifications for tree protection are detailed on the Tree Preservation Plan (**Figure 3**), including the locations of required tree protection fencing. Most trees proposed to be retained will be primarily protected by tree protection fencing, which is to be placed at minimum beyond the Critical Root Protection Zone (CRPZ) of trees adjacent to the fencing. A CRPZ for each tree has been determined as per the *Tableland Tree Assessment Guidelines* (City of Brampton, 2018); specific CRPZ radii follow the Tree Protection Zone criteria outlined in the *Tree Protection Policy and Specifications for Construction Near Trees* (City of Toronto, 2016). Fencing provides protection from potential damage during construction activities such as the use of machinery near trees and branches and stockpiling of materials over the root zone. Root pruning has also been proposed to preserve the root system of certain trees adjacent to the proposed development where the proposed works may result in mechanical injury to the roots (Section 5.2.4).

5.2.2 Tree Protection Fencing

Tree protection fencing is to be installed as per City of Brampton Engineering Standard L110 (**Attachment B**). In general, trees that are to be retained with <30 cm DBH will have protection fencing installed at the tree dripline. Trees that are to be retained with ≥30 cm DBH will have protection fencing at twice the dripline as per Specification L110 (**Figure 3**). As per L110, tree protection fencing is to be 1.2 m tall Paige wire, secured on existing grade by T-bar posts every 1.2 m on-centre. However, every third post should be a 10 cm x 10 cm wood post (pressure treated jack pine or cedar) rather than a T-bar. The wood posts are to be secured a minimum of 92 cm into the ground. The Paige wire should be secured to each post with wire ties every 30 cm (i.e. 4 times per post).

Tree protection zones demarcated by the fencing are to include signs (as per below) secured at regular intervals on the fencing. The signs are recommended to be 40 cm x 60 cm and made of white corrugated plastic board or equivalent material.

Tree Protection Zone (TPZ)

All construction related activities, including grade alteration, excavation, soil compaction, any materials or equipment storage, disposal of liquid and vehicular traffic are NOT permitted within this TPZ.

This tree protection barrier must remain in good condition and must not be removed or altered without authorization of City of Brampton Planning and Infrastructure Services. Concerns or inquiries regarding this TPZ can be directed to 3-1-1 OR DEV-Construction@brampton.CA.

5.2.3 Specific Tree Protection Fencing Locations

In general, tree protection fencing should be placed at a distance that is beyond the dripline for trees #122 and 144, or at the limit of road construction. Due to the good health condition of these trees, it is felt that they would be healthy enough and have an adequate rooting radius to tolerate slight impingement into its CRPZ**.** Although identified as in poor condition, due to the close proximity of Tree #143 to #144, fencing will consequently encompass this individual as well.

5.2.4 Pruning

Some root pruning may be required for trees #122 #143 and #144, due to their proximity to the proposed development works. Any root pruning required to accommodate development is to be completed by a qualified arborist and must be performed in accordance to good arboricultural practices. After root pruning and trenching is completed, the trench should be promptly backfilled and (re)mulched to protect any roots that remain undisturbed.

In addition, Trees #C (**Photo 5**) and D were identified as having growth forms with significant westerly leans into vicinity of the proposed road alignment. Should pruning of their branches be required to accommodate the proposed development, then such work is to also be completed by a qualified arborist and performed in accordance to good arboricultural practices.

Any roots or branches that extend beyond the CRPZ of adjacent trees, which require pruning, must also be completed by a qualified arborist and must be performed in accordance to good arboricultural practices. The consulting landscape architect must advise the City of Brampton Open Space Development Section a minimum of 48 hours prior to commencing any specified pruning work.

Photo 5. Tree #C, showing significant westerly lean into proposed development footprint.

5.3 General Mitigation Considerations

Through the finalization of the detailed design and construction, mitigation and protection measures must be implemented. All of these measures are to be detailed and conveyed as part of the final tender document for appropriate understanding and implementation by the contractor under the supervision of the Contract Administrator. The following general mitigation and enhancement measures are provided:

- In compliance with the *Migratory Bird Convention Act*, vegetation removal is to be avoided within the “regional nesting period” for this area (generally late April to late July), unless a survey by a

qualified avian biologist indicates: an absence of actively nesting breeding birds, or appropriate mitigation/protection measures to be implemented as needed, including delaying tree removal until nest(s) are inactive.

- In the unlikely event that SAR are encountered, work will stop and the Ministry of Environment, Conservation and Parks (MECP) will be contacted for specific advice and direction.

- To minimize the potential for erosion and off-site transport of sediment into the natural environment, the project will implement Best Practices related to erosion and sediment control (ESC). ESC measures used by the contractor on all construction should meet guidelines as outlined in Erosion and Sediment Control Guideline for Urban Construction, December 2006 (ESC Guideline), prepared by the Greater Golden Horseshoe Area Conservation Authorities (GGHACA), or equivalent standards. Runoff from stockpiles or site dewatering through an appropriate device, such as filter bags/silt sock.

- All exposed and newly constructed surfaces should be stabilized using appropriate means in accordance with the characteristics of the exposed soils. These surfaces should be fully stabilized and re-vegetated as quickly as possible following the completion of the works.

- All activities, including the maintenance of construction machinery, should be controlled to prevent the entry of petroleum products, debris, rubble, concrete or other deleterious substances into the natural environment.

6. Policy Conformity

Based on the above, no implications to natural heritage policy (as detailed through Section 1) have been identified. Furthermore, the proposed tree preservation plan and compensation measures ensure conformity to the City's *Tree Preservation By-Law (317-2012)* and *Tableland Tree Assessment Guidelines (2018).*

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7. Conclusion

The findings of this study are the result of a background review, ecological field surveys, and an analysis of data using current scientific understanding of the ecology of the area and natural heritage policy requirements. This information has been used to support the development of the proposed road extension design and provide guidance on natural heritage mitigation recommendations and implementation.

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Attachment A

Tree Inventory Data

Tree Inventory Data

Tree ID	Common Name	Species Name	# of Trunks	DBH (cm)	Effective DBH (cm)*	Critical Root Protection Zone (m)**	Health / Condition	Recommendation	Comments
122	Blue Spruce	*Picea pungens*	1	42	42	3	G	POTENTIAL FUTURE REMOVAL (to accommodate future ROW)	Straight trunk, obvious taper.
123	Manitoba Maple	*Acer negundo*	2	16, 16	23	1.8	F (declining)	REMOVE	Tightly situated between shed and fence. Minor trunk mechanical damage and girdling (from adjacent fence). Epicormic shoots at trunk base.
124	Manitoba Maple	*Acer negundo*	1	16	16	1.8	F (declining)	REMOVE	Lean into adjacent shed with resultant girdling. Minor girdling of branches along shed side. Epicormic shoots at trunk base.
125	Black Walnut	*Juglans nigra*	1	22	22	1.8	G	REMOVE	Situated between fence and shed.
126	Manitoba Maple	*Acer negundo*	1	36	36	2.4	F	RETAIN	Epicormic shoots from trunch centre and base.
127	White Ash	*Fraxinus americana*	1	30	30	2.4	P	REMOVE	Evidence of Emerald Ash Borer infestation (exit holes, extensive canopy die-back).
128	Siberian Elm	*Ulmus pumila*	3	7, 16, 20	27	1.8	P	RETAIN	Extensive foliage damage due to insect feeding. Potential root damage from driveway. Trunk girdling evident from fence.
129	European Linden	*Tilia* x *europaea*	5	20, 20, 16, 18, 12	39	2.4	G	RETAIN	
130	Manitoba Maple	*Acer negundo*	2	15, 9	17	1.8	P	REMOVE	Along metal fence - trunk girdling by fence. Dense epicormic growth at base.
131	Norway Maple	*Acer platanoides*	1	24	24	1.8	F (declining)	REMOVE	Along metal fence - trunk girdling by fence.
132	Crabapple	*Malus sp.*	3	11, 14, 13	22	1.8	F	REMOVE	Along metal fence.
133	Black Walnut	*Juglans nigra*	1	20	20	1.8	G	REMOVE	Along metal fence.
134	Manitoba Maple	*Acer negundo*	1	15	15	1.8	P	REMOVE	Along metal fence - extensive trunk griding by fence.
135	Manitoba Maple	*Acer negundo*	1	15	15	1.8	P	REMOVE	Along metal fence - extensive trunk griding by fence.
136	Norway Maple	*Acer platanoides*	1	15	15	1.8	F (declining)	REMOVE	Along metal fence - trunk girdling by fence, declining health
137	Manitoba Maple	*Acer negundo*	1	16	16	1.8	F (declining)	REMOVE	Along metal fence - trunk girdling by fence, declining health
138	Manitoba Maple	*Acer negundo*	1	17	17	1.8	P	REMOVE	secondary branches.
139	Manitoba Maple	*Acer negundo*	1	22	22	1.8	P	REMOVE	Along metal fence - extensive trunk griding by fence.
140	Norway Maple	*Acer platanoides*	1	21	21	1.8	F	REMOVE	
141	Crabapple	*Malus sp.*	1	18	18	1.8	F	REMOVE	Along metal fence. Failure of large branch.
142	Manitoba Maple	*Acer negundo*	1	20	20	1.8	P	REMOVE	Along metal fence - extensive trunk griding by fence.
143	Manitoba Maple	*Acer negundo*	3	22, 26, 24	42	3	P	RETAIN	
144	Manitoba Maple	*Acer negundo*	1	30	30	2.4	G	RETAIN	Large wound in upper portion of main stem (from snap/break?)
A	American Basswood	*Tilia americana*	1	35	35	2.4	F	REMOVE	codominent/weak union. Construction materials and heavy equipment storage within root zone - no protective fencing installed.
B	Manitoba Maple	*Acer negundo*	1	30	30	2.4	G	REMOVE	Tightly situated between 2 fences, unable to access.
C	Manitoba Maple	*Acer negundo*	1	40	40	2.4	F	RETAIN	Significant northerly lean with canopy extending approximately 2 m into adjacent property.
D	Manitoba Maple	*Acer negundo*	1	50	50	3	F-P	RETAIN	Significant northerly lean with canopy extending approximately 0.5 m into adjacent property.
E	Manitoba Maple	*Acer negundo*	1	40	40	2.4	G	RETAIN	
F	Manitoba Maple	*Acer negundo*	1	35	35	2.4	G	RETAIN	Significant easterly lean.
G	Pear	*Pyrus sp.*	1	25	25	1.8	G	RETAIN	
H	Crabapple	*Malus sp.*	1	15	15	1.8	P	RETAIN	
I	Silver Linden	*Tilia tomentosa*	1	36	36	2.4	G-F	RETAIN	Dense epicormic growth at base.

** Critical Root Protection Zone Distances as per *Tree Protection Policy and Specifications for Construction Near Trees* (City of Toronto, 2016)

*Effective DBH calculated as the square root of the sum of squares for all tree stems.

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Attachment B

City of Brampton Engineering Standard L110

NOTES:

1. EXISTING TREES SHALL BE PROPERLY PROTECTED WITH TEMPORARY FENCING AS PER THE APPROVED LANDSCAPE PLAN UNTIL PRELIMINARY ACCEPTANCE.
2. MAINTAIN EXISTING GRADE WITHIN FENCING LINE OF ALL TREES TO BE PRESERVED.
3. THE AREA WITHIN THE PROTECTED FENCING SHALL REMAIN UNDISTURBED AND FREE OF DEBRIS, BUILDING MATERIALS AND EQUIPMENT.
4. PRUNE DEAD WOOD ONLY UNLESS DIRECTED OTHERWISE BY THE CITY. DO NOT PRUNE LEADERS.
5. WATERING AND FERTILIZING PROGRAM SHALL BE MAINTAINED TO THE SATISFACTION OF THE CITY.
6. THE COST OF REPLACING DEAD AND SEVERELY DAMAGED TREES, AS DETERMINED BY THE CITY, SHALL BE BORNE BY THE DEVELOPER AND/OR GENERAL CONTRACTOR. THE SPECIES AND SIZE(S) MUST BE APPROVED BY THE CITY.
7. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.

BRAMPTON Flower City

TEMPORARY TREE PROTECTION FENCING

SITE PREPARATION - SERIES 100 SEPTEMBER 2014

L110

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