THORNY BRAE PLACE, MISSISSAUGA, ON

RESIDENTIAL RE-DEVELOPMENT

SCOPED ENVIRONMENTAL IMPACT STUDY


Prepared for:

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1.0 INTRODUCTION

1.1 Study Overview and Context

WSP Canada Group Ltd. (formerly MMM Group Limited) has been retained by Pace Developments (2462357 Ontario Inc.) to complete a Scoped Environmental Impact Study (EIS) for two proposed developments: 1) a proposed residential re-development at 1745, 1765, and 1775 Thorny Brae Place in Mississauga, Ontario (the “subject property”; aka “The Hazel”); and 2) a stormwater management (SWM) outlet that will accept flows from the subject property and neighbouring properties to the south (the Church of Croatian Martyrs and “The Archways”).

A Scoped EIS in support of the SWM outlet was submitted in March 2017, as part of application (T-09/002; hereafter referred to as the "SWM Outlet" application). That report addressed item 2: the SWM outlet that will accept flows from the subject property and neighbouring properties to the south. The current report addresses the residential re-development and builds on the previous submission, with consideration of agency comments received to date.

The subject property encompasses approximately 2.1ha and is bounded by Mississauga Road to the west, Eglington Avenue West to the north, the Church of Croatian Martyrs to the south and Natural Hazard Lands associated with the Credit River Valley to the east (see attached Figure 1). A portion of the subject property is located within the valley system and regulatory floodplain of the Credit River. A portion of the subject property at the Credit River is within the City of Mississauga and Region of Peel natural heritage systems. The subject property is dominated by a former farmstead and abandoned residential lands adjacent to a forested slope of the Credit River Valley. The adjacent forested valley is comprised of a mosaic of remnant and anthropogenically influenced vegetation (e.g., deciduous forest, cultural meadow).

An EIS is required under the Region of Peel Official Plan, POP (1996; December 2016) and the City of Mississauga Official Plan, MOP (2018) when development is proposed on lands adjacent to the *Greenlands System* and/or *Significant Natural Area* to demonstrate that any negative impacts can be avoided. Negative impacts that cannot be avoided will be mitigated through restoration and enhancement, to the greatest extent possible. This report summarizes findings of the natural heritage assessment of the subject property, including: a review of existing background information; results of field surveys to characterize existing ecological conditions; evaluation of the sensitivity and significance of the natural features in the subject property; review and assessment of natural heritage policy; and proposed development details. Impacts on the identified natural features and functions as a result of the proposed development are presented along with recommendations for mitigation measures to eliminate or reduce the potential impacts. Recommendations for ecological restoration and enhancements are also provided.

Scope of work for the current study has been determined through an agency-approved Terms of Reference (TOR), included in Appendix A.

1.2 Planning History / Background

The site has some planning history, with re-development contemplated from the mid-2000s by previous owners. As part of that process, a number of technical studies and points of agency contact were undertaken, as listed in Section 3.1.

In addition, the subject property and a nearby site (the "Archways", 4583-4601 Mississauga Road), south of the church property, are proposed to share a stormwater management (SWM) outlet location at an existing outlet on the subject property (see Figure 2). Some work and agency liaison has occurred in 2015, 2016 and 2017 in relation to that proposal and for the current lands, as follows:

- Site walk with City and CVC staff on December 14, 2015
- Preparation of a Scoped EIS Draft TOR for the SWM Headwall and Outfall (MMM 2015), submitted to City and CVC on December 10, 2015 (via email)
- Preparation of a Tree Inventory Plan (BTI, January 2016, updated March 6, 2019)
- A Report to 2462357 Ontario Inc. A Soil Investigation for Proposed Residential Development. 1745, 1765 and 1775 Thorny Brae Place, City of Mississauga (Oct. 2016)
- Stormwater Management Design Brief, The Archways and Hazel Common Element Condominium. 4583, 4589 and 4601 Mississauga Road, City of Mississauga (Cole Engineering; December 13, 2016; Revised June 29, 2017)
- Comments from CVC in a letter dated February 2, 2016
- Preparation of an EIS Draft TOR for the proposed residential re-development at the subject property (MMM 2016) submitted to City and CVC on May 24, 2016 (via email)
- Comments from CVC via an email dated June 27, 2016.
- Comments from CVC via an email dated November 23, 2017
- Site walk with City and CVC staff on July 17, 2018

1.3 Existing Natural Heritage Features

1.3.1 Aquatic Resources

The Credit River forms the eastern boundary of the subject property. This reach of the Credit River is classified as a warmwater watercourse (Land Information Ontario (LIO) database, 2011). An existing stormwater outlet / headwall, currently draining stormwater from the church property, is located within the *Natural Hazard Lands* on the valley slope, approximately 50 m linear distance from the Credit River and at an elevation of 19 m above the High Water Mark. Discharge from the outlet is conveyed to the Credit River via a narrow drainage feature with barriers to fish migration from the river; hence, the drainage feature represents indirect fish habitat, contributing to a downstream fish-bearing watercourse (Credit River).

There is a small, ephemeral un-named tributary that conveys surface flows across a portion of the subject property, via a culvert under the Thorny Brae Place, discharging to a ravine to the southeast (where the existing SWM outlet is present further downslope). This feature, which is dry except during rain or snow melt events, is discussed in Sections 4.1 and 4.2.

1.3.2 Terrestrial Resources

The majority of the subject property is comprised of abandoned residential / former farmstead lands. A portion of the subject property is located within the valley system and regulatory floodplain of the Credit River and the lands to the east are designated as *Natural Hazard Lands* in the MOP (2017). The east portion of the subject property has natural heritage and/or open space designations under the Region and City Official Plans. Refer to Sections 5 and 6 for details.

Vegetation on the subject property has a history of anthropogenic influence / disturbance; it includes cultural habitats around the existing residences, successional meadow / thicket on the tablelands, and forested habitat types on and adjacent to the steep valley slope and the un-named tributary ravine (the only remnant or relatively undisturbed vegetation on the property).

2.0 POLICY AND PLANNING FRAMEWORK

This EIS is being undertaken in accordance with relevant federal and provincial policies and guidelines, as well as those of the City of Mississauga, Region of Peel and CVC.

Additional relevant planning legislation and policy pertinent to this study are listed below and discussed in further detail in Section 6.0 Policy Review and Assessment.

- Federal:
  - Fisheries Act (1985)
  - Migratory Birds Convention Act (1994)
  - Species at Risk Act, SARA (2002)
- Provincial:
  - Endangered Species Act, ESA (2007)
  - Provincial Policy Statement (2014)
- Regional/Municipal
  - Region of Peel Official Plan (December 2016 Office Consolidation)
  - City of Mississauga Official Plan (2018 Office Consolidation)
- CVC Regulation 160/06 (2013) and Watershed Planning and Regulation Policies (2010)

3.0 STUDY APPROACH

This report relies on field studies conducted on the subject property in 2015 and 2016 and a review of background information and relevant policy. A summary of the field methodology and results of those surveys are provided in Section 4.0. Policies pertinent to this study are listed discussed in further detail in Section 6.0: Policy Review and Assessment.

3.1 Background Review

As part of the current EIS, MMM initiated agency consultation and reviewed relevant background material to provide a focus to field investigations and ensure compliance with regulations and policy. Available resources were reviewed and updated in support of the current study.

Specifically, the following sources of information were reviewed to supplement and provide context for field investigations:

- Ministry of Natural Resources and Forestry (MNRF):
- Natural Heritage Information Centre (NHIC) Biodiversity Explorer database and mapping
- Land Information Ontario (LIO)
- Species at Risk (SAR) Website

- Topographic mapping and aerial photography
- Region of Peel Official Plan (Dec. 2016 Office Consolidation)
- City of Mississauga Official Plan (Aug. 2017 Office Consolidation)
- Existing technical reports:
    - Scoped Environmental Impact Study for Thorny Brae Place, Part of Lot 3 & 4, Range 5 (N. of Dundas Street), Mississauga, Ontario (Dougan & Associates, 2009).
    - Slope Stability Study (McClymont and Rak Engineering Inc. February 2009)
    - Slope Stability Study Addendum (Soil Engineers Ltd. Dec. 2016)
    - Slope Stability Study Revised Addendum (Soil Engineers Ltd. March 2019)
    - Top of Bank, as delineated by Credit Valley Conservation (CVC) in 2004 and shown on the drawing prepared by Schaeffer Dzaldov Bennett Ltd., dated July 21, 2015.
    - Thorny Brae Place, Mississauga, ON. Scoped Environmental Impact Study for SWM Outlet (MMM Group; March 2017)
    - Thorny Brae Place, Mississauga, ON. Residential Re-Development. Scoped Environmental Impact Study (WSP; December 2017)
    - *Draft* Thorny Brae Woodland Enhancement Strategy (WSP; November 6, 2018)
    - Restoration Landscape Plan (Budrevics, January 12, 2018)
    - 2462357 Ontario Inc.(Pace Developments). Functional Servicing Report. The Hazel, City of Mississauga, UD15-0682 (Cole Engineering, March 2019)
- Background and other data sources are also listed in the References section of this report.

3.2 Field Surveys

An overview of field work to date is provided below. For a detailed summary of all ecological field surveys undertaken, see the Field Survey Chronology provided in Appendix B. Methodologies and results for all field surveys are provided in detail in Section 4.0.

Vegetation

- Botanical Inventory and Floristic Analysis
- Vegetation community classification and description
- Butternut Health Assessment (BHA) – Report #: 602-002
- Woodland Delineation / Site Walk

Wildlife

- Avifaunal surveys (breeding bird surveys)
- General Wildlife
- Significant Wildlife Habitat Assessment

Aquatic Resources

- Aquatic habitat characterization in drainage feature
- Headwater Drainage Feature (HDF) Assessment upstream of headwall outlet.

Species at Risk

- Species at Risk (SAR) habitat screening analysis
- Cavity Tree Survey (SAR bat habitat assessment)

3.3 Agency Liaison

As part of the EIS for the SWM Headwall and Outfall, CVC was provided with a draft Terms of Reference on December 10, 2015 (via email) which outlined the proposed scope of work (see Appendix A). Comments from CVC were received in a letter dated February 2, 2016.

As part of the EIS for the proposed residential re-development at the subject property, CVC was provided with a draft Terms of Reference on May 24, 2016 (via email) which outlined the proposed scope of work (see Appendix A). Comments from CVC were received in an email dated June 27, 2016. The City had no comments per correspondence on July 18, 2016.

Site Walks

- Site walk with City and CVC staff on December 14, 2015
- Site walk with MNRF on September 7, 2016; assessment of Butternut
- Site walk with City and CVC staff on July 17, 2018

4.0 EXISTING CONDITIONS

An overview of the subject property and existing natural heritage features are provided in Section 1.0. of this report. The following sections provide additional characterization of the natural features and functions within the subject property.

4.1 Past and Present Land Use

Based on a review of historical aerial photography from 1954 to present, the following key site characteristics are evident:

- 1954: the general area is dominated by agriculture, with a few farmsteads visible, including a home / laneway on the subject property. Several homes are present south of the 'church' property. The subject property is open / non-treed up to the top of valley slope. The unnamed tributary that discharges to the ravine at the southeast property limits is evident as a very small, non-vegetated feature that extends a short distance north of the farmstead laneway. Limits of the forested valley / ravine are generally similar in 1954 through to the present.
- 1966: four residential properties are present on Thorny Brae Place and the farm homestead is still present on the subject property. The remainder (east portion) of the subject property is open / non-treed up to the top of valley slope. The unnamed tributary is not evident north of the lane. Surrounding lands are still agriculture-dominated. Eglinton Avenue is present at the north property limit.
- 1985: the church is present to the south. The subject property shows some evidence of vegetation regeneration in the east portion. The unnamed tributary is not evident. Surrounding lands are still agriculture-dominated.
- 1989: Residential housing is present west of Mississauga Road, north of Eglinton Avenue and east of the Credit River. The subject property is similar, except that the east portion appears to be mostly non-treed. The unnamed tributary is faintly evident.
- 1995: Eglinton Avenue has been widened. The subject property is generally unchanged. The unnamed tributary is not evident.
- 2006: The subject property shows some evidence of early successional regeneration in the east portion, but is mostly non-treed. The unnamed tributary is not evident.

Given the long-standing residential / agricultural use, the subject property has a high degree of anthropogenic disturbance.

Currently, the property is comprised of: a remnant residential area near Mississauga Road (vacant homes; ~ 1/3 of the property area); culturally influenced vegetation on former farmstead areas in the central portion (~ 2/3 of the property area); and a small area comprised of deciduous forest on the Credit River valley and un-named tributary slopes in the east portion.

4.2 Land Use Designations

Currently, the property is designated in the MOP (2017) as follows:

- West portion (~2/3): *Residential Low Density 1*
- East portion (~1/3): *Natural Hazards* (the Credit River valley and un-named tributary ravine up to confirmed Top of Bank); and *Greenlands* (the valley / ravine and a portion of adjacent tableland).

The following designated natural features, shown in Figure 1, are found within (or partially within) the subject property. Some of these features have multiple / overlapping natural environment designations.

- No features designated at the provincial or federal level (e.g., PSW, ANSI etc.)
- CVC Regulated Areas (O. Reg. 160/06)
    - Credit River valley / slopes and adjacent areas
- Region of Peel Official Plan (2016)
    - *Core Areas of the Greenlands System* – Credit River Valley, including the west valley slope on the subject property
- City of Mississauga Official Plan (2017)
    - Tablelands (west):
        - none (residential)
    - Credit River valley and tablelands (east):
        - Schedule 1 (Urban System): *Green System*
        - Schedule 3 (Natural System): *Natural Hazard*
        - Schedule 4 (Parks and Open Spaces): *Public and Private Open Space*
        - Schedule 10 (Land Use Designations): *Greenlands* and *Natural Hazards*
- No lands on the subject property are designated as *Significant Natural Areas and Natural Greenspaces* (per Schedule 3). Lands associated with the Credit River and east floodplain are designated as such.
- City of Mississauga Natural Areas Survey (2014):

- *Significant Natural Site CRR11* (Along the Credit River from Highway 403 to Eglington Avenue West). This feature extends to the west bank of the Credit River in the vicinity of the east property limit and does not include the west valley slope or tablelands on the subject property.

4.3 Vegetation Resources

4.3.1 Approach

A three-season botanical inventory and vegetation assessment were conducted on the subject property and adjacent lands on the following dates:

- October 16, 2015
- October 29, 2015
- May 20, 2016
- June 23, 2016
- Sept 7, 2016 (MNRF Butternut Health Assessment Review)
- July 6, 2018

Refer to the field chronology for additional detail (Appendix B) and Figure 3 for vegetation and floral coverage and results.

The scope of field work and analyses for the current EIS included the following:

- Botanical inventory and analysis, including preparation of a vascular plant species list, and (Table C, Appendix C)
- Plant species status was evaluated using the Plants of the Credit River Watershed (Credit Valley Conservation [CVC] 2002) for regional significance; the NHIC website for provincial rarity ranks (i.e., S-Ranks); the Species at Risk in Ontario list (MNRF; updated periodically) for provincial status designations; and the Canadian Species at Risk list (COSEWIC; updated periodically) for national status designations
- Nomenclature generally follows NatureServe Explorer (2010)
- Analysis of floristics of all inventoried plant species was completed by using their *Coefficient of Conservatism* (CC) and *Coefficient of Wetness* (CW)
- Butternut Health Assessment for one tree located in Veg. Unit 5b. The assessment was completed by a qualified Butternut Health Assessor (BHA # 602) using guidance provided

in the Butternut Health Assessor's Field Guide: 2015 Edition (MNRF, 2015) and Butternut Health Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the Endangered Species Act, 2007, Version 2 (MNRF, 2014)

- Classifying, mapping and evaluating vegetation communities within the subject property. Vegetation communities were classified using the Ecological Land Classification for Southern Ontario (ELC) (Lee et al. 1998).
- Vegetation community significance was evaluated using Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario (Bakowsky 1996; NHIC website);
- General notes were taken on community health and site disturbance.
- Inventory and health assessment of trees within the subject property (BTI; March 6, 2019). Refer to Appendix J.

4.3.2 Botanical Inventory and Floristic Analysis

In total, 109 vascular plant species were recorded within the subject property. Of these, 5 taxa (*Crataegus*, *Carex*, *Lonicera*, *Poa*, and *Ribes*) were identified to genus only. Of the identified species, 57 (53%) are native and 52 (48%) are non-native.

One species, (Butternut, *Juglans cinerea*), is listed as "S3" (rare to uncommon within the province), and one species (Black Walnut [*Juglans nigra*[1]] listed as "S4", which indicates that this species is uncommon but not rare in the province. All other native species are ranked as "S5" (common and widespread within the province).

Of the 57 native species recorded for which *coefficient of conservatism*[2] (CC) values are provided, CC values range from 0 to 6, with the majority between 4 and 6. Species recorded are as expected for site conditions, consisting of disturbance tolerant and / or early successional species.

Butternut was the only Species at Risk recorded on or adjacent to the subject property (Figure 3).

Three species ranked as regionally *uncommon* (per Varga et.al. 2000) were recorded:

- Allegheny Serviceberry (*Amelanchier laevis*): Unit 5a - one individual
- Wild Cranes'-bill (*Geranium maculatum*): Unit 5a and 5b - occasionally occurring throughout both units.

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1 Some of the trees identified as Black Walnut show leaf length characteristics of Japanese Walnut (*Juglans ailantifolia*)

2 Coefficient of Conservatism: Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters (Oldham et al., 1995)

- Virginia Stickseed (*Hackelia virginiana*): Units 1, 3, 4, 6a and 6b - occurring sparsely throughout units.

One locally rare species (i.e., rare per CVC 2002) was recorded:

- Catchweed Bedstraw (*Galium aparine*): Unit 2 - occurring sparsely in localized patches

Botanical inventory results are generally consistent with previous work (Dougan & Associates, 2009), where 49 species were recorded, the majority of which are non-native. The only plant SCC recorded in that study was Butternut.

4.3.3 Vegetation Communities

The vegetation on the subject property is characterized by a mosaic of early successional meadows, thickets, and young forest with low to moderate botanical quality. The subject property slopes gently in the west portion, then steeply towards the Credit River to the east.

Vegetation community types in nine natural / semi-natural vegetation units are present, as shown in Figure 3:

- Dry-Moist Old Field Meadow (CUM1-1)
- Mineral Cultural Savanah (CUS1)
- Raspberry Cultural Thicket (CUT1-5)
- Fresh - Moist Lowland Deciduous Forest Type (FOD7)
- Fresh – Moist White Elm Lowland Deciduous Forest Type (FOD7-1)
- Fresh – Moist Ash Lowland Deciduous Forest Type (FOD7-2)
- Mineral Cultural Woodland Ecosite (CUW1).

None of these vegetation community types is considered provincially significant (per Bakowsky 1996 / NHIC website). Each community is described briefly below. For detailed descriptions of each vegetation layer, see Table 1. In addition, representative site photographs are provided in Appendix D.

Vegetation classifications are generally consistent with previous work (Dougan & Associates, 2009), where four ELC vegetation communities were described: Cultural Woodland; Cultural Meadow; Cultural Thicket; Deciduous Forest; and complexes of CUW / CUM / CUT.

4.3.3.1 Cultural Meadow (CUM1-1) – Unit 1a & b

Cultural meadow is found in disjunct pockets around the road (Thorny Brae Place) and the west / north portions of the property. It is characterized by common cultural meadow species including pioneer species such as Tall Goldenrod (*Solidago altissima*), Awnless Brome (*Bromus inermis ssp. inermis*), Kentucky Bluegrass (*Poa pratensis*) and Meadow Timothy (*Phleum pratense*). In addition, a small patch of Scotch Pine (*Pinus sylvestris*) and Eastern White Cedar (*Thuja occidentalis*) is present near the Thorny Brae Place Cul-de-sac. A small drainage swale, as identified in Figure 5, is located within Unit 1b, which contains several species indicative of wetlands, such as Purple Loosestrife (*Lythrum salicaria*), Elecampane Flower (*Inula helenium*), and Reed Canary Gass (*Phalaris arundinacea*). The small drainage swale is dominated by non-native species such as This unit is highly disturbed, reflecting the land use history (e.g., dumped garbage near Thorny Brae Place Cul-de-sac and trails leading to the river and northeastern portion of the property).

4.3.3.2 Mineral Cultural Savannah (CUS1) – Unit 2

Unit 2 occurs in the northern corner of the subject property adjacent to the steep valley slope. This unit is dominated by Staghorn Sumac (*Rhus typhina*) in the subcanopy, and Tree-of-heaven (*Ailanthus altissima*) in the canopy and understory layers with occasional Manitoba Maple (Acer negundo) in the canopy. Tree-of-Heaven is a highly invasive species and this community contains less than 10% native trees by abundance. The CUT1-1 community (Unit 6a) transitions from Staghorn Sumac dominated to Tree-of-heaven dominated in Unit 2. Dense growth of Allegheny Blackberry (*Rubus allegheniensis*) and Thicket Creeper (*Parthenocissus vitacea*) are present in the ground layer. This unit also contains dumped garbage and recreational trails.

4.3.3.3 Raspberry Cultural Thicket (CUT1-5) – Unit 3

The Raspberry thicket occurs in the northeastern side of the subject property on a gentle slope adjacent to the steep valley slope. This unit is characterized by dominant Allegheny Blackberry, with a minor component of the vegetation found in Unit 1; Tall Goldenrod, Awnless Brome, Kentucky Bluegrass and Meadow Timothy. Scarce Black Walnut and Colorado Spruce (Picea pungens) are also present in the canopy layer. The botanical quality in this unit is low with many disturbances including exotic species and recreational trails. There are also a number of snags and deadfalls.

4.3.3.4 Fresh - Moist White Elm Lowland Deciduous Forest (FOD7-1) – Unit 4

The Elm Lowland Forest is on sloping tableland adjacent to valleylands associated with the unnamed tributary and Credit River. It is dominated by American Elm (*Ulmus americana*) in the

canopy and sub-canopy layers, with occasional Black Cherry (*Prunus serotina*), and scarce Black Walnut in the sub-canopy. The stand is young with few trees greater than 24 cm DBH and most less than 10cm DBH. The topography begins as a gentle slope in the west and becomes increasingly steep to the east. The soil moisture regime is closer to fresh than moist.

4.3.3.5 Fresh – Moist Lowland Deciduous Forest (FOD7) – Unit 5a

This Lowland Forest is a fairly disturbed community located directly adjacent to the Credit River and along the ravine slope to the east of the subject property. The topography is a steep slope running down to the river. The unit is characterized by frequent to occasional Black Walnut, Green Ash (*Fraxinus pennsylvanica*), and Manitoba Maple with occasional Black Cherry in the canopy, and Hawthorn (*Crataegus* sp.), Manitoba Maple, and Green Ash in the sub-canopy. There is also a concentration of Manitoba Maple near the river. The stand is young; few trees are greater than 50 cm DBH, and most are 10 - 24 cm DBH. This unit also contains dumped garbage, recreational trails and windthrow.

4.3.3.6 Fresh–Moist Ash Lowland Deciduous Forest (FOD7-2)–Unit 5b / 5c

These Ash Lowland Forests are located on the northeastern side of the subject property along the top of and partially within the ravine. The topography is a steep slope running down to the ravine and towards the river. The unit is characterized by dominant Green Ash, abundant American Elm and Black Walnut with occasional Black Cherry in the canopy, and Hawthorn (*Crataegus* sp.), Bitternut Hickory (*Carya cordiformis*) and Green Ash in the sub-canopy. Unit 5c is nearest Unit 6b, which contains a concentration of Black Walnut trees. The Unit 5c stand is young with few trees greater than 25 cm DBH, and most 10 - 24 cm DBH. This small strip of forest is located between the neighbouring parking lot to the south and Unit 6b and is highly disturbed by cultural influences, including a very high concentration of invasive species and garbage. While Unit 5b is also culturally influenced and contains high concentrations of invasive species, but has higher ecological importance, as it is part of the Credit River valleylands.

4.3.3.7 Sumac Cultural Thicket (CUT1-1) – Unit 6a

The second of two CUT1-1 units occurs along the northern edge of the subject property, bordering Eglington Ave W. This unit is characterized by dominant Staghorn Sumac with a component of Hawthorn and Tartarian Honeysuckle (*Lonicera tatarica*) in the understory. Few trees occupy the canopy layer, including Tree-of-heaven, Manitoba Maple, Norway Maple (*Acer platanoides*), Trembling Aspen (*Populous tremuloides*) and Colorado Spruce. Thick vegetation of Lesser Periwinkle (*Vinca minor*), Crown-vetch (*Coronilla varia*), Tall Goldenrod, Awnless Brome, Kentucky Bluegrass and Meadow Timothy are present in the understory and ground layer. This

unit also contains dumped garbage, recreational trails, evidence of Emerald Ash Borer (*Agrilus planipennis*) and old plantation as well as a significant amount of noise from Eglinton Ave W.

4.3.3.8 Mineral Cultural Woodland (CUW1) – Unit 6b

The Mineral Cultural Woodland is located directly south of Thorny Brae Place, extending southwest toward the un-named tributary ravine. The canopy in this unit is sparse with many areas under 30% cover with a few areas over 50% cover, however, there has been substantial growth since the last site inventory by Dougan and Associates (2009). It is characterized by dominant Black Walnut in the canopy and dominant Black Walnut with a component of American Basswood (*Tilia americana*) and Green Ash in the sub-canopy. The ground layer consists of Creeping Thistle (*Cirsium arvense*), Common Starwort (*Stellaria media*), Tall Goldenrod, Awnless Brome, Kentucky Bluegrass and Meadow Timothy. The stand is young with few trees greater than 25 cm DBH, and most 10 - 24 cm DBH. This unit also contains dumped garbage, recreational trails, windthrow and evidence of Emerald Ash Borer.

4.3.3.9 Hedgerow

A single row of mid-aged Littleleaf Linden trees (< 25 cm DBH) is located along the Croatian Martyrs Church parking lot property boundary with mown lawn underneath. While the canopy trees are not located on the subject property, some of the dripline extends onto the subject property and there are some sub-canopy trees and understory shrubs located within the subject property. Species present within the hedgerow are similar to that of Unit 6b (above).

Table 1. Vegetation Community Descriptions and ELC Classification

Unit	ELC Vegetation Type	Area	Vegetation Layer	Component Species	Plant Species of Conservation Concern
1 a / b	CUM1-1	1a: 0.367 ha 1b: 0.891 ha	Canopy	Scarce White Ash (*Fraxinus americana*), Eastern Cottonwood (*Populous deltoides*) and Slippery Elm (*Ulmus rubra*) throughout the unit	Virginia Stickseed
			Sub-canopy	Dotted Hawthorn (*Crataegus punctata*) abundant throughout the unit, with Riverbank Grape (*Vitis riparia*) and Allegheny Blackberry occurring occasionally	
			Understory	Closely resembles sub-canopy with Dotted Hawthorn abundant throughout the unit, with Riverbank Grape and Allegheny Blackberry occurring occasionally	
			Ground Layer	Tall Goldenrod is abundant with frequent Awnless Brome, Kentucky Bluegrass and Meadow Timothy	
2	CUS1-1	0.043 ha	Canopy	Occasional young Manitoba Maple and Tree-of-heaven throughout the unit	Catchweed Bedstraw
			Sub-canopy	Dominant Staghorn Sumac with occasional young Green Ash	
			Understory	Dominant Staghorn Sumac throughout unit with abundant Allegheny Blackberry and occasional Thicket Creeper and Tartarian Honeysuckle	
			Ground Layer	Abundant Garlic Mustard (*Alliaria petiolata*) with occasional Orange Daylily (*Hemerocallis fulva*), and Greater Burdock (*Arctium lappa*)	
3	CUT1-5	0.099 ha	Understory	Unit dominated by Allegheny Blackberry	Virginia Stickseed
			Ground Layer	Tall Goldenrod is abundant with frequent Awnless Brome, Kentucky Bluegrass and Meadow Timothy	
4	FOD7-1	0.082 ha	Canopy	American Elm dominates canopy layer	Virginia Stickseed
			Sub-canopy	Dominant American Elm with occasional Black Cherry, and scarce Black Walnut	
			Understory	Allegheny Blackberry abundant with frequent European Buckthorn (*Rhamnus cathartica*) and occasional Tartarian honeysuckle and Staghorn Sumac	
			Ground Layer	Abundant species include Garlic Mustard, White Avens (*Geum canadense*), Tall Goldenrod and Awnless Brome	
5a	FOD7	0.213 ha	Canopy	Stand dominated equally by Green Ash and Black Walnut with occasional Black Cherry as well as Manitoba Maple concentrated near the river	Allegheny Serviceberry Wild Crane's-bill
			Sub-canopy	Equally frequent Hawthorn, Manitoba Maple, and Green Ash	
			Understory	Equally frequent Hawthorn species, Tartarian Honeysuckle, European Buckthorn, and Staghorn Sumac	

Unit	ELC Vegetation Type	Area	Vegetation Layer	Component Species	Plant Species of Conservation Concern
			Ground Layer	Equally abundant Garlic Mustard, Virginia Strawberry (*Fragaria virginiana*) and White Avens	
5b / c	FOD7-2	Unit 5b: 0.150 ha Unit 5c: 0.043 ha	Canopy	Green Ash dominant with Black Walnut and American Elm as frequent, as well as Sugar Maple, White Ash, and American Basswood as occasional	Unit 5b: Wild Crane's-bill Butternut (END)
			Sub-canopy	Green Ash and Bitternut Hickory are both occasional	
			Understory	Occasional Hawthorn species, Tartarian and Morrow's Honeysuckle, and European Buckthorn,	
			Ground Layer	Abundant Garlic Mustard, frequent Virginia Strawberry (*Fragaria virginiana*) and Yellow Avens, and occasional Calico Aster (*Symphyotrichum lateriflorum*)	
6a	CUT1-1	0.299 ha	Sub-canopy	Frequent Tree-of-heaven, Manitoba Maple, Norway Maple, Trembling Aspen and Colorado Spruce	Virginia Stickseed
			Understory	Dominated by Staghorn Sumac and Hawthorn species with frequent Tartarian Honeysuckle	
			Ground Layer	Lesser Periwinkle and Crown-vetch equally dominate ground layer with occasional Tall Goldenrod and Awnless Brome, Kentucky Bluegrass and Meadow Timothy	
6b	CUW1	0.156 ha	Canopy	Dominated by Black Walnut	Virginia Stickseed
			Sub-canopy	Dominated by Black Walnut with frequent American Basswood, and occasional Green Ash	
			Understory	Dominated by Hawthorn species with frequent young Black Walnut and Green Ash	
			Ground Layer	Tall Goldenrod is abundant with frequent Awnless Brome, Kentucky Bluegrass, Meadow Timothy, and Lesser Periwinkle and Crown-vetch	
N/A	Hedgerow	0.051 ha	Canopy	Littleleaf linden (*Tilia cordata*) located off property	
			Sub-canopy	Common Buckthorn, Black Walnut, Hawthorn species, and Manitoba Maple	
			Understory	Scattered Tartarian Honeysuckle and Common Privet	
			Ground Layer	Cultural meadow species on the subject property side of the fence and mown lawn to the south of the property line	

4.4 Wildlife Resources

4.4.1 Breeding Birds and Other Wildlife

4.4.1.1 Approach

Breeding bird / wildlife surveys were conducted by WSP staff on 3 dates: June 23, 2016, July 4, 2016, and July 6, 2018. The purpose of these surveys was to evaluate wildlife habitat, assess SAR wildlife potential habitat, record all wildlife observations and document breeding bird use within the subject property. Breeding Bird data had previously been collected within the subject property by Dougan and Associates staff on June 18, 2007, and can be found in Appendix 2 of their scoped EIS report (Dougan and Associates, 2009). That information has been included in the total list of species observed on site that is presented in Table 2 below.

The breeding bird surveys were undertaken by thoroughly walking random transects within the subject property and recording presence, abundance and level of breeding evidence[3]. Additional evidence of breeding activity (e.g., fledged young, breeding displays in early spring etc.) was recorded during other field surveys within and outside of the breeding window, as observed.

Level of breeding evidence was determined using the Ontario Breeding Bird Atlas [OBBA] methodology and terminology (Cadman et.al. 2007; Bird Studies Canada 2001). Avifaunal species status was evaluated using the following sources:

- The COSEWIC[4] list for national status designations (current list at the time of report preparation)
- The Species At Risk Act (SARA) for federally listed species (current at the time of report preparation)
- The Species At Risk in Ontario list (O. Reg 230/08) for provincial status designations under the Endangered Species Act (ESA) (current list at the time of report preparation)
- The MNRF / NHIC website for provincial rarity ranks (i.e., S-Ranks);
- The Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E for area sensitivity (MNRF 2015)
- The Credit Valley Conservation Species of Conservation Concern Project (2010) for local significance

[3] Breeding birds include species for which any level of breeding evidence was recorded (i.e. possible, probable, confirmed; or `observed` where some potential for local breeding exists. Determined using Ontario Breeding Bird Atlas protocols

[4] COSEWIC: Committee on the Status of Endangered Wildlife In Canada

During the breeding bird surveys, particular attention was paid to assessing habitat for potential SAR use or potential *Significant Wildlife Habitat* (SWH) features; see Sections 4.4.3 and 4.6 for discussion.

In addition, all direct wildlife observations and wildlife signs (including browse, track / trails, animal scat, bird nesting activity, tree cavities, burrows, excavated holes and vocalizations) made during all field surveys were recorded. Targeted amphibian breeding surveys were not conducted on the property due to the lack of suitable breeding / overwintering habitat (i.e., ponds or wetlands).

4.4.1.2 Results - Avifauna

In total, 36 'breeding' bird species were observed within the subject property (Table 2). Avifaunal species observed are a diverse mix of common generalists and urban-adapted species, with forest-associated species in the treed areas of the subject property.

Avifaunal Species of Conservation Concern

An overview of survey results in consideration of SCC status is provided below:

- None is designated as a Species at Risk (SAR) in Canada (by COSEWIC or under the SARA)
- None is designated as a Species at Risk in Ontario (by COSSARO[5] or under the ESA)
- One species is considered *Area Sensitive* (per MNRF 2015):
    - Coopers Hawk (*Accipiter cooperii*)
- One Species of Interest in the Credit Valley Watershed was recorded:
    - Cooper's Hawk (i.e., Tier 2 per CVC 2010)

[5] COSSARO: Committee on the Status of Species at Risk in Ontario

Table 2. Breeding Bird Survey Results

Common Name	*Scientific Name*	GRANK[1]	SRANK[2]	SARO (ESA) Status[3]	COSEWIC Status[4]	SARA Status [5]	CVC (2010) [6]	MNR Area Sensitive[7]	Site Visit Details									
									18-Jun-07[6]		23-Jun-16		4-Jul-16		6-Jul-18		Overall	
									Number	Highest BE	Number	Highest BE	Number	Highest BE	Number	Highest BE	Highest Abundance	Highest breeding Status
American Crow	*Corvus brachyrhynchos*	G5	S5B				4		1	S							1	POSS
American Goldfinch	*Spinus tristis*	G5	S5B				4		3	S	6	S/H	13	S/H	9	S	13	POSS
American Robin	*Turdus migratorius*	G5	S5B				4		1	S	3	FY	2	S/H	2	S	3	CONF
Baltimore Oriole	*Icterus galbula*	G5	S4B				3		1	S	1	S/H	1	S/H			1	POSS
Black-capped Chickadee	*Poecile atricapillus*	G5	S5				4		1	CF	4	S/H	10	H	3	S	10	CONF
Blue Jay	*Cyanocitta cristata*	G5	S5				4				2	H					2	POSS
Brown-headed Cowbird	*Molothrus ater*	G5	S4B				4		2	FY							2	CONF
Cedar Waxwing	*Bombycilla cedrorum*	G5	S5B				4				1	S/H	5	H			5	POSS
Chipping Sparrow	*Spizella passerina*	G5	S5B				4				1	S/H					1	POSS
Cliff Swallow	*Petrochelidon pyrrhonota*	G5	S4B				3										2	OBS
Common Grackle	*Quiscalus quiscula*	G5	S5B				4				1	P	2	P			2	PROB
Cooper's Hawk	*Accipiter cooperii*	G5	S4				2	X					1	H	1	H	1	POSS
Downy Woodpecker	*Picoides pubescens*	G5	S5				4						2	H			2	POSS
Eastern Kingbird	*Tyrannus tyrannus*	G5	S4B				3								2	P	2	PROB
Eastern Phoebe	*Sayornis phoebe*	G5	S5B				3				2	FY	1	S/H			2	CONF
European Starling	*Sturnus vulgaris*	G5	SNA				5		4	CF	2	S/H	4	S/H	6	A/T	6	CONF
Gray Catbird	*Dumetella carolinensis*	G5	S4B				3		1	S	3	CF	2	S/H	2	S	3	CONF
House Finch	*Carpodacus mexicanus*	G5	SNA				5		1	S							1	POSS

[6] Data adapted from Dougan and Associates 2009 report – Appendix 2..

Common Name	*Scientific Name*	GRANK[1]	SRANK[2]	SARO (ESA) Status[3]	COSEWIC Status[4]	SARA Status[5]	CVC (2010)[6]	MNR Area Sensitive[7]	Site Visit Details									
									18-Jun-07[6]		23-Jun-16		4-Jul-16		6-Jul-18		Overall	
									Number	Highest BE	Number	Highest BE	Number	Highest BE	Number	Highest BE	Highest Abundance	Highest breeding Status
House Sparrow	*Passer domesticus*	G5	SNA				5		1	H			2	P			2	PROB
House Wren	*Troglodytes aedon*	G5	S5B				4				1	S/H					1	POSS
Indigo Bunting	*Passerina cyanea*	G5	S4B				3						2	S/H	1	S	2	POSS
Mallard	*Anas platyrhynchos*	G5	S5B				4		1	X							1	OBS
Mourning Dove	*Zenaida macroura*	G5	S5				4		1	S/H							1	POSS
Northern Cardinal	*Cardinalis cardinalis*	G5	S5				4		1	S/H	2	S/H	4	S/H	2	S	4	POSS
Northern Flicker	*Colaptes auratus*	G5	S4B				3		1	S					1	H	1	POSS
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	G5	S4B				3		2	X					2	X	2	OBS
Red-eyed Vireo	*Vireo olivaceus*	G5	S5B				4						2	S/H	2	S	2	POSS
Red-winged Blackbird	*Agelaius phoeniceus*	G5	S4				4				2	S/H	2	S/H	8	X	8	POSS
Rock Pigeon	*Patagioena livia*	G5	SNA				5		4	H							4	POSS
Song Sparrow	*Melospiza melodia*	G5	S5B				4		2	CF	4	S/H	1	S/H	2	S	4	CONF
Spotted Sandpiper	*Actitis macularius*		S5						1	H							1	POSS
Tree Swallow	*Tachycineta bicolor*	G5	S4B				3				5	FY	4	H	7	X	7	CONF
Turkey Vulture	*Cathartes aura*	G5	S5B				3								1	X	1	OBS
Warbling Vireo	*Vireo gilvus*	G5	S5B				4		1	S	1	S/H					1	POSS
White-breasted Nuthatch	*Sitta carolinensis*	G5	S5				3	X							3	S	3	POSS
Yellow Warbler	*Setophaga petechia*	G5	S5B				4		1	P/A	1	FY	3	S/H	4	S	4	CONF
Total No. of Species									**20**		**18**		**19**		**18**		**36**	

4.4.1.3 Results - Mammals

Four mammal species were observed during field visits: Eastern Chipmunk (*Tamias striatus*), Gray Squirrel (*Sciurus carolinensis*), Eastern Cottontail (*Sylvilagus floridanus*) and White-tailed Deer (*Odocoileus virginianus*). A similar diversity\ of species was also recorded during previous work (Dougan & Associates 2009).

The general area also likely supports other mammals often found in urban and semi-natural areas, including: Striped Skunk (*Mephitis mephitis*); Coyote (*Canis latrans*); Red Fox (*Vulpes vulpes*); Raccoon (*Procyon lotor*); Groundhog (*Marmota monax*); Muskrat (*Ondatra zibethicus*); and a number of small mammals that often go undetected (for example shrews, voles and mice).

No SCC mammals were recorded on the subject property during field surveys and we are not aware of any specific records of mammal SCC in the vicinity.

4.4.1.4 Results - Herpetofauna

No herpetofauna species were observed during the field surveys for the current study. Two species were recorded during previous work (Dougan & Associates 2009): Eastern Red-backed Salamander (*Plethodon cinereus*) and Dekay's Brownsnake (*Storeria dekayi*). The general area, including lands along the Credit River, likely also supports Eastern Gartersnake (*Thamnophis sirtalis*), Green Frog (*Lithobates clamitans*), Northern Leopard Frog (*Lithobates pipiens*), American Toad (*Anaxyrus americanus*), and possibly Midland Painted Turtle (*Chrysemys picta marginata*).

WSP staff did not observe evidence of turtle nesting (e.g., past nest predation) along the banks of the Credit River or anywhere within the subject property – during searches completed with breeding bird and bat habitat assessment surveys. Ideal nest sites for turtles tend to face south or west with little overhead cover, have gravely, sandy or loamy soil, and are within a few metres of water (Brooks 2007). Based on this definition, no 'ideal' turtle nesting habitat occurs within the subject property. The shorelines of the Credit River are mostly steep and rocky with no natural breeding habitat (sand or gravel beaches and shoals). In addition, there are very limited turtle basking opportunities within the Credit River in proximity to the subject property (i.e., limited to a few scattered boulders).

No reptile hibernacula or potential hibernacula sites were noted within the subject property or vicinity.

4.4.1.5 Results – Lepidoptera

One Monarch (*Danaus plexippus*) butterfly was incidentally observed during the July 6, 2018 site visit. No other Lepidoptera were recorded during previous site visits.

4.4.2 SAR Bat Habitat

4.4.2.1 Approach

Four endangered bat species, all subject to provisions of the ESA, are known from the area (per MNRF SARO list) or potentially present based on records in southern Ontario:

- Eastern Small-footed Myotis (*Myotis leibii*);
- Little Brown Bat (*Myotis lucifugus*);
- Northern Long-eared Bat (*Myotis septentrionalis*);
- Tri-colored Bat (*Perimyotis subflavus*).

At present, there is no General Habitat Description or Habitat Regulation for any of these bat SAR. The following has informed our assessment of bat habitat:

- Correspondence with MNRF Guelph and Aurora staff on multiple dates in 2015 and 2016
- Technical Note, Species at Risk (SAR) Bats (MNRF Regional Operations Division, June 2015)
- Bat and Bat Habitat Surveys of Treed Habitats (MNRF Guelph District, May 2016)
- Use of Buildings and Isolated Trees by Species at Risk Bats. Survey Methodology (MNRF Guelph District, October 2014)
- Correspondence with MNRF Aurora staff in November 2017 and July 2018.

Current guidance regarding surveys focuses on identification of candidate maternity roost habitat, though all SAR bat habitat (i.e., day roosting habitat, foraging habitat, hibernacula) is protected under the ESA.

Survey methodology is as follows:

- **Tier 1. Habitat suitability assessment**. This focuses on snags / cavity trees (in woodland or non-woodland habitats).

  Snags / Cavity Trees. There is, at present, no explicit criteria for determining what is a 'suitable' snag / cavity tree for maternal roosting, but guidance is provided in the Technical

Note (MNRF 2015) and Bat and Bat Habitat Surveys of Treed Habitats (MNRF Guelph District, May 2016) for selection of best candidate roost trees for acoustic monitoring; these have been used in our determination of snag habitat suitability.

  - Trees within the subject property (Figure 4) were assessed using those characteristics, with notes and representative photos taken.
  - A reconnaissance level assessment of trees within adjacent valley slope forest was undertaken for context, though none of those trees will be removed / impacted by proposed works.
  - A targeted habitat assessment survey was completed on October 12, 2016, with supplementary searches during other field surveys from October 2015 through September 2016.

- **Tier 2. Presence / absence survey**. To be undertaken if any suitable habitat could potentially be removed or impacted.

As no potentially suitable cavity trees that could be impacted by the proposed works were recorded, presence / use surveys were not deemed to be required and none was undertaken.

4.4.2.2 Results - Bat Habitat Assessment

In total, three deciduous trees with cavities that may be suitable for bat roosting / maternity colony use were recorded during field surveys in 2015 and 2016 (as shown on Figure 4 and described in Table 3):

- All are within the valley slope / ravine forest areas. None is within areas proposed for development / potential impact areas
- These trees have been ranked as 'poor' (Butternut and Basswood) or 'moderate' (Willow); see Table 3. Rankings are based on criteria in the MNRF Technical Note (2015).

Note that woodland habitat is well-represented along the Credit River valley in the local landscape and trees on the subject property are not unique in this regard.

It is also likely that bats forage along the Credit River and open park / meadow areas on adjacent lands and in the local landscape.

WSP corresponded with MNRF in November 2017 and July 2018 regarding SAR bat habitat. See Section 4.6.5 for discussion.

Table 3. Assessment of bat roosting tree habitat suitability

Snag Description								Snag Ranking								Impact (Retained or Removed)
Cavity/ Snag Number	Decay Class	Cavity Descriptions	Species	Dbh (cm)	Open canopy surrounding tree (%)	Max. Cavity Height (m)	Relative Tree Height (m)	Tree Height Rank	DBH rank	high density of snags	Cavity height rank	Decay class rank	Equal Weight Rank	Weighted Rank	Comments / Rationale	
								Ranked out of								
								7	6	1	1	1				
								Weight								
								5	4	3	2	1				
Forest / Treed Habitat Snags (max rank: 15)																
1	2	1 knothole cavity (5x5cm), 2.5 m up; 1 shallow cavity (5x6cm), 1.5 m up; 1 cavity (8x5cm) 6m up	Butternut	35	70	6	-1	3	2	0	0	1	1.8	4.5		Retained; close proximity to existing SWM outlet
2	2	2 small cavities (3x3cm), 6m up	Willow	50	90	6	+3	6	4	0	0	1	2.5	8.0	Cavities likely too small for bats	Retained within valley slope TOB
3	1	1 cavity entrance (7x6cm) to hollow trunk, 6m up; 1 long split (20x6cm) entrance to hollow trunk, 5m up	Basswood	42	70	6	+3	6	3	0	0	1	2.4	7.3		Retained within valley slope TOB

LEGEND

Height Rank	
Height Relative to Canopy	Rank
+5+ m	7
+3-4m	6
+1-2m	5
=	4
-1-2m	3
-3-4m	2
-5+m	1

DBH Rank	
DBH	Rank
>70cm	6
61-70cm	5
50-60cm	4
40-49cm	3
30-39cm	2
<30cm	1

Snag Density Rank	
Proximity to other Snags	Rank
clustered	1
not clustered	0

Cavity Height Rank	
Cavity Height	Rank
>10m	1
<10m	0

Decay Class Rank	
Decay Class	Rank
1	1
2	1
3	1
>3	0

Weighted Rank Outcomes		
Treed		Snag Suitability
13-15		Very Good
10-13		Good
8-10		Moderate
<8		Poor

4.4.3 Significant Wildlife Habitat

The presence of candidate *Significant Wildlife Habitat* (SWH) on the subject property was determined based on the Peel-Caledon Significant Wildlife Habitat Study (North-South Environmental 2009), with reference to the provincial Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF 2015) and Significant Wildlife Habitat Technical Guide (MNRF 2000), and the Oak Ridges Moraine SWH guide (Government of Ontario 2007).

A comprehensive evaluation is provided in Appendix E. Each SWH criterion in the Peel-Caledon guidelines was evaluated based on the description of Candidate SWH using the results of the background information and field investigations. For several criteria, candidate SWH is described; however, no criteria are available to confirm SWH and it could not be evaluated, though commentary is provided. Where candidate SWH was identified outside the area of impact of the development, further studies to confirm SWH were deemed to be not required.

Key results of the SWH evaluation are as follows, with areas mapped on Figure 4:

- No SWH is currently identified on the subject property.
- Five *Candidate SWH* types are present:
    - **Snake Hibernacula**: some potentially suitable hibernacula habitat is present on exposed rock areas on the valley slope, but it is shaded and not ideal. None is present on the tablelands of the subject property. As the development limit is set back from the top of valley slope, no direct impacts and no impacts to overall function are anticipated.
    - **Bat Maternal Roosts and Hibernacula**: no hibernacula habitat is present. Three potentially suitable cavity trees are present on the subject property. All are in areas to be retained. The development proposes the removal of ~ 0.03 ha of treed habitat of an ELC type that meet candidate SWH: a very small portion of Unit 5c ([FOD7-2),] a young Ash-dominated forest. The proposed woodland removal represents a very small proportion of the contiguous woodland along the Credit River valley and nearby woodland on adjacent lands west of Mississauga Road. In Units 5c and 6b, trees proposed for removal are young to mid-aged, with no observed cavities. Approximately 30 trees are greater than 15 cm dbh.
    - **Raptor Nesting Habitat** (wetlands, ponds and rivers): potential Osprey nesting habitat (candidate SWH) is associated with the Credit River treed areas. No nests or SWH has been confirmed on the subject property and all valley forest will be retained with the proposed plan, though there will be removal of young woodland/forest on the tablelands. As noted above, this represents a very small proportion of the contiguous woodland along the Credit River valley and nearby woodland on adjacent lands west of Mississauga Road.

- **Raptor Nesting Habitat** (woodland): potential for raptor nesting in immature woodland on the subject property (primarily on the valley slope and ravine) and Cooper's Hawk was recorded as a potential breeding species in the area (flyover). Nesting has not been confirmed during targeted searches. The more mature, less disturbed forest areas (i.e., valley / ravine slope forest) and additional forest will be retained with the proposed plan.
- **Animal Movement Corridors**: Although there are no specific criteria for confirming corridors as SWH, the Credit River valley, including the eastern edge of the property, functions as a corridor for movement of wildlife and dispersal of plants. Natural vegetation within the valley will be retained and protected with the proposed development.

- Three *Confirmed SWH* types:
  - **Species listed as Rare in Ontario**: 1 Butternut tree is present in ELC Unit 4 (ravine).
    - However, given its declining health and conclusions of the BHA (i.e., Category 1 – do not need to retain) as discussed in Section 4.6.1, it is uncertain whether this would be considered SWH. We have conservatively mapped as SWH, including a 25m radius from the trunk
    - Notwithstanding this, there will no impact to Butternut habitat or individuals as a result of the proposed works, with implementation of mitigation and protection measures and best management practices during construction.
  - **Species Identified as Nationally Endangered or Threatened by COSEWIC which are not listed as Endangered or Threatened under Ontario's Endangered Species Act.:** One Monarch butterfly was recorded on a single date. No Monarch breeding habitat will be impacted as all significant natural areas (including Unit 3, where Milkweed is present in low abundance) are being retained with setbacks. In addition, open areas outside of the development envelope will be enhanced with a native seed mix to increase foraging and breeding opportunities for Monarch
  - **Species Identified as Special Concern based on the Species at Risk in Ontario list that is updated annually by MECP**: As above.

4.4.4 Wildlife Movement Opportunities

The Credit River and associated riparian corridor function as a natural wildlife movement corridor stretching northwest-southeast across the city of Mississauga. The Credit River corridor connects the Credit River Watershed beyond the city boundaries to the northwest to Lake Ontario in the southeast. This natural wildlife movement corridor provides a linkage between shelter, foraging, breeding and/or wintering habitats and provides a natural route for juvenile dispersal as well as the dispersal of plant seeds that may be carried by wildlife to new habitats.

4.5 Aquatic Resources

4.5.1 Aquatic Habitat Assessment

4.5.1.1 Methodology

Field surveys included taking representative photographs and assessment of the following aquatic habitat parameters:

- Flow condition, clarity, general gradient and velocities
- Dimensions and general character
- Morphology (e.g., riffles, pools)
- Cover opportunities (i.e., woody debris, undercut banks, boulders, aquatic vegetation)
- Substrate type
- Bank height, character and stability / evidence of erosion
- Riparian vegetation (general)
- Physical barriers to fish movement
- Potential specialized and important habitat areas including potential spawning habitat, good nursery cover, holding habitat (deeper refuge pools)
- Evidence of groundwater discharge
- Disturbances, habitat limitations and potential habitat enhancement opportunities

On October 16, 2015 and August 9, 2016, a detailed aquatic habitat characterization was undertaken on the drainage feature within the subject property, from the roadside ditch north of Thorny Brae Place to the Credit River. On February 23, 2017, a site visit was undertaken to observe the effects of a spring freshet on the drainage feature from upstream of Thorny Brae Place to the Credit River.

Additional observations were recorded during other field surveys in 2015 and 2016.

4.5.1.2 Results

The drainage feature has been partitioned into four separate reaches (Figure 5):

- Reach 1: This drainage swale on the tablelands is the most upstream reach, beginning as roadside drainage to the north of Thorny Brae Place and continuing downstream to the Credit River natural hazard lands at the ravine. This reach flows through a cultural woodland south of Thorny Brae Place.

- Reach 2: This reach begins at the natural hazard lands (ravine) of the Credit River downstream to the SWM outlet. This reach is more defined than Reach 1 and flows through a Fresh-Moist White Ash Lowland Deciduous Forest (FOD7-2).
- Reach 3: This reach begins at the SWM outlet, downstream to the base of the slope. This is a steep, well-defined reach with a slope of approximately 50° through a Fresh-Moist White Ash Lowland Deciduous Forest (FOD7-2).
- Reach 4: This reach occurs within the floodplain of the Credit River, from the base of the slope east to the confluence with the river. It is an open drainage feature through manicured lawn.

Reach 1 begins as roadside drainage to the north of Thorny Brae Place and is conveyed under the road by a corrugated steel pipe (CSP). Both Reach 1 and Reach 2 were dry during aquatic survey visits in the late summer / fall and no flow or standing water was noted during field surveys completed in 2015 and 2016 (including visits in October, December, May, June, July, August and September). Water was observed in Reach 1 upstream of Thorny Brae Place (<2cm depth) during the spring freshet on February 23, 2017. Trickle flow (<0.01 m/s) was observed through the culvert, pooling at the culvert outlet downstream of Thorny Brae Place (standing water only). Water depth did not exceed 2 cm depth downstream of the culvert and did not extend beyond the culvert outlet (i.e., the remainder of Reach 1 and Reach 2 was dry with no evidence of recent flow). Water was observed discharging from the outfall during the October 29, 2015, and February 23, 2017 visits only, with flow evident in both Reach 3 and Reach 4. Based on a review of historic air photos, this drainage pattern appears to have been established from 1954; no defined drainage course is evident beyond (north) of the current limits of Eglinton Avenue.

Water is conveyed under the road via CSP and flows into a landscape depression through immature Cultural Woodland (Veg. Unit 6b) towards the headwall / outfall. No discernable drainage feature was evident upstream of the outfall (Reaches 1 and 2), only a depression in the landscape. Discharge from the outlet is conveyed to the Credit River via a 0.5-1.0 m wide steep drainage feature down the side of the valley wall (Reach 3), a grade of approximately 50°. The large gradient of the watercourse on the forested valley slope, combined with a 1.5 m high knick point approximately 5 m downstream of the outfall, provides a substantial barrier to fish migration. Substrate through the valley slope reach (Reach 3) consists mainly of bedrock and boulders. Below the slope, the gradient flattens out and watercourse flows as a small drainage ditch 0.45 m wide with vertical banks 0.24 m in height (Reach 4). Substrate consists mainly of cobble and silt and riparian vegetation consists solely of manicured lawn. This ditch meanders for approximately 30 m before discharging over the top-of-bank of the Credit River (approximately 1.5 m vertical height).

The habitat characteristics within the drainage feature throughout its length suggests it acts as contributing habitat to downstream reaches (Credit River) but does not support direct fish use.

4.5.2 Headwater Drainage Feature (HDF) Assessment

4.5.2.1 Methodology

Per comments received from CVC on June 27, 2016 on the draft TOR, we have evaluated the un-named drainage feature on the portion of the subject property above the confirmed top of bank (Reach 1) following the Evaluation, Classification and Management of Headwater Drainage Features Guidelines (the HDF Guidelines) (CVC & TRCA, January 2014). This evaluation is best applied in the short period of time following a major freshet event, which in southern Ontario generally occurs during late winter and spring (March to early April), and before new vegetative growth covers and disrupts any newly deposited sediment. This assessment was completed on February 23, 2017, following a major freshet event. These observations were supplemented with observations during other field visits in, May, June, July, August, September, October and December.

Part 1: Evaluation

Based on the February 23, 2017 assessment, it was concluded that the HDF upstream of the Hazards Lands on the subject property was a 'low sensitivity site' (i.e., features that are ill-defined, contain only ephemeral flow and are unlikely to contain sensitive species and/or habitat) and as such, the Rapid Survey Technique was used for assessment, as outlined in the HDF Guidelines (CVC & TRCA, January 2014). Using this evaluation method, components of the headwater sampling protocol (Ontario Stream Assessment Protocol [OSAP] Section 4 Module 10, March 2013) were applied, documenting HDF form and flow conditions, riparian vegetation and site features that are important components of habitat.

HDF information collected during the field survey encompassed the following general parameters, where relevant:

- Feature Type (e.g., defined natural drainage feature, channelized, not defined, etc.)
- Riparian Conditions (e.g., none, cropped land, forest, etc.)
- Flow Conditions (e.g., no water, standing water, interstitial flow, minimal or substantial flow)
- Feature Vegetation
- Feature / Bankfull Widths / Depths
- Sediment Deposition / Transport
- Flow Measures
- Longitudinal Gradient
- Site Features (e.g., roughness)
- Connectivity
- Representative site photographs

Part 2: Classification

The data collected during the HDF evaluation phase (Part 1: Evaluation) was used to apply appropriate classifications to the HDFs being assessed, identifying the functions of each HDF that were considered for Management Recommendations. Following the HDF Guidelines, a classification was applied to each of the following four categories: Hydrology; Riparian; Fish and Fish Habitat; and Terrestrial Habitat (see Table 4).

Part 3: Management Recommendations

The classification categories identified in Part 2 provide the basis of the management recommendations provided below. A flow chart in the HDF Guidelines provides guidance for translating classification results to management recommendations. The classifications and Management Recommendations are summarized for each segment and HDF in Table 4.

4.5.2.2 Results

The classification and management recommendation for the HDF identified on the subject property resulting from the field surveys and evaluation is provided in Table 4.

Table 4. Summary of HDF functional classifications and management recommendations

Functional Classification and Management Recommendations		**Drainage Feature Upstream of Hazard Lands**
Step 1	Hydrology*	FC – 1 and 2 (No Surface Water / Standing water) FT – 7 (Swale) ***Limited or Recharge***
	Modifiers	None
Step 2	Riparian	***Important Functions*** (CUW)
Step 3	Fish Habitat	***Contributing Functions***
Step 4	Terrestrial Habitat	***Limited Functions***
Management Recommendation	***No Management Required***	

* FC = OSAP Flow Condition Codes; FT = OSAP Feature Type Codes

Although trickle flow was observed through the culvert at Thorny Brae Place during the 2017 freshet assessment, standing water only (<2 cm depth) was observed immediately upstream and downstream of the culvert; the remainder of the drainage feature upstream of the Hazard Lands was dry at the time of assessment with no defined drainage feature / flow path evident. The feature exists as swale only with no identified substrate sorting. Lack of flow or standing water in May-June and lack of moisture tolerant plants along the swale indicate that it is not a feature with valued or contributing hydrology. Therefore, we concluded, per Figure 2 in the HDF Guidelines, our Management Recommendation for this feature above the confirmed top of bank is 'No Management Required' as the feature does not provide an important hydrological function, is not a wetland and does not function as a wildlife movement corridor.

4.6 Species at Risk (SAR)

A SAR habitat assessment for the subject property has been undertaken based on the SAR list for Peel Region (MNRF 2016), as well as any specific records indicated on the MNRF NHIC database, via correspondence with MNRF or CVC biologists or based on recent additions to the Species at Risk in Ontario (SARO) list (e.g., Tri-colored Bat). The likelihood of presence on the subject property for each species was determined based on evaluation of preferred habitat in the context of background and field surveys, as well as known ranges and occurrences of the species. The likelihood of development works impacting each species was determined by considering the likelihood of presence, the life functions supported by the impacted habitat (e.g., nesting), and the proximity of development to the potential habitat.

The SAR Habitat assessment is provided in Appendix F.

We concluded that most species have no / minimal likelihood to be present on and/or impacted by proposed works on the subject property. Details of SAR that were confirmed on the subject property or were assessed as having a potential for presence or impacts are discussed below.

4.6.1 Butternut

One Butternut was recorded; in Vegetation Unit 5b at the southeast edge of the property. A *Butternut Health Assessment* was completed for the tree on May 20, 2016 and it was classified as Category 1 (non-retainable). A Butternut Health Assessment Report (#602-02) was submitted to MNRF on September 6, 2016. The tree was assessed on-site by MNRF (B. Kowalyk) on September 7, 2016; it was confirmed after some discussion that the tree should be classified as Category 1. An updated BHA Report was submitted to MNRF on September 8, 2016 and MNRF confirmed findings and classification as Category 1 via an email dated September 21, 2016.

As Category 1, this tree is not subject to the provisions of the ESA (i.e., it could be harmed / removed). Notwithstanding this, the proposed activities do not require removal and it will be retained. Per MNRF comments, nails in the tree will be removed (Appendix K).

4.6.2 Barn Swallow (*Hirundo rustica*) and Chimney Swift (*Chaetura pelagica*)

Neither species was recorded on the subject property during field investigations. However, both species are known from the general area (MNRF regional list), and a small amount of suitable foraging habitat is present on the subject property; hence, there is some (low) potential for presence.

WSP staff conducted searches under and on the Eglinton Avenue bridge as part of the breeding bird surveys. One Eastern Phoebe nest was recorded under the bridge. No Barn Swallow nests were recorded.

We conclude that no breeding habitat for either species is present on the property, therefore the likelihood and magnitude of potential impacts to these species is minimal, and would consist only of impacts to a very small amount previously disturbed foraging habitat, which is abundant in the surrounding landscape. No further ESA compliance measures are anticipated for these species.

4.6.3 Monarch

One Monarch butterfly was incidentally observed during the July 6, 2018 site visit. The host plant for Monarch reproduction, Common Milkweed (*Asclepias syriaca*), was present in low numbers in Vegetation Unit 3. Unit 3 will be retained in full. Monarchs may also use old field (CUM1-1) species for a source of nectar, such as Fuller's Teasel (*Dipsacus fullonum*), aster species (*Symphyotrichum* spp.), goldenrod species (*Solidago* spp.), etc.; however, these plant species are common throughout the broader landscape and no impacts are anticipated for Monarchs by removal of CUM1-1 communities. No further ESA compliance measures are anticipated for this species.

4.6.4 American Eel

Although not observed during field surveys, CVC has indicated that American Eel is present within the Credit River, immediately adjacent the subject property. American Eel is designated *Endangered* under the Endangered Species Act (2007) and receives species and general habitat protection. No direct impacts are anticipated as the drainage feature on the subject property contains contributing habitat only (i.e. does not support direct fish use). Indirect impacts (e.g. downstream sedimentation) will be prevented through the installation of proper mitigation (e.g. ESC fencing).

4.6.5 SAR Bats

MNRF Aurora staff were consulted by WSP in November 2017 and July 2018 in regard to bat habitat and in reference to two conceptual residential development options. The following key points were expressed by MNRF:

- The first step is determining the significant woodland limit (i.e., no point in completing SAR bat surveys until this is resolved)

- SAR bat habitat would include contiguous significant woodland on the tableland, but not the CUW (Unit 6b); hence acoustic monitoring surveys would not be required to pursue removal of Unit 6b

As part of the current revised Scoped EIS (Section 6), we have concluded that *Significant Woodland*, as a component of the *Natural Areas and Corridors* (NAC) designation in the ROP, is present in the Credit River valleylands (defined by the LTSSL) and a 25m radius surrounding the Butternut. In addition, *Significant Woodland*, as a component of the *Significant Natural Areas* designation in the City OP, is present in the valleyland forest communities (i.e., valley portions of Units 5a, and 5b). With the proposed development, all of these areas will be retained in full (including the three cavity trees located within the valleylands on the subject property, which provide suitable maternity roosting habitat). In addition, woodland, thicket and forest communities beyond the LTSSL and Butternut habitat will be retained with the proposed development (i.e., Unit 2, Unit 4, and portions of Unit 5c and 6a) and enhanced with the *Woodland Enhancement Strategy*.

Conclusion: Provided that all tree removals occur outside the SAR bat active period (April 1 – Sept. 30), there will be no impact to potentially suitable SAR bat habitat and no requirement for acoustic monitoring surveys.

4.7 Geotechnical

Information presented in this section is based on the Soils Investigation (Soil Eng. Oct. 2016; Addendum Dec. 22 2016; Revised Addendum March 2019). In that study, 12 boreholes were drilled to a depth of 3.0 to 6.6 m below ground surface (bgs) and soils were analyzed for grain type and permeability. Key results are as follows:

- Soils consist of pavement or topsoil over hard silty clay till interstratified with firm silty clay, with shale bedrock at ~3.7 to 5.6 m bgs
- Groundwater not encountered in boreholes (i.e., minimal depth of 6+m bgs)
- Slope Stability Study: confirmed a Long-term Stable Slope Line (LTSSL), as shown on all figures herein. This incorporates the specified stable gradient component and toe erosion setback (where necessary). It is generally coincident with the agency approved Top of Bank around the south portion of the property (at the un-named drainage feature ravine), but slightly west of the TOB in the north portion of the site.
- Note that there is a minor change to the LTSSL limit, based on agency comments and as identified in the 2019 Revised Addendum. The revised LTSSL limit is shown on all base plans for the current submission.

5.0 PROPOSED ACTIVITIES

As input to the proposed development and activities, natural heritage and geotechnical feature limits were delineated and/or confirmed (Section 5.1). Setback requirements were then determined based on the features and functions of these adjacent features, and literature guidance (Section 4.2). Brief descriptions of the proposed stormwater management strategy (Cole Engineering 2017) and design are included in Section 5.3.

For the purposes of the impact assessment herein, we focus on development of the tablelands above the valley top of slope. All works associated with the proposed stormwater management strategy (including SWM design and fluvial geomorphology assessment / recommendations) are discussed as part of the previous submission. The reader is directed to the March 2017 EIS and associated documents for details.

5.1 Delineation of Feature Limits

The following natural feature limits have been reviewed, with recommended limits established or confirmed as part of the current study. See Section 6 for additional discussion.

5.1.1 Region of Peel Greenlands

Core Areas of the Greenlands System in Peel are mapped on ROP Schedule A as generally coincident with the top of valley slope on the subject property.

- Based on a review of ROP policies (Section 6.3), we conclude that the un-named tributary ravine also meets criteria as a *Core Areas of the Greenlands System in Peel*
- This limit, including the ravine, has been more accurately delineated as a “Top of Bank” defined by CVC (Young and Young Surveying Inc., February 23, 2004)
    - This limit has been verified through current work, as documented in the Slope Stability Study Addendum (Soil Engineers Ltd. 2016; 2019)

      The Long-Term Stable Slope Line (LTSSL) generally follows the previously delineated Top of Bank, TOB (CVC 2004) along the un-named tributary / drainage feature, but extends up to approximately 12.5 m west of the previous TOB along the Credit River drainage feature.

      The LTSSL (per Soil Engineers Ltd. 2016; 2019) is the recommended ‘valley’ limit as input to natural heritage designations discussed herein.
- The *Core Area* limit has been confirmed at the LTSSL, and extended to include a 25m radius around the Butternut (see Figure 6)

5.1.2 City of Mississauga Natural Hazard

The *Natural Hazard* per Schedule 3 (Natural System) of the MOP is generally coincident with the top of valley slope on the subject property, including a northwest projection that encompasses the ravine associated with the un-named tributary.

- This limit has been more accurately delineated as a "Top of Bank" / "Top of Slope" defined by CVC (Young and Young Surveying Inc., February 23, 2004)
    - Verified through current work, as documented in the Slope Stability Study Addendum (Soil Engineers Ltd. 2016) and revised Addendum (2019)
    - It follows the LTSSL on Soil Engineers Ltd. 2019 Dwg. No. 1 and figures herein
- This limit has been confirmed at the LTSSL, and extended to include a 25m radius around the Butternut (see Figure 6)

5.1.3 City of Mississauga Natural Area CRR11

The *Significant Natural Areas and Natural Green Spaces* feature per Schedule 3 (Natural System) of the MOP is generally coincident with the west bank of the Credit River on the subject property, derived from mapping of *Natural Area CRR11* in the City of Mississauga Natural Areas Survey 2014 Update (North-South Environmental Inc. and City of Mississauga 2014). The CRR11 Natural Areas Fact Sheet is included in Appendix G.

- This is also an *Environmentally Significant Area*; limits of the *Environmentally Significant Area* were confirmed in the field with CVC staff on November 12, 2008 (Dougan & Associates 2009).
- No change to the limits are proposed as part of the current study – the *Significant Natural Areas and Natural Green Spaces* / ESA / CRR11 limit is at the west Credit River bank, following the LTSSL, and including a 25m radius around the Butternut

5.1.4 City of Mississauga Greenlands

The *Greenlands* (Schedule 10 Land Use Designations) and *Green System* (Schedule 1a Urban System – Green System) designations on the subject property are coincident and include the following:

- Natural Heritage System elements (i.e., the *Significant Natural Area CRR11* and *Natural Hazard* per MOP Schedule 3), associated with the Credit River / valley slope
    - Limits are confirmed as the LTSSL (hazards) and west river bank (SNA CRR11), and including a 25m radius around the Butternut
- *Public and Private Open Spaces*, per MOP Schedule 4 (Parks and Open Spaces). This encompasses the natural vegetation in the valley as well as regenerating vegetation on the tableland above the valley slope on the east portion of the subject property

5.2 Setbacks and Development Constraint Limits

5.2.1 Setbacks

The natural heritage features and functions recommended for retention and protection are all associated with the Credit River valley, including the un-named tributary ravine, and all are within the defined top-of-bank / natural hazard limit.

Recommended development setbacks from those features are based on a combination of: the nature and sensitivity of features to be protected; relevant policy and guidance; endeavoring to be consistent with buffers applied to natural features in the area; and buffer guidelines from published literature.

Recommended setbacks:

1. Region *Core Area* + 10 m
2. City *Significant Natural Area* + 10 m
3. Top of Bank / Natural Hazard + 10 m
4. Confirmed *Significant Wildlife Habitat* + 10m

5.2.2 Development Constraint Limit

The recommended development constraint limit is the greater of the recommended setbacks described in Section 5.2.1, as shown on Figure 6. The development limit extends well beyond the constraint limit, including lands to be restored / enhanced as described herein. The development setback is one of the recommended natural heritage mitigation and protection measures; additional measures are described in following sections.

5.3 Description of Proposed Activities

The proposed activities are removal of existing residential homes and construction of one single-detached house and 37 townhouses, along with associated grading, road access and servicing. All works will be restricted to the proposed development envelope, as shown on Figure 6.

Note that some of the servicing / road installation has or will be undertaken as part of the previous 'SWM Outlet' application, with pertinent details summarized herein.

The new storm sewer was constructed in 2018 on Thorny Brae Place with an outfall to the Credit River as part of the approved subdivision agreement under file number T-09002M (4601 Mississauga Road, south of the Church). This storm sewer was sized to also capture storm flows from the proposed development, including sections of Mississauga Road. The location of the approved and constructed storm sewer has been designed in conjunction with the future Thorny Brae Place extension to the east with a new watermain, sanitary sewer system, service connections, roadway

and utilities to be constructed as part of the subject development. Per requirements of the T-09002 approval and associated MOE, CVC, and City permits, work was undertaken in the following sequence: ESC and vegetation protection fencing was installed and inspected and subsequently cleared by City Staff in March 2018; trees and vegetation were removed in accordance with TRP-18-14 prior to April 6, 2018; grading and storm sewer installation and headwall works commenced through Summer 2018 with the completion of works on Thorny Brae in August 2018. Outstanding work includes installation of the restoration plantings, which is scheduled to be completed in Spring 2019, subject to weather conditions.

The proposed development and activities discussed herein are shown on the following:

- Concept Plan (RN Design Ltd., March 2019)
- Stormwater Management Design Brief - Revised. The Archways and Hazel Common Element Condominium (Cole Engineering; June 29, 2017)
- Functional Grading Plan (Cole Engineering; March 2019)
- Functional Servicing Plan (Cole Engineering; March 2019)
- Tree Inventory & Preservation Plan (BTI Landscape Architecture; March 6, 2019)

Key elements of the proposed activities are as follows:

- Prior to any construction, sedimentation control measures and vegetation protection fencing are to be installed at the limits of grading, as shown on Drawing ESC-01 (Cole Engineering; March 2019).
- Restoration and enhancement works within the future valley buffer and contiguous tablelands is discussed within the *Woodland Enhancement Strategy* (Appendix M).
- Existing trees are to be removed inside the designated limit of construction, in compliance with in compliance with the Migratory Birds Convention Act (MBCA), and in consideration of potential SAR bat habitat (i.e., removal during the bat hibernation period from October 1 to March 31 to prevent harm to individuals).
- The Tree Inventory & Preservation Plan and letter (BTI; March 6, 2019) quantify tree retention and removals, as follows:

  In total 144 trees are recommended for removal, 96 of which are due to construction on the subject property:

  - 80 private trees between 10-30cm DBH are recommended for removal:
    - 43 trees due to construction on the subject property
    - 37 trees due to poor condition
  - 39 private trees between over 30cm DBH are recommended for removal:
    - 28 trees due to construction on the subject property

        - 11 trees due to poor condition
    - 25 City owned trees between 10-30cm DBH including one ash tree are recommended for removal due to construction on the subject property

- For trees recommended for removal due to construction, compensation in accordance with City requirements will be determined as a condition of approval.
- The replacement trees should be selected from native tree and shrub species such as Trembling Aspen, White Oak, Basswood, Eastern Hemlock, Eastern White Pine, Northern Bush Honeysuckle, Staghorn Sumac, Flowering Raspberry.
- Buffer enhancement is a component of the *Woodland Enhancement Strategy* (Appendix M), to be finalized as a condition of approval.
- *Woodland Enhancement Strategy* (Appendix M), including the following key elements:
    - Retention of existing higher quality woodland associated with the FOD7-1 vegetation community (as well as CUS communities) north of the approved stormwater management (SWM) outfall easement and temporary access / work area. Retain standing snags, if not hazards.
    - Removal of woodland south of the SWM easement. This is primarily CUW1, with a small amount of FOD7-2 (extension of Vegetation Unit 5c).
    - Creation of new woodland habitat north of the SWM easement (currently cultural meadow), contiguous with retained woodland – via native species plantings and retention of non-invasive tree species.
    - Invasive species control within retained woodland areas and proposed restoration areas. There are several high-density concentrations of five priority taxa identified through scoped field surveys undertaken by WSP in 2018
    - Woodland enhancement plantings with native species.
    - Seed collection of Virginia Stickseed and dispersal through enhancement areas
    - Salvage of logs, rootwads and brush from areas of tree removal.
    - Installation of additional wildlife habitat elements + retention of existing habitat (utilizing materials salvaged from the site).
    - Closure of the informal pedestrian trail.
    - Garbage removal.

5.4 Stormwater Management

The SWM strategy for Thorny Brae is outlined in the Stormwater Management Design Brief - Revised. The Archways and Hazel Common Element Condominium (Cole Engineering; June 29, 2017) and Functional Servicing Report (Cole Engineering; March 2019).

The proposed stormwater management plan meets criteria outlined by the City of Mississauga, CVC and the MOE. Key elements of the SWM strategy are as follows:

- The existing SWM outlet on the subject property will be utilized (with improvements) to accept drainage from the subject property and adjacent two properties to the south: the Church of the Croatian Martyrs; Mississauga Road; and the Archways
- **Water Quantity**. Due to the close proximity to the Credit River, quantity controls are not required.
- **Water Quality**. Since the total asphalt area of the site is comparable to the existing conditions, and the proposed rooftops are will generate "clean" runoff (to infiltration galleries), the overall water quality of the site will remain comparable to existing conditions; therefore, no additional quality controls are required. Notwithstanding this, Low Impact Development (LID) techniques will be considered at detailed design; effective use of LID's will promote infiltration and provide additional water quality measures for the development site. LID techniques being considered include at source infiltration, rain barrels, treatment swales, increased topsoil, etc.,
- **Water Balance**. To be confirmed at detailed design. LID's to be considered as they can promote water balance objectives. LID features may be a combination of at source infiltration, rain barrels, treatment swales, increased topsoil, etc.
- **Erosion & Sedimentation**. Mitigation for erosion and sedimentation in the receiving watercourse (Credit River), via channel improvements / restoration in the drainage channel, as demonstrated through the following previously submitted documents:
    - Plan, Profile and Cross-Section Drawing DET1 and PP1 (Water's Edge; February 2017). These propose fluvial geomorphological works to mitigate erosion potential downstream of the outlet via measures for erosion protection and aquatic habitat enhancement (riffle / pool and step pools; riparian plantings).
    - Tree Inventory & Preservation Plan (BTI Landscape Architecture; March 6, 2019)
    - The Archways Restoration Landscape Plan (Alexander Budrevics & Associates Ltd.; January 12, 2018)

6.0 POLICY ASSESSMENT

Relevant planning legislation and policy pertinent to this study are summarized in the following sections. An overview of key policies and implications is provided along with an assessment of the policy as it relates to natural heritage features within the subject property.

6.1 Federal

6.1.1 Fisheries Act

The Canadian Fisheries Act (1985) provides provisions for the protection of fish and fish habitat. Section 35 (1) of the Fisheries Act states:

> "No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery."

The Act interprets 'serious harm to fish' as "the death of fish or any permanent alteration to, or destruction of, fish habitat".

Proponents that plan to undertake activities in or near water have potential to negatively affect fisheries, as such, are responsible for avoiding, mitigating, and offsetting 'serious harm to fish'. Avoidance is achieved by undertaking measures which completely prevent serious harm to fish. These measures include project design considerations, location of activity, and timing of works. Mitigation is implemented by following best practices such as those described in the 'measures to avoid harm' to fish and fish habitat'. Any residual impacts are then required to be addressed by offsetting. An offsetting measure is one that counterbalances serious harm to fish resulting from a project, where serious harm remains after all feasible mitigation measures have been applied.

6.1.1.1 Study Assessment

For the current proposal, no works are proposed in direct or contributing fish habitat.

As part of the separate SWM Outlet process / application, the existing headwall and SWM outlet on the subject property will be upgraded to accommodate additional flows from the re-development of the subject property and adjacent properties to the south (i.e., existing flows from the Church of the Croatian Martyrs and future flows from the 'Archways' property). The requirement for review by the Federal Department of Fisheries and Oceans (DFO) and potential for authorization under the Fisheries Act will be determined at the detailed design phase of the project when the details of the undertaking are known.

Key applicable self-assessment criteria applicable to the construction of, and repairs to, water outfalls include:

- No temporary or permanent increase in existing footprint below the High-Water Mark
- No new temporary or permanent fill placed below the High-Water Mark
- No work occurring below the High-Water Mark of a nearby waterbody

In addition, the drainage swale on the subject property, including the existing SWM outfall draining into the Credit River, was assessed in context of the Fisheries Act. It was concluded that this drainage feature acts as contributing habitat to downstream reaches (i.e., the Credit River) but does not support direct fish use. The portion of the swale above the existing outlet will be piped directly to the outlet post-construction.

The only disturbances and potential for impacts within the Credit River are secondary impacts (e.g. sedimentation) associated with upgrading the existing headwall. Based on the proposed works, review by DFO will not be required as long as all appropriate measures to avoid harm are implemented. Refer to 'Measures to Avoid Harm' on the DFO website: http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html. Proposed activities for development of the subject property do not require DFO review.

6.1.2 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, including surrounding ocean waters, regardless of ownership. General prohibitions under the MBCA and MBR protect migratory birds, their nests and eggs and prohibit the deposit of harmful substances in waters / areas frequented by them.

The MBR includes an additional prohibition against incidental take, defined by Environmental Canada as:

> "The inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs."

Environment Canada implements policies and guidelines to protect migratory birds, their eggs and their nests. There is guidance on the Environment Canada website to minimize the risk of incidental take effects to migratory birds, to achieve compliance with the law and to maintain sustainable populations of migratory birds.

Compliance with the MBCA and MBR is best achieved through a due diligence approach, 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

6.1.2.1 Study Assessment

Works with potential MBCA implications may occur during the construction phase of the project when vegetation is removed for project activities, potentially removing nests of migratory birds.

Twenty-three breeding migratory bird species subject to the MBCA were recorded on the subject property. None of these species is solely dependent on the habitat to be directly impacted by proposed development and there is no suitable nesting habitat for several species in areas of proposed development (i.e., Bank Swallow, Barn Swallow, Chimney Swift and Great-blue Heron).

Compliance with the MBCA will be achieved using the following due diligence approach:

- Proponent awareness of the MBCA, potential for nesting in the area and potential for impacts to migratory birds, nests and eggs:
- Implementation of the following avoidance and mitigation measures (to be determined at detailed design), considering for example:
    - Avoiding works (i.e., vegetation / potential nesting habitat removal) within the "regional nesting period" for this area, where possible.
    - Avoiding works in key sensitive locations.
        - The proposed development area is entirely outside of the *Significant Natural Area* (CRR11) and Credit River valley lands.
    - Minimizing encroachment into higher quality, more sensitive habitats.
        - No removal or disturbance of higher quality natural vegetation communities associated with the valley is proposed. Vegetation to be removed is comprised of immature / successional culturally influenced communities (i.e., cultural meadow, cultural thicket, cultural woodland and immature forest) which have established on a former farmstead. These areas provide habitat for avifaunal species that are primarily generalists and/or urban-adapted.
    - Recommended Best Management Practices (BMPs) during construction to minimize potential indirect impacts to vegetation / potential nesting habitat outside of the direct footprint.

6.1.3 Species at Risk Act (2002)

The federal Species at Risk Act (SARA) includes a number of prohibitions to protect individuals of listed Species at Risk, including:

- No person shall kill, harm, harass, capture or take an individual of a threatened, endangered or extirpated species.
- No person shall possess, collect, buy, sell or trade an individual of a threatened, endangered or extirpated species, or any part or derivative of such an individual.
- No person shall damage or destroy the residence of one or more individuals of a threatened or endangered species, or of an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.

These prohibitions apply on private lands throughout Canada only to aquatic species and species of migratory birds protected by the MBCA listed as *Endangered*, *Threatened*, or *Extirpated* under Schedule 1 of SARA. For other listed wildlife species, these prohibitions apply only on federal lands or where recommended by order of the Governor in Council.

SARA also includes provisions to protect critical habitat; these are complex and vary according to the species in question and the location of the critical habitat. SARA's provisions also permit the Minister of the Environment, the Minister of Fisheries and Oceans and the Minister of Canadian Heritage broad discretionary powers to implement (or not) prohibitions to protect critical habitat. Generally, critical habitat protection applies to Threatened, Endangered and Extirpated species.

6.1.3.1 Study Assessment

Applicability:

The proposed development is on non-federal (private) lands and there is no order by Governor in Council; hence SARA applies only to aquatic and migratory bird species / habitat.

Individuals and Residences:

No aquatic species are present in the footprint area and there are no direct impacts to aquatic habitat / species. We are aware of no downstream critical habitat for aquatic SAR species which would be impacted by the proposed activities, with proper implementation of recommended measures to avoid harm during construction. Closest known SAR records are: Shortnose Cisco (*Coregonus reighardi*; approximately 5km downstream at Erindale Park); and Redside Dace (*Clinostomus elongatus*; approximately 6.5km upstream at Highway 401) (DFO SAR Mapping, 2016). The Shortnose Cisco record is likely historical as it has not been captured in Lake Ontario or its tributaries since 1964 and is believed to be extinct.

No federally designated SAR birds were recorded during field surveys.

Critical Habitat:

No critical habitat for SARA-listed aquatic or migratory species is present on the subject property and none is known on adjacent lands where there is potential for direct or indirect impact.

6.2 Provincial

6.2.1 Endangered Species Act (2007)

Species designated as *Threatened* or *Endangered* by 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 ESA (Subsection 9(1)) states that:

"No person shall,

(a) kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;

(b) possess, transport, collect, buy, sell, lease, trade or offer to buy, sell, lease or trade,

(i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species,

(ii) any part of a living or dead member of a species referred to in subclause (i),

(iii) anything derived from a living or dead member of a species referred to in subclause (i); or

(c) sell, lease, trade or offer to sell, lease or trade anything that the person represents to be a thing described in subclause (b) (i), (ii) or (iii)."

Clause 10(1)(a) of the ESA states that:

"No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario list as an endangered or threatened species"

The ESA also calls for the development of species-specific Recovery Strategies and Habitat Regulations. Unlike the general habitat of a species, regulated habitat may include areas that are currently unoccupied by the species. These areas are commonly referred to as "recovery habitat."

In order to balance social and economic considerations with protection and recovery goals, the ESA also enables the MNRF to issue permits or enter into agreements with proponents in order to authorize activities that would otherwise be prohibited by subsections 9(1) or 10(1) of the Act provided the legal requirements of the Act are met.

6.2.1.1 Study Assessment

Applicability:

Species afforded protection under the ESA (2007) and their habitats have been recorded within the subject property.

Habitat Screening / Assessment:

A SAR habitat assessment was undertaken, as described in Section 4.6.

Individuals and Residences:

No aquatic habitat is present in areas directly impacted by proposed works and there are no direct impacts to aquatic habitat / species. CVC has indicated that American Eel (*Anguilla rostrate*) is present within this reach of the Credit River; however, any indirect impacts (e.g. downstream sedimentation) will be mitigation with proper implementation of recommended measures to avoid harm during construction (e.g. ESC fencing and other Best Management Practices).

One *Endangered* species was recorded within the subject property: Butternut. As Category 1 evaluated tree, this tree is not subject to the provisions of the ESA (i.e., it could be harmed / removed). Notwithstanding this, the proposed activities do not require removal and it will be retained. Per MNRF comments, nails in the tree will be removed. Refer to Section 4.6.

There is potentially suitable foraging habitat for two *Threatened* bird species (Barn Swallow and Chimney Swift) on the subject property; however no confirmed and/or critical habitat for either of these species will be impacted by the proposed development.

See Section 4.6.5 for additional commentary regarding SAR bats.

6.2.2 Provincial Policy Statement

The Ontario Provincial Policy Statement, PPS (2014) was issued under Section 3 of the Ontario Planning Act. Section 3 of the Planning Act requires that decisions affecting planning matters "shall be consistent with" policy statements issued under the Act (OMMAH 1990). The PPS provides policy direction on land use planning and development matters that are of provincial interest which protect the natural environment as well as public health and safety. Key natural heritage policies are discussed below.

Per Section 2.1.4 of the PPS, development and site alteration shall not be permitted in:

1. *significant wetlands* in Ecoregions 5E, 6E and 7E1; and
2. *significant coastal wetlands*.

Per Section 2.1.5 of the PPS, development and site alteration shall not be permitted in:

3. *significant wetlands* in the Canadian Shield north of Ecoregions 5E, 6E and 7E1;
4. *significant woodlands* in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
5. *significant valleylands* in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
6. *significant wildlife habitat*;
7. *significant areas of natural and scientific interest*; and
8. *coastal wetlands* in Ecoregions 5E, 6E and 7E1 that are not subject to policy 2.1.4(b)

unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions."

Per Section 2.1.6:

> "Development and site alteration shall not be permitted in *fish habitat* except in accordance with provincial and federal requirements."

Per Section 2.1.7:

> "Development and site alteration shall not be permitted in *habitat of endangered species and threatened species*, except in accordance with provincial and federal requirements."

Per Section 2.1.8:

> "Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions."

6.2.2.1 Study Assessment

The following features are present on or adjacent to the subject property: *significant valleylands*; candidate and confirmed *significant wildlife habitat* (SWH); *fish habitat*; and habitat of *Endangered* and *Threatened* species.

An assessment of PPS natural heritage policies for these attributes is presented below.

Significant Woodlands

None is identified on the subject property (LIO 2016). Analysis of woodland significance is provided under the Region of Peel Official Plan Section 2.3.2.18 (Dec. 2016) and City of Mississauga Official Plan (2018). Significant woodland, as a component of the *Natural Areas and Corridors* (NAC) designation in the ROP, is present within the woodland in the valley (i.e., defined by the valley LTSSL and 25m radius around the Butternut). In addition, *Significant Woodland*, as a component of the *Significant Natural Areas* designation in the City OP, is present in the valleyland forest communities (i.e., valley portions of Units 5a, and 5b).

> **Conclusion**: no development within significant woodland; no impact to feature or function.

Significant Valleylands

The Credit River valley up to the top of bank / LTSSL is designated as a significant valley (per Schedule A of the ROP).

Conclusion: no development within significant valleyland; no impact to feature or function.

Significant Wildlife Habitat

No confirmed SWH is currently identified on the subject property (per existing mapping / databases). Candidate SWH was identified in five categories: Snake hibernacula; bat maternal roosts; Raptor nesting habitat (rivers); Raptor nesting habitat (woodlands); and Wildlife movement corridors. Three confirmed SWH types are present: Species listed as rare in Ontario (Butternut); species listed as Endangered by COSEWIC, but not listed as Endangered or Threatened under the ESA (Monarch); species listed as Special Concern by SARO (Monarch).

Conclusion: Confirmed SWH will be retained in full, with no direct impacts. The proposed activities will not result in negative impact to SWH/candidate SWH features and functions with recommended retention, protection, mitigation and enhancement measures discussed herein. Refer to Table E.1, Appendix E for additional details and Figure 4 for locations.

Fish Habitat

See Section 4.4 for an assessment of aquatic features and fish habitat. The Credit River supports direct fish use; however, the drainage swale located on the subject property provides only contributing habitat to the Credit River and does not support direct fish use.

Conclusion: no development within fish habitat; no impact to feature / function (i.e., no harm), with implementation of recommended protection, mitigation and enhancement measures.

Endangered or Threatened Species

See discussion in Section 4.6 and 6.2.1.

Conclusion: no development within confirmed and/or critical habitat; no impact to feature function with implementation of recommended protection, mitigation and enhancement measures discussed herein.

Development of Adjacent Lands

Lands adjacent to features identified in Policies 2.1.4, 2.1.5 and 2.1.6 have been considered in the current study. Development is proposed on the tablelands portion of the subject property, with potential impacts to ecological features and functions addressed in Section 7.

Conclusion: no impacts to identified ecological features and functions associated with the Credit River valley, with proposed protection and mitigation measures identified herein.

6.3 Regional / Municipal

6.3.1 Region of Peel Official Plan (ROP) (2016)

The ROP was adopted by Regional Council in July 1996 and subsequently approved with modifications by the Minister of Municipal Affairs and Housing in October 1996. Sections of the Plan deemed not under appeal became effective in October 1997. The appeals of the plan were separated into four OMB hearing phases, the last of which become effective in July 1998. The Office Consolidation includes Ministry and OMB approvals as well as approved amendments made through December 2016. The ROP identifies a *Greenlands* System of environmental features and linkages among them. Policies of the Plan have the goal of protecting the natural environment, supporting and strengthening the integrity and long-term sustainability of the ecosystems in Peel and neighbouring municipalities. The *Greenlands System* is comprised of *Core Areas*, *Natural Areas and Corridors* (NAC), and *Potential Natural Areas and Corridors* (PNAC). A summary of designations met on the subject property is presented in Table 5.

6.3.1.1 Core Areas

Core Areas of the Greenlands System in Peel are shown on Schedule A of the ROP as well as on Figure 1. As noted above, a portion of the subject property includes a *Core Area*, whose mapped limit is generally coincident with the top of valley slope (including the un-named tributary ravine) on the subject property, but extended to include a 25m radius around the Butternut. This has been more accurately delineated as a "Top of Bank" / "Top of Slope" defined by CVC (Young and Young Surveying Inc., February 23, 2004).

The *Core Area* on the property is interpreted to have been derived from the *ESA / SNA* (*Natural Area CRR11*), but includes contiguous and naturally vegetated valley slope on the subject property.

No additional *Core Areas*, as defined in Section 2.3.2.2 of the ROP, are present on the subject property outside of the currently mapped limit, but an extension of the mapped limit is recommended. An evaluation of *Core Area* criteria is provided below.

- *significant wetlands*
    - No wetlands are present.
- significant coastal wetlands
    - No wetlands are present.
- core *woodlands* meeting one or more of the criteria in Table 1 of the ROP
    - None is present. Refer to detailed evaluation in Appendix I.

- *Environmentally Sensitive or Significant Areas*[7]
    - The existing *Environmentally Sensitive or Significant Areas* were determined by CVC staff, in conjunction with Dougan and Associates, on November 12, 2008. The surveyed limit generally follows the valley limit. No ESAs are present on tablelands on the subject property and there is no rationale to extend the existing CRR11 *Significant Natural Area* / *Environmentally Sensitive Area*.
- Provincial Life Science *Areas of Natural and Scientific Interest*
    - None is present
- *Significant* habitats of *threatened* and *endangered* species
    - None is present on tablelands on the subject property. One Butternut (end) is present adjacent to the *natural hazard* / *Core Area* associated with the un-named tributary. It will not be harmed by proposed development.
- *Escarpment Natural Areas* of the Niagara Escarpment Plan (NEP)
    - None is present. Not within the NEP area.
- Core *Valley and stream corridors* meeting one or more of the criteria in Table 2 of the ROP
    - Credit River valleyland and ravine associated with the un-named tributary meet evaluation criteria. Refer to detailed evaluation in Appendix I.

Recommendation: Core Area limit to follow surveyed LTSSL / Top of Bank, including the ravine associated with the un-named tributary and within a 25m radius of the Butternut tree. See Figure 6. This is consistent with description of core areas in the introduction of Section 2.3 of the Official Plan: "The Core Areas contain ecological features, forms and/or functions that provide favourable conditions for uninterrupted natural systems and maximum biodiversity." P.47

Policy Compliance

Per Policy 2.3.2.6 of the ROP, *development*[8] and *site alteration*[9] within *Core Areas* is prohibited, with some exceptions.

- The recommended *Core Area* will be retained in full, with development setbacks of 10 m.
- As part of the separate SMW Outlet process / application, *minor development*[10] / *site alteration*

[7] **Environmentally Sensitive or Significant Areas**: places where ecosystem functions warrant special protection. These may include, but are not limited to, rare or unique plant or animal populations or habitats, plant or animal communities, or concentrations of ecological functions.

[8] **Development:** means the creation of a new lot, a change in land use or construction of buildings and structures, requiring approval under the Planning Act but does not include activities that create or maintain infrastructure authorized under an environmental assessment process or works subject to the Drainage Act.

[9] **Site alteration:** activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site.

[10] **Minor development:** development, which due to its scale or intensity, can demonstrate no significant incremental or cumulative impacts on the landform, features or ecological functions of the Greenlands System in Peel, as set out in further detail in the area municipal official plans.

[11] for *essential*[12] *infrastructure* is proposed for the modification to the existing SWM outlet and channel.

6.3.1.2 Natural Areas and Corridors

Natural Areas and Corridors (NAC) of the Greenlands System in Peel are defined in Section 2.3.2.9 of the ROP. The Official Plan also notes that: NACs contain ecologically important features and play a crucial role in support of Core Areas; and disturbance to NACs could have an immediate or cumulative impact on ecosystem integrity.

No NACs are mapped in the ROP and they are intended to be identified through the municipal Official Plans. An evaluation of NAC criteria for the subject property is presented below.

- Evaluated non-provincially *significant wetlands*
  - No wetlands are present. Wetlands are present in the adjacent floodplain.
- NAC *woodlands* meeting one or more of the criteria in ROP Table 1
  - The valleyland portion of the woodland on the subject property (i.e., valley portions of Veg. Units 5a and 5b) meets 3 criteria (linkage, surface water quality, significant species and communities). Note that this area is within the recommended *Core Area* limit, which would take precedence over the *NAC* designation.
- *Significant wildlife habitat* meeting one or more of the criteria in Figure 5 of the ROP.
  - No SWH is currently mapped / identified.
  - Based on the detailed evaluation in Appendix E and summary of results in Section 4.4.3, three *Confirmed SWH* types are present: species listed as rare in Ontario (Butternut, S3); species listed as Endangered by COSEWIC, but not listed as *Endangered* or *Threatened* under the ESA (Monarch); species listed as Special Concern by SARO (Monarch). See Figure 4 for locations.
- *Fish habitat*[13]
  - The drainage feature on the subject property acts as contributing habitat to downstream reaches (Credit River) but does not support direct fish use. No impacts to fish habitat with proposed mitigation.
- Regionally significant Life Science *Areas of Natural and Scientific Interest*
  - None is present
- Provincially significant Earth Science *Areas of Natural and Scientific Interest*

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[11] **Minor site alteration:** site alteration, which due to its scale or intensity, can demonstrate no significant incremental or cumulative impacts on the landform, features or ecological functions of the Greenlands System in Peel, as set out in further detail in the area municipal official plans.

[12] **Essential:** necessary to the public interest after all reasonable alternatives have been considered (ROP p. 236)

[13] **Fish habitat:** spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes. (ROP pg. 237)

- None is present

- *Escarpment Protection Areas* of the Niagara Escarpment Plan (NEP)
  - None is present. Not within the NEP area.
- The Lake Ontario *shoreline* and *littoral zone* and other *natural lakes* and their *shorelines*
  - None is present
- Any other *valley and stream corridors* that have not been defined as part of the *Core Areas*
  - The ravine associated with the un-named tributary meets this criterion; it is recommended for inclusion in the *Core Area* (limit defined by the LTSSL)
- *Headwater* source and discharge areas
  - None is present
- Any other natural features and functional areas interpreted as part of the Greenlands System Natural Areas and Corridors by the individual area municipalities, in consultation with the conservation authorities and the Ministry of Natural Resources, including, as appropriate, elements of the *Potential Natural Areas and Corridors*
  - PNACs are present, as discussed below

Recommendation: Vegetation Units 5a and 5b within the valleylands are recommended for inclusion as an NAC; however, all areas where NAC criteria are met per the above evaluation are within the recommended Core Area associated with the Credit River valley, including the ravine associated with the un-named tributary.

Policy Implications

The ROP defers protection / stewardship of NACs to area municipal official plans, but suggests that losses of NAC could have an immediate or cumulative impact on ecosystem integrity. No NACs are located within the development envelope and no impacts are anticipated.

6.3.1.3 Potential Natural Areas and Corridors

Potential Natural Areas and Corridors (PNAC) of the Greenlands System in Peel are defined in Section 2.3.2.10 of the ROP. As noted in the Official Plan, PNACs support NAC and Core Area integrity, and may contain important ecological features. The ROP recommends the evaluation and, where appropriate, protection of these features.

None is mapped in the ROP and they are intended to be identified through the municipal Official Plans. An evaluation of PNAC criteria for the subject property is presented below.

- unevaluated *wetlands*
  - No wetlands are present. Wetlands are present in the adjacent floodplain.

- *Cultural woodlands* and *cultural savannahs* within the Urban System and Rural Service Centres meeting one or more of the criteria in Table 1. The evaluation of *Cultural woodlands* and *cultural savannahs* is also subject to policy 2.3.2.19
    - When combined, Units 2, 4, 5c, 6b meet the criteria for inclusion as a PNAC based on size and proximity.
    - Refer to detailed evaluation in Appendix I.
- Any other woodlands greater than 0.5 hectares (1.24 acres)
    - None is present.
- Regionally significant earth Science *Areas of Natural and Scientific Interest*
    - None is present
- Sensitive *groundwater recharge areas*
    - None is present.
- Portions of *Historic shorelines*[14]
    - None is present
- Open space portions of the *Parkway Belt West Plan Area*
    - The portion of the subject property within the defined Credit River valley (excluding the ravine associated with the un-named tributary) is within the *Parkway Belt West Plan Area* and identified as open space in the ROP and MOP
- Potential ESA's identified as such by the conservation authorities
    - None is present
- Any other natural features and functional areas interpreted as part of the *Greenlands System Potential Natural Areas and Corridors*, by the individual area municipalities, in consultation with the conservation authorities
    - None is present.

Recommendation: When combined with natural areas in the adjacent valleylands, the treed vegetation communities on the tablelands (Units 2, 4, 5c, 6b) meet PNAC criteria based on size and proximity, but would not meet the criteria on their own.

The recommended PNAC limit follows the approved treed limit staked on July 17, 2018. See Figure 6.

Policy Implications

Section 2.3 of the ROP recommends that PNACs be evaluated and, where appropriate, protected, but defers to the area municipal official plan. Within the subject property, treed habitats on the tablelands (i.e., (Units 2, 4, 5c, 6b) are concluded to be a PNAC. With the development proposal, the majority of these vegetation communities will be protected. The area proposed for removal (i.e., Unit 6b and a portion of Unit 5c; ~0.2 ha in total) is young, highly disturbed, and does not provide an

[14] Historic shorelines: the steep slopes or other remnants of the shorelines of glacial Lake Iroquois and Lake Peel.

ecological linkage to other natural areas. Moreover, an equivalent area will be protected an enhanced as part of the proposed *Woodland Enhancement Strategy* discussed herein (Appendix M).

The primary objective of this strategy is to enhance the existing but degraded woodland community on the property, relative to the current condition (i.e., presence of non-native / invasive species, limited woodland plant species composition, high edge ratio, and limited woodland understory and ground layer), including retention of the higher quality areas of the woodland. This will result in a healthy, functional deciduous forest community that supports natural succession and has better long-term viability. See the *Woodland Enhancement Strategy* (Appendix M) for further details.

Table 5. Summary of Peel O.P. Designations Met on the Subject Property

Official Plan	Desig-nation	Component	Met?
Region of Peel	Core Areas	Significant wetland	No
		Significant coastal wetlands	No
		Environmentally sensitive areas	Yes, Credit River valleylands
		Provincial Life Science Areas of Natural and Scientific Interest	No
		Significant habitats of Threatened and Endangered Species	Yes, 25 m surrounding Butternut (based on MNRF habitat guidance)
		Core Valley and Stream Corridors	Yes, Credit River valleylands
	NAC	Evaluated non-provincially significant wetlands	No
		NAC woodlands meeting one or more of the criteria in ROP table 1	Yes, Credit River valleylands + 25 m surrounding Butternut
		Fish habitat	Yes, indirect fish habitat from SWM outlet (within the valley)
		Regionally significant Life Science Areas of Natural and Scientific Interest	No
		Provincially significant Earth Science Areas of Natural and Scientific Interest	No
		Escarpment Protection Areas of the Niagara Escarpment Plan	No
		The Lake Ontario shoreline and littoral zone and other natural lakes and their shorelines	No
		Any other valley and stream corridors that have not been defined as part of the Core Areas	No
		Headwater source and discharge areas	No
		Other natural features and functional areas interpreted as part of the Greenlands System Natural Areas and Corridors by municipalities	No
	PNAC	Unevaluated wetlands	No
		Cultural woodlands and savannahs within the Urban System and Rural Service Centres meeting one or more of the criteria in Table 1.	Yes, Units 2, 4, 5c, 6b meet criteria for inclusion as PNAC based on size and proximity
		Any other woodlands greater than 0.5 hectares (1.24 acres)	No
		Regionally significant earth Science Areas of Natural and Scientific Interest	No
		Sensitive groundwater recharge areas	No
		Portions of Historic shorelines	No
		Open space portions of the Parkway Belt West Plan Area	No
		Potential ESA's identified as such by the conservation authorities	No
		Other natural features and functional areas interpreted as part of the Greenlands System Potential Natural Areas and Corridors by municipalities	No

6.3.2 City of Mississauga Official Plan (August 2018 Office Consolidation)

The City of Mississauga Official Plan (MOP) was adopted by Regional Council in July 1996 and approved in October 1996 with an updated consolidation in 2018. Goals of the Plan include the protection, enhancement, restoration and expansion of the *Natural Heritage System*.

The Plan identifies the *Green System* (as mapped on Schedule 1a) in the City of Mississauga which includes: the *Natural Heritage System; Urban Forest*; *Natural Hazard Lands*; and *Parks and Open Spaces*. A portion of the subject property is identified as part of the *Green System*, and each of the four components is mapped and/or present on or adjacent to the subject property – in the Credit River valley and tablelands (north/east):

- Schedule 1 (Urban System): *Green System*
- Schedule 3 (Natural System):
    - *Significant Natural Areas and Natural Green Spaces*
    - *Natural Hazard*
- Schedule 4 (Parks and Open Spaces): *Public and Private Open Space*
- Schedule 10 (Land Use Designations): *Greenlands* and *Natural Hazards*

An evaluation of the various designations and discussion of policy compliance is provided below.

6.3.2.1 Natural Heritage System

The *Natural Heritage System* (per Policy 6.3.9 and as mapped on Schedule 3) is composed of the following (with commentary on application to the subject property): *Significant Natural Areas*; *Natural Green Spaces*; *Special Management Areas*; *Residential Woodlands*; and *Linkages*. The extent of the *Natural Heritage System* is determined through completion of an approved EIS. Minor refinements to the boundaries of the *Natural Heritage System* may occur through an EIS, updates of the *Natural Heritage System*, or other appropriate studies accepted by the City without amendment to the Official Plan, while major boundary changes require an amendment.

Significant Natural Areas

In the Mississauga Official Plan (August 2018), a portion of *Significant Natural Areas* are mapped at the north / east property limit and lands to the east associated with the Credit River valley extending to the west bank of the river. None is mapped on the west valley slope or tablelands on the subject property. It is assumed that this limit is derived from the *Significant Natural Site CRR11*, as mapped in the City of Mississauga Natural Areas Survey 2014 Update. The *Significant Natural Areas* designations are described in Section 6.3.12 of the OP and achieved by meeting one or more of the following criteria:

a. Provincially or regionally significant life science areas of natural and scientific interest (ANSI);

- None is present

b. Environmentally sensitive or significant areas;

- The existing *Environmentally Sensitive or Significant Areas* were determined by CVC staff, in conjunction with Dougan and Associates, on November 12, 2008. The surveyed limit generally follows the valley limit, with an extension to include a 25m radius around the Butternut. No ESAs are present on tablelands on the subject property and there is no rationale to extend the existing CRR11 Significant Natural Area / Environmentally Sensitive Area

c. Habitat of threatened or endangered species;

- One S3 / Endangered species was recorded (Butternut) in Unit 5b. Habitat includes a 25m radius from the trunk

d. Fish habitat;

- The drainage feature acts as contributing habitat to downstream reaches (Credit River) but does not support direct fish use

e. Significant wildlife habitat;

- Three confirmed SWH types are present: Species listed as rare in Ontario (Butternut); species listed as Endangered by COSEWIC, but not listed as Endangered or Threatened under the ESA (Monarch); species listed as Special Concern by SARO (Monarch). All SWH areas are within the retained natural area. See Appendix E for additional details and Figure 4 for locations

f. Significant woodland

- See Table 6 for analysis
- The valleyland forest communities (i.e., the valley portions of Units 5a, and 5b) within the subject property meet criteria for significant woodland

g. Significant wetlands;

- No wetlands are present

h. Significant valleylands are associated with the main branches, major tributaries and other tributaries and watercourse corridors draining directly to Lake Ontario including Credit River

- Valleylands within the Credit River are present within the east portion of the subject property, as defined by the LTSSL

Table 6. Assessment of Woodland Significance based on the Mississauga Official Plan Criteria in Section 6.3.12

Criteria	Criteria Met
Woodlands, excluding *cultural savannahs* >/= 4 ha	No. Total woodland area is ~ 1.5 ha (excluding Unit 2 and 6b[15])
Woodlands, excluding *cultural woodlands* and *cultural savannahs*, >/= 2 ha and < 4ha	No. Total woodland area is ~ 1.5 ha (excluding unit 2 and 6b[15] – see note below)
Any *woodland* > 0.5 ha that supports old growth trees (< 100 yrs old)	No. Trees within the subject property are immature to mid-aged; no older growth present and no late successional characteristics
Any *woodland* > 0.5 ha that supports a linkage function as determined through an approved EIS.	Yes. The forest communities within the valleylands (i.e., the valley portions of Units 5a, and 5b) provide support and function to the Credit River movement corridor. Vegetation communities on the tablelands do not to support the linkage function, as there are no natural features on lands to the west
Any *woodland* > 0.5 ha that is located within 100 m of another Significant Natural Area supporting a significant ecological relations ship between the two features	Yes. The forest communities within the valleylands (Units 5a, and 5b) are located within 100 m of the Credit River valleylands and fish habitat. The forest communities along the tablelands are not considered to provide a significant ecological relationship with the valleylands.
Any *woodland* > 0.5 ha that Is located within 30 m of a watercourse or significant wetland	Yes. The forest communities within the valleylands (Units 5a, and 5b) are located within 100 m of the Credit River. The forest communities on the tablelands are located outside of this distance.
Any *woodland* > 0.5 ha that supports significant species or communities	Yes. One S3 / Endangered species was recorded (Butternut) in Unit 5b (FOD7-2)
Total	**Four** criteria are met by the valleyland forests (Units 5a, and 5b) within the subject property, and thus are considered significant woodland. The tablelands[15] do not meet significant woodland criteria

[15] Section 6.3.13 of the Mississauga OP indicates that cultural savannah and cultural woodland communities that are confirmed to have significant ecological value, as determined by an approved EIS, will be included for the purpose of determining the size of a Significant Woodland and will be included. Based on the vegetation and wildlife characteristics of unit 2 (CUS1) and unit 6b (CUW1), for the purposes of this EIS these communities have been excluded from the calculations and have not been included as Significant Natural Area as they do not provide significant ecological value that contributes to the integrity and function of the broader woodland features on the subject property.

Natural Green Spaces

- Natural Green Spaces are identified if a natural area does not fulfil the requirements of a Significant Natural Area.
    - None is mapped
- Per Policy 6.3.14, the subject property does not meet any of the four criteria for Natural Green Spaces
    a. woodlands greater than 0.5 hectares that do not fulfill the requirements of a significant woodland
        i. Per analysis in Table 6, significant woodland criteria are met for the portions of forest communities within the valley (i.e., portions of Veg. Units 5a and 5b within the valley limit defined by the LTSSL) and habitat within 25m of the butternut. Forest communities on the tablelands (Veg. Unit 5a / b in part) are considered significant woodland
        ii. Under the ROP, the same area is also considered NAC / Significant Woodland. See discussion in Section 6.3.1 and Appendix I.
        iii. Other woodland on the property (i.e., Veg. Units 2, 4, 5c, and 6b; total area ~0.46 ha) does not meet the size threshold
    b. wetlands that do not fulfill the requirements of a significant wetland;
        i. no wetlands are present
    c. watercourses that do not fulfill the requirements of a significant valleyland, even if they are predominantly engineered; and
        i. the un-named watercourse in the ravine is within the valleyland *Core Area*.
    d. all natural areas greater than 0.5 hectares that have vegetation that is uncommon in the city.
        i. With the exception of habitat associated with one Butternut, considered part of the SNA, vegetation outside of the recommended valleyland *Core Area* is common, culturally derived communities that are widespread and abundant.

Special Management Areas

Special Management Areas are areas adjacent to, or in close proximity to, *Significant Natural Areas* or *Natural Green Spaces*. These should be managed to enhance and restore natural functions in support of the Significant Natural Area or Natural Green Space.

- Lands adjacent the SNA will be maintained and enhanced, where possible, to improve the natural function and support the SNA. Refer to the *Woodland Enhancement Strategy*

Residential Woodlands

Residential Woodlands are areas that contain mature trees forming a “fairly continuous canopy and minimal native understory due to maintenance of lawns and landscaping”.

- None is present

Linkages

Linkages are areas necessary to maintain the biodiversity and ecological functions of *Significant Natural Areas* and *Natural Green Spaces* but are not determined to fall under the designations above.

- None is present west of the valleylands. Lands adjacent to the Credit River valley on the tablelands of the subject property will be maintained and enhanced to improve the natural corridor linkage along the valley.

Recommendation:

- SNAs within the subject property are located along the valleylands (from LTSSL to the Credit River), as well as surrounding the Butternut tree. No SNAs are present within the development envelope
- No *Natural Green Spaces* are present on the subject property.
- *Special Management Areas* include the lands adjacent to the SNA
- No *Residential Woodlands* present on the subject property

Table 7. Summary of Natural Heritage System designations from the Mississauga Official Plan

Official Plan	Designation	Component	Met?
City of Mississauga	Significant Natural Area	Provincially/regionally significant life science areas of natural and scientific interest	No
		Environmentally sensitive/significant areas	Yes, Credit River valleylands
		Habitat of threatened/endangered species	Yes, 25 m surrounding Butternut (based on MNRF habitat guidance)
		Fish habitat	No direct fish habitat
		Significant wildlife habitat	Yes, within area defined by the staked treed limit (July 2018) – primarily within the valleylands and partially on adjacent tablelands
		Significant woodland	Yes, Credit River valleylands + 25 m surrounding Butternut
		Significant wetlands	No
		Significant valleylands	Yes, Credit River valleylands – defined by LTSSL
	Natural Green Spaces	Woodlands > 0.5 ha that do not fulfill the requirements of a significant woodland	No
		Wetlands that do not fulfill the requirements of a significant wetland	No
		Watercourses that do not fulfill the requirements of a significant valleyland, even if they are predominantly engineered	No
		All natural areas > 0.5 ha that have vegetation that is uncommon in the city.	No
	Special Management Areas		Yes, lands adjacent to the SNAs
	Residential Woodlands		No
	Linkages		Yes, within the Credit River valley

Policy Compliance:

The proposal complies with natural heritage protection policies (i.e., 6.3.23 through 6.3.38, where relevant), as follows:

- the portion of the *Natural Heritage System* on and adjacent to the development envelope (i.e., the *Significant Natural Area*) will be retained in full, with setbacks and buffer management identified in the current study. No development or site alteration is proposed in *Core Areas* of the *Greenlands System*, *Significant Natural Areas*, *Natural Green Spaces* or *Linkages*.
- Buffer enhancement plantings will utilize appropriate native species
- The current EIS characterizes ecological attributes, significance and sensitivity, and includes recommendations to protect, enhance, restore and expand the *Natural Heritage System* and associated ecological functions
- Potential negative impacts that cannot be avoided will be mitigated through restoration and enhancement as discussed herein, with no net impacts.
- The current EIS demonstrates that negative impacts have been minimized in accordance with the *Greenlands* designation and that there are no negative impacts to natural heritage feature and function (per policy 6.3.29). Refer to Section 7 for additional discussion.

6.3.2.2 Urban Forest & Tree Protection

The *Urban Forest* includes all trees in the City on public and private lands (not mapped). Trees are present on the subject property, within and outside of the *Natural Heritage System.*

In addition, the Private Tree Protection By-law (254-12) applies to the property. This by-law identifies a general prohibition and exceptions for injury / destruction of trees, with requirements for replacement trees as input to permits, where required.

An inventory and assessment of trees on the subject property was undertaken, as shown on the Tree Inventory & Preservation Plan (BTI; March 6, 2019). It is included in Appendix J.

Policy Compliance:

The proposal complies with *Urban Forest* policies (i.e., 6.3.39 through 6.3.46, where relevant) and By-law 254-12, as follows:

- Portions of the *Urban Forest* within the *Natural Heritage System* will be retained in full, as discussed in Section 6.3.2.1.
- The Tree Inventory & Preservation Plan inventoried and assessed health of trees within the subject property and quantified removals (BTI; March 6, 2019). Refer to Appendix J.
- For trees recommended for removal due to construction, compensation in accordance with

City requirements will be determined as a condition of approval, thereby demonstrating no negative impact to the *Urban Forest* resulting from proposed development / site alteration.

6.3.2.3 Natural Hazard Lands

Schedule 3 (Natural System) of the MOP maps *Natural Hazard Lands* at the north / east property limit – coincident with the Credit River valley top of slope, including the ravine associated with the un-named tributary.

- Top of Bank / valley slope for the valleyland *Natural Hazard*, previously delineated by the CVC in 2004 and shown on the drawing prepared by Schaeffer Dzaldov Bennett Ltd., dated July 21, 2015.
    - This limit has been verified through current work, as documented in the Slope Stability Study Addendum (Soil Engineers Ltd. 2016) and the Revised Slope Stability Study Addendum (Soil Engineers Ltd.; March 2019).
    - The LTSSL generally follows the previously delineated Top of Bank, TOB (CVC 2004) along the un-named drainage feature, but extends approximately 12.5 west of the TOB limit on the north portion of the property.

Policy Compliance:

The proposal complies with *Valleylands* and *Flood Plain* policies (i.e., 6.3.47 through 6.3.55, where relevant), as follows:

- Proposed works are supported by detailed engineering studies in reports prepared under separate cover and considered herein (i.e., slope stability, erosion, fluvial geomorphology)
- No development or site alteration is proposed in the valley or floodplain. Note that works associated with the upgraded SWM outlet and drainage feature enhancements have been completed as part of the approved SWM Outlet authorization.
- Slope stability. No works for the development are proposed within the LTSSL; grading limits respect the recommended LTSSL + 10 m setback. Note that works associated with the SWM outlet improvements minimize footprint and provide mitigation measures and post-construction enhancements.

6.3.2.4 Parks and Open Spaces

Schedule 4 (Parks and Open Spaces) of the MOP maps *Public and Private Open Spaces* on the east portion of the subject property (see Figure 1).

- The subject property is private land and it is not clear what component of *Public and Private Open Spaces* has been identified; it is presumed to be “conservation”.

Policy Compliance:

The proposal complies with *Parks and Open Space* policies (i.e., 6.3.64 through 6.3.86, where relevant), as follows:

- The significant treed areas associated with the valleyland *Core Area* and recommended buffer will be retained
- Given the steepness of slopes and sensitivity of adjacent *Core Areas* in the valleyland, this is not recommended for park land and no pedestrian access is proposed
- Stormwater Best Management Practices are proposed for consideration (e.g., Low Impact Development [LID] measures such as lot-level infiltration galleries and/or swales). LID's will be discussed in the detailed design submission.

6.3.3 Credit Valley Conservation Authority

The Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 160/06), is a regulation issued under the Conservation Authorities Act, R.S.O. 1990. Through this, CVC has the responsibility to regulate activities in natural and hazardous areas (e.g., areas in and near rivers, streams, floodplains, wetlands, slopes and shorelines).

A permit will be required from the CVC under the Reg. 160/06 to proceed with site alteration within regulated areas. In addition, site alteration proposed within 120 m of these features, requires the completion of an EIS to evaluate and demonstrate that there will be no negative impacts on the identified natural feature or on its ecological functions, as described under Reg. 160/06.

Policy Compliance:

The north/east portion of the subject property (~1/2) is located within CVC regulated lands (i.e., Credit River valley and adjacent lands). The current application complies with requirements of the Planning and Development Administrative Procedural Manual (CVC Dec. 2011), as follows:

- Completion of an EIS in accordance with the Environmental Impact Study Terms of Reference (CVC 2008), as informed by: pre-consultation; meetings with CVC staff; review of / input to the draft TOR by CVC staff; site walks; and review of the submitted EIS.
- Per Section 4.1, a permit will be required for the current application since development within a regulated area are proposed. Per O. Reg. 160/06, Section 3(1), the proposal will not affect the control of flooding, erosion, dynamic beaches, pollution or the conservation of land, based on the following:
    - Stable top of slope has been determined and respected in the proposed design/works. The proposed works will not negatively impact the stable top of slope.
    - Floodplain / 100-year flood – detailed design of the stormwater management pipe

(from the right of way, upstream of the existing headwall) and the proposed rehabilitation/restoration of the existing drainage feature (downstream of the existing headwall) takes into account and is meant to withstand impacts from a 100-year flood.

- The proposed SWM strategy will not exacerbate erosion in the existing drainage feature. As part of the 'SWM Outlet' application, potential erosion impacts in the channel are discussed, with mitigation proposed through design measures (Waters Edge; February 2017).
- Natural Heritage. No wetlands are impacted. Natural heritage features and functions are protected and enhanced as discussed herein. Stable top of slope has been determined and respected in the proposed design / works

7.0 IMPACT ANALYSIS AND MITIGATION

7.1 Impact Overview and Mitigation Measures

With the proposed development, there will be minor direct impacts to some natural vegetation on the tablelands of the subject property (i.e., removal), with no long-term impact to retained natural heritage features (predominantly within the valleylands) and their ecological functions. Potential indirect impacts include 'during' and 'post-construction' effects such as construction related activities, surface runoff effects on receiving areas and occupancy related effects on retained adjacent natural areas.

Proposed mitigation measures are outlined below, with a detailed assessment in Table 8, for three primary natural environment factors (aquatic habitat, vegetation and wildlife / habitat). In Table 8, each factor is reviewed in terms of potential effects, proposed mitigation and residual effects. The identified mitigation measures will be incorporated with appropriate wording on construction drawings and the detailed site plans that will be finalized prior to any site grading / disturbance. The proposed works and recommended mitigation / enhancement measures are provided on drawings included in Appendix H and Appendix J.

With the proposed development envelope, there will be no direct impact to currently designated natural heritage features, features which meet criteria for designation based on analysis presented herein or known habitat for species at risk.

Specific mitigation and environmental management measures are discussed in Table 8. These include:

- Development setbacks as described in Section 5.2.1
- Buffer restoration / enhancement, as part of the *Woodland Enhancement Strategy* discussed below and in consideration of recommendations in Section 5.3

- A *Woodland Enhancement Strategy* has been prepared by WSP (Appendix M). The plan was submitted as a draft in November 2018 and the revised version discussed herein incorporates edits and comments from CVC and City staff. Key elements of the strategy include: retention of existing higher quality woodland; retaining standing snags, if not hazards; removal of woodland south of the SWM easement / temporary access - work area; creation of new woodland habitat north of the SWM easement (currently cultural meadow); invasive species control within retained woodland areas and proposed restoration areas; woodland enhancement plantings with native species; seed collection of Virginia Stickseed and dispersal through enhancement areas; salvage of logs, rootwads and brush from areas of tree removal; installation of additional wildlife habitat elements + retention of existing habitat (utilizing materials salvaged from the site); closure of the informal pedestrian trail; and garbage removal.

  For additional details, refer to Appendix M.

- Post-construction biological monitoring plan, included in the *Woodland Enhancement Strategy*, and including the following key elements:
  - Two years of post-construction monitoring of plantings, invasive species, breeding bird use and general woodland health.
- Permanent fencing at the development / retained natural area interface - to restrict uncontrolled access to the valleylands and prevent rear yard 'creep' into the natural area
- Signage identifying the presence of a ‘sensitive natural area’ is recommended at regular intervals along the development / valley interface.
- Implementation of the recommended SWM strategy, with refinements at detailed design, which will maintain water inputs to the channel / Credit River and mitigate potential erosion and sedimentation in downstream receiving areas
- Implementation of the recommended SWM outlet / channel improvements (previous submission Water's Edge; 2017). That proposal will mitigate potential additional erosion (relative to the current condition where erosion is occurring and the drainage feature will continue to degrade over time) via stabilization and drainage feature design measures. Outstanding works are anticipated for completion in 2019.
- Best management practices during construction:
  - Erosion and Sediment Control (ESC) Plan including ESC fencing installed at grading limits prior to and throughout construction;
  - Installation of vegetation protection fencing, coincident with the ESC fencing, prior to and throughout construction.
  - Spills Management Plan; guidelines for heavy equipment use to reduce potential for damage to natural areas (mechanical damage to trees, soils compaction etc.);

- Follow the Clean Equipment Protocol for Industry (Ontario Invasive Plant Council 2013);
- Clear delineation of the protected natural area / valleylands via permanent fencing and signage at the development / valley interface
- Restricted access to the natural area / valleylands via fencing and no trail connections

Table 8. Thorny Brae Development – Impact Assessment

Feature Significance and Sensitivity	Natural Environment Impacts	Mitigation Measures	Residual Effects
Aquatic Resources			
<u>Subject Property</u> • Un-named ephemeral drainage feature includes reaches on the Credit River valley slope and within the floodplain and a poorly defined draw on tablelands above the slope • No evidence of springs or groundwater seepage • Majority of drainage feature on steep slopes and tablelands does not provide direct fish habitat. The lower reach on the Credit River floodplain may provide temporary habitat for fish during high water events **<u>Adjacent Lands</u>** • Credit River – with intermittent direct connectivity as noted above	**Long-term** • No removal of, or direct impacts to fish habitat as part of the development proposal. • Potential impacts to the drainage feature and receiving watercourse (Credit River) resulting from increased erosion / sedimentation (due to increased SWM discharge) from the development lands • The upper reaches of the drainage feature within the development envelope have been removed via the approved SWM strategy (per TRP-18-14 and T-09002), detailed as part of the SWM Outlet application. Lower reaches will be improved via the proposed channel restoration strategy. • **Hydrogeology and Hydrology.** There is potential for impacts to the drainage feature resulting from changes to groundwater and surface water inputs post-construction. • **Occupancy-related Impacts.** There is some potential, including: informal trail creation reducing the amount of stream shading and cover provided by riparian vegetation; refuse dumping; or water quality effects related to residential uses (i.e. salt, pesticides). **During-construction.** There is potential for temporary impacts to the retained reaches of the drainage feature (downstream of the SWM outlet) during construction. These include: erosion and sedimentation; and spills of contaminants/fuels; impacts from dewatering (interruption of groundwater contribution; discharge increasing potential for sedimentation).	• **Long-term Impacts** mitigated by: ○ Maintaining water inputs to the retained portion of the drainage feature and Credit River. Water balance to be clarified at detailed design. ○ Specific mitigation measures for the SWM outlet / channel works under the separate SWM Outlet process / application, including: ▪ Stabilization of the drainage feature to reduce erosion potential and sedimentation of downstream reaches and the Credit River ▪ Aquatic and riparian zone enhancements (riffle – pool and step – pool sequences, riparian zone plantings) ○ Considering the implementation of LIDs to reduce surface runoff and promote infiltration and improved water quality. LIDs manage SWM runoff and mimic the natural process of infiltration. They improve water quality by removing surface pollutants such as nutrients, contaminants, bacteria and suspended solids and preventing them from entering the Credit River. To be confirmed at detailed design. • **During-construction (short-term).** Mitigated by ○ Specific mitigation measures for the SWM outlet / channel works under the separate SWM Outlet process / application, including: ▪ Respecting a warmwater timing window for protection of spawning salmonids in the Credit River. Note that works will not block salmonid movement in the river. ▪ Utilizing designated stockpile and dewatering areas, as required ○ Implementing an ESC plan, with ESC fencing to be installed prior to any site grading ○ Implementing a Spills Management Plan and BMPs during construction	• There will be no direct impacts to fish or habitat for direct fish use. • No anticipated adverse effects to groundwater, aquatic habitat and fisheries from construction activities are anticipated with implementation of recommended mitigation measures, with details to be provided at detailed design. • Residual long-term effects to aquatic habitat and fisheries are anticipated to be minor or negligible, considering: ○ Aquatic habitat will be enhanced relative to the current condition, via improved drainage feature stabilization (mitigating erosion) and improvements to aquatic habitat via recommended works (per recommendations in the 'SWM Outlet' application)

Feature Significance and Sensitivity	Natural Environment Impacts	Mitigation Measures	Residual Effects
Vegetation			

• **Vegetation**. The subject property is composed of a mosaic of culturally derived or culturally influenced vegetation on a former farmstead (tablelands) and forested slopes within the Credit River valley. None of the vegetation communities is provincially rare.
• **Flora**. 105 vascular plant species were recorded, 48% of which are non-native. This is a mix of typical early successional, tolerant species in more disturbed areas with forest-associates on the valley slope
• **SAR**. One SAR was recorded in the subject property: Butternut. One tree is present in the vicinity of the SWM outlet within Unit 5b in the valley.
• Four regionally or locally rare species were recorded:
  ○ Allegheny Serviceberry (Unit 5a - one individual);
  ○ Wild Cranes'-bill (occasional within Units Unit 5a and 5b);
  ○ Virginia Stickseed (sparse within Units 1, 3, 4, 6a and 6b); and
  ○ Catchweed Bedstraw (sparse in localized patches in Unit 2)
• **Designated / Natural Areas**. The vegetation communities within the Credit River valley (as defined by the LTSSL) are considered *Core Areas* of the Greenlands System in Peel and City of Mississauga Natural Hazard / Significant Natural Area / Greenlands. See additional discussion in Section 6
	Direct Impacts.
	• Permanent removal of (~ 8,765 m^2 of successional / tolerant vegetation on the tablelands above the LTSSL).
	• Recommended tree removals (per the Tree Inventory & Preservation Plan (BTI; March 6, 2019) as follows:
	  ○ 25 trees (10 - 30 cm DBH) due to construction on the subject property, including one dead / dying ash tree
	  ○ 89 trees (10 - 30 cm DBH) due to construction on City property, including 12 dead / dying ash trees
	  ○ 30 trees (10 - 30 cm DBH) due to construction on City property, including two dead / dying ash trees
	  ○ Trees over 10 cm DBH to be replaced with native tree and shrub species
	• No impacts to SAR
	Potential impacts to regionally / locally significant species: Virginia Stickseed. While the majority of the individuals of this species found on the subject property are being retained within the enhancement areas, they are sparsely found within Unit 6b as well. Further mitigation to occur via seed collection and distribution in enhancement areas.
	Indirect Impacts. There is potential for indirect impacts to vegetation as the result of construction.
	• **Edge Effects.** Vegetation dieback at the forest edge can result from exposure of retained trees and forest habitat to additional sunlight and invasive plant species which can lead to trunk damage (sunscald), increased drying of the forest, and localized changes in ground flora (e.g. increase in exotic / invasive species).
	However, theses impacts are anticipated to be very limited to negligible as there is a strong anthropogenic influence already and retained forest will be protected through the retention of vegetation in the proposed buffer.
	• **Occupancy-related Impacts.** There is some potential, including: informal trail creation damaging vegetation and introducing invasive species; refuse dumping; or water quality effects related to residential uses (i.e. salt, pesticides).
	• **Construction-related Impacts (short-term)**, including: damage to vegetation outside the work zone; sedimentation; spills of contaminants; root pruning; damage to limbs; and soil compaction.
		Direct Impacts to be mitigated by:
		• Maintaining high quality, more mature forest vegetation within the valley
		• Installing temporary **Vegetation Protection Fencing** prior to any site grading to delineate the work zone and prevent direct damage to adjacent retained vegetation (i.e. mechanical damage, root damage, soil compaction). This fencing will remain until construction is complete.
		• Implementing buffer management measures, as a component of the *Woodland Enhancement Strategy*, and finalized as a condition of approval
		• Implementing the *Woodland Enhancement Strategy*
		  ○ Compensating for tree removals in accordance with City requirements (to be determined) Recommendations for tree planting to compensate for the removal of these trees will be determined as part of a future submission, to the satisfaction of City and CVC
		  • Retaining regionally / locally rare species, where possible, within the future buffer and considering seed salvage for Virginia Stickseed in areas to be removed.
		Indirect Impacts to be mitigated by:
		• Implementing an ESC plan, with ESC fencing to be installed prior to any site grading
		• Installing vegetation protection fencing at grading limits
		• Maintaining hydrogeological inputs to dependent vegetation, as required - to be confirmed at detailed design
		• Measures to mitigate occupancy-related effects:
		  ○ Permanent fencing at the development / retained natural area interface to restrict access and prevent rear year 'spread'
		  ○ Signage at the development / retained natural area interface
		  ○ No trail access to the retained natural area / valley
		  ○ Encouraging resident stewardship (e.g., watering, contaminants, vegetation / rubbish dumping, controlling pets)
			Residual impacts to vegetation are anticipated to be minor, with proper implementation of recommended mitigation measures.
			• Direct impacts will be restricted to removal of early successional vegetation and immature woodland within anthropogenically influenced / derived vegetation communities.
			These removals represent a very minor proportion of woodland vegetation in the Credit River valley and broader landscape
			• No provincially significant vegetation types or SAR / provincially significant plants will be removed or impacted
			• Tree removals will be compensated, in accordance with City and CVC requirements
			• Overall woodland function will be improved with implementation of the *Woodland Enhancement Strategy*
			• Residual impacts from construction are anticipated to be negligible, with implementation of recommended vegetation protection fencing, ESC fencing and spills management plan and compensation / enhancement plantings.

Feature Significance and Sensitivity	Natural Environment Impacts	Mitigation Measures	Residual Effects
Wildlife			
• **General**. Small site that provides habitat for a mix of urban-adapted and wetland / woodland associated species (the latter primarily associated with the Credit River valley). • **Avifauna**. 23 breeding bird species recorded; these are a mix of common generalists and urban-adapted species, with forest-associated species in the treed areas of the subject property and adjacent lands. • **Herpetofauna**. None recorded during current work; two species recorded during previous studies. No amphibian breeding areas are present and no reptile hibernacula / potential hibernacula sites were noted within the subject property or vicinity. • **Mammals**. Four common urban-adapted species recorded. Woodland habitat, including three deciduous trees with cavities that may be suitable for SAR bat roosting / maternity colony is present, with more mature forest restricted to the valley. • **SAR habitat**. No confirmed SAR wildlife habitat. Potential SAR bat habitat as noted above. • **SCC**. Cooper's Hawk (Area Sensitive per MNRF [2015] and Species of Interest per CVC [2010]) was recorded as a potential breeding species. • **SWH**. None is currently identified/mapped. Three confirmed SWH type identified during current study: SAR (Butternut) habitat; END species by COSEWIC not listed as END or THR under the ESA (Monarch); SC species by SARO (Monarch). Five candidate SWH types identified during current study, associated with treed/riverine/slope habitats in the Credit River valley and forest habitats on the tablelands. • **Wildlife Movement Corridors**. The Credit River valley on adjacent lands is a natural wildlife movement corridor. None is present on the majority of the subject property (i.e., on any lands outside of the valley).	Potential impacts on wildlife habitat are similar to those discussed for vegetation (i.e. removal of culturally influenced vegetation within the proposed development envelope). • **Direct impacts**. Removal of ~ 8,765 m^2 of culturally derived wildlife habitat (CUM, CUT, CUW and FOD) within Units 1a, 1b, 4, 5c, 6a and 6b. None of this habitat is within the valley as defined by the LTSSL. ○ **Movement opportunities**. No impact to wildlife movement opportunities is anticipated. No defined movement trails are present on the subject property and significant barriers to movement exist at the west and north limits of the property. Broader movement opportunities along the Credit River valley will be maintained. ○ **Habitat for wildlife species of concern** will not be impacted. Potential woodland habitat (for Cooper's Hawk) in the retained natural area / valley will be retained. ○ **SAR habitat** will not be impacted. Suitable SAR bat maternal roosting habitat (3 cavity trees and forest habitat) retained. Small area of potentially suitable Monarch breeding habitat and some foraging habitat retained and Butternut habitat will be retained. ○ **SWH** will not be impacted. Vegetation removals on the tableland will not impact function of confirmed or candidate SWH predominantly associated with the Credit River valley (which is abundant in the local landscape). • **Indirect Impacts**. ○ Occupancy-related Impacts. There is some potential, including: informal trail creation damaging vegetation and introducing invasive species; refuse dumping; pet predation of wildlife; or water quality effects related to residential uses (i.e. salt, pesticides). ○ **Construction-related Impacts (short-term)**. These include: damage to vegetation outside the work zone; sedimentation; spills of contaminants / fuels; root pruning; damage to limbs; and soil compaction.	Retention and protection of vegetation in the retained natural area / Credit River valley (as defined by the LTSSL) will also protect wildlife habitat. Mitigation measures for vegetation also apply to wildlife habitat. Mitigation measures for wildlife are as follows: • All measures specified under 'vegetation'. • **Timing of works**. ○ To protect breeding birds, avoid works (particularly vegetation / potential nesting habitat removal) within the "regional nesting period", or use other suitable approach to demonstrate compliance with the MBCA. The regional nesting period for the majority of species in this area (Zone C2) is early April – late August. Restriction of activities which could harm birds/nests/eggs within the nesting period is one mechanism of a demonstration of MBCA compliance; however, it is the responsibility of the proponent to demonstrate compliance. ○ To protect SAR bats potentially present, trees are to be removed inside the designated limit of construction during the bat hibernation period from October 1 to March 31 (when bats are not present).	Residual impacts to wildlife and wildlife habitat resulting from the proposed development are anticipated to be very minor considering: • The proposed footprint is very small and there is no direct impact to unique, significant or sensitive wildlife habitats or wildlife movement opportunities. Vegetation removals are limited to early successional meadow / thicket and immature woodland. • Measures are proposed to reduce potential for indirect impacts to offsite wildlife habitat during construction (i.e. work zone delineation / tree protection fencing, ESC measures and other BMPs during construction) and resulting from occupancy. • Overall woodland function will be improved with implementation of the *Woodland Enhancement Strategy*

7.2 Net Effects

With proper implementation of proposed protection, mitigation and enhancement measures identified herein, net effects to natural heritage features and functions are expected to be minor. Ecological features and functions of the Credit River valley and significant contiguous habitats will be maintained and overall woodland function will be improved with implementation of the *Woodland Enhancement Strategy*.

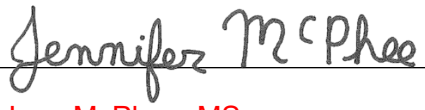
8.0 CONCLUSIONS & RECOMMENDATIONS

Based on the review discussed herein, we support the proposed development on the subject property. The proposed works can be undertaken while protecting environmental features, in consideration of the following:

- The broader environmental context has been considered in the following manner:
    - The natural environment review and site investigations have fulfilled the role of addressing ecosystem features / functions and identifying opportunities, constraints and mitigation strategies.
    - The proposed works comply with policies at the local, regional, provincial and federal level, including species designations and policies of the City of Mississauga Official Plan, Peel Region Official Plan and PPS
- The SWM strategy and SWM outlet / channel design (per separate application, partially implemented as of late winter 2019) have minimized potential impacts to natural heritage features and functions (all associated with the Credit River valley) to the extent possible.
- The proposed development will mitigate potential impacts to the Credit River valley ecological features and functions, by:
    - Retaining all valley vegetation with a minimum 10 m setback from the LTSSL
    - Retaining significant vegetation, wildlife habitat and species of conservation concern, all of which are primarily associated with the valleylands and areas of contiguous forest habitat
    - Enhancing the existing woodland via a *Woodland Enhancement Strategy* included herein and to be finalized at detailed design

- Ensuring water inputs to receiving watercourses and vegetation
- Installing fencing at the development / retained natural area interface to delineate the natural area, restrict access, and prevent rear yard 'creep' into the natural area
- Installing signage at the development / retained natural area interface and encouraging stewardship of the adjacent natural area
- Utilizing best management practices during construction, including: ESC fencing, vegetation protection fencing; timing restrictions for tree removals; and other measures.

Prepared by



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APPENDIX A

TERMS OF REFERENCE

May 20, 2016

Re. Draft Terms of Reference for an Environmental Impact Study (EIS) at 1745-1775 Thorny Brae Place, Mississauga, ON

1.0 Introduction

MMM Group, a WSP company, has been retained by Pace Developments (2462357 Ontario Inc.) to complete an Environmental Impact Study (EIS) for two proposed developments: 1) a proposed residential re-development at 1745-1775 Thorny Brae Place in Mississauga, Ontario (the "subject property"); and 2) a stormwater management (SWM) outlet that will accept flows from the subject property and neighbouring properties to the south. Both studies are proposed to have the same scope of work as described herein, but it is anticipated that the SWM Outlet EIS will be submitted first.

The subject property encompasses approximately 2.5ha and is bounded by Mississauga Road to the west, Eglington Avenue Road West to the north, the Church of Croatian Martyrs to the south and Natural Hazard Lands associated with the Credit River Valley to the east (see attached Figure 1). The subject property is located within the valley system and regulatory floodplain of the Credit River. A portion of the subject property at the Credit River is within the City of Mississauga's *Natural Heritage System* and designated as a *Significant Natural Site* under the City's Natural Areas Survey. The subject property is dominated by abandoned residential lands adjacent to a forested slope of the Credit River Valley. The adjacent forested valley is comprised of a mosaic of remnant and anthropogenically influenced vegetation (e.g. deciduous forest, cultural meadow).

These Terms of Reference (TOR) provide background information on the subject property and outline the steps required to complete the EIS's. An EIS is required under Region of Peel Official Plan (1996) and the City of Mississauga Official Plan (November 2012) when development is proposed on lands adjacent to the *Greenlands System* and/or *Significant Natural Area* to demonstrate that any negative impacts can be avoided. Negative impacts that cannot be avoided will be mitigated through restoration and enhancement, to the greatest extent possible.

2.0 Planning History / Background

The site has some planning history, with re-development contemplated from the mid-2000s by previous owners. As a result, the following supporting work and studies have been undertaken:

- Scoped Environmental Impact Study for Thorny Brae Place, Part of Lot 3 & 4, Range 5 (N. of Dundas Street), Mississauga, Ontario (Dougan & Associates, 2009).
- Slope Stability Study (McClyont and Rak Engineering Inc.)
- Top of Bank, as delineated by Credit Valley Conservation (CVC) in 2004 and shown on the drawing prepared by Schaeffer Dzaldov Bennett Ltd., dated July 21, 2015.

In addition, the subject property and a nearby site (the "Archways", 4583-4601 Mississauga Road), south of the church property, are proposed to share a stormwater management (SWM) outlet location at an existing outlet on the subject property (see Figure 1). Some work and agency liaison has occurred in 2015 and 2016 in relation to that proposal, as follows:

- Site walk with City and CVC staff on December 14, 2015
- Preparation of a Scoped EIS *Draft* TOR for the SWM Headwall and Outfall (MMM 2015), submitted to City and CVC on December 10, 2015 (via email)
- Preparation of a Tree Inventory Plan (BTI, January 2016)
- Comments from CVC in a letter dated February 2, 2016

3.0 Natural Environment Overview

Terrestrial: Vegetation on the subject property has a history of anthropogenic influence/ disturbance; it includes cultural habitats around the existing residences, successional meadow and deciduous forest community on and adjacent to the valley slope. Vegetation in the central portion of the property is Dry-Moist Old Field Meadow (CUM1-1), Sumac Cultural Thicket (CUT1-1) and Raspberry Cultural Thicket (CUT1-5) with scattered trees. The meadow habitats are dominated by Awnless Brome (*Bromus inermis ssp. inermis*), a few scattered pioneer trees, such as Trembling Aspen (*Populus tremuloides*), and a mix of forbs, such as Queen Anne's Lace (*Daucus carota*), Garden Bird's-foot-trefoil (*Lotus corniculatus*), Tall Goldenrod (*Solidago altissima*) and Tufted Vetch (*Vicia cracca*).

The meadow / thicket transitions to forested habitat types nearer the river: Fresh – Moist Sugar Maple - White Elm Deciduous Forest (FOD6-4)(on tableland adjacent to the slope); Fresh – Moist Sugar Maple - Ash Lowland Deciduous Forest (FOD6-1) (in the ravine / SWM outlet area); and Dry – Fresh Sugar Maple – White Ash Deciduous Forest (FOD5-8)(on the slope closer to the river).

One Butternut (*Juglans cinerea*) tree was found approximately 20 m from the existing SWM outlet headwall. Butternut is endangered in Ontario and subject to the Ontario Endangered Species Act (2007). Butternut Health Assessments will be undertaken by a qualified assessor, if required.

Aquatics: The Credit River forms the eastern boundary of the subject property. This reach of the Credit River is classified as a warmwater watercourse (Land Information Ontario (LIO) database, 2011). An existing stormwater outlet / headwall, currently draining stormwater from the church, is located within the Natural Hazard Lands on the valley slope, approximately 50 m linear distance from the Credit River and at an elevation of 19 m above the High Water Mark. Discharge from the outlet is conveyed to the Credit River via a 0.5-1.0 m wide channel with a knick point approximately 5 m downstream of the outfall (1.5 m high) and a substantial drop at the river (2.0 m). The substantial elevation change and knick points within the channel represent barriers to fish migration; as such, the drainage channel represents indirect fish habitat, contributing to a downstream fish-bearing watercourse (Credit River). Some erosion is evident along the drainage channel.

4.0 Proposed Scope of work

The proposed scope of work for the EIS's, as outlined below, is based on: available background information; field survey information collected to date; requirements / guidance found in the Environmental Impact Study Terms of Reference (CVC 2008) and City of Mississauga and Region of Peel Official Plans; and comments provided by CVC in a letter dated February 2, 2016

4.1 Pre-Consultation

Pre-consultation was undertaken in 2015 and 2016, as noted above, leading to the development of these Terms of Reference. The EIS's have been scoped based on that pre-consultation.

4.2 Development proposal

The following will be included within the EIS documents:

1) Description of the proposed development

2) A site plan of the subject property and the proposed development

3) An outline of the current land use designation and zoning.

We will also briefly describe the historical and present land uses of the subject property, including, but not limited to:

1) Grading / filling activities
2) Easements or restrictions
3) What is generally permitted on the property under existing planning regime.

4.3 Natural Features of Concern

A list and description of all natural areas onsite and immediately adjacent to the subject property, including any natural area designations as defined by CVC, the Region of Peel or City of Mississauga, the Ministry of Natural Resources and Forestry (MNRF), etc., will be provided. A general location aerial photograph will be provided that identifies the subject property, proposed development and natural areas both onsite and on the adjacent lands.

4.4 Municipal and Agency Requirements

The consultant / applicant will outline and briefly describe the relevant federal, provincial, municipal and agency legislation and policies related to the natural areas and designations that will be applied to this development.

4.4 Biophysical Inventory / Existing Conditions Characterization

Biophysical inventories and surveys proposed herein will be conducted on the entire subject property, as applicable.

4.4.1 Earth and Water Resources

Relevant information from other technical studies (e.g., soils, flow, slope etc. details hydrogeology, fluvial hydrogeology and stormwater management studies) will be reviewed and integrated, as relevant.

4.4.2 Vegetation Resources

a) ELC communities will be identified and mapped in the field and a comprehensive plant list compiled for each vegetation community potentially affected by the development. ELC element ranking, floristic quality indicators (FQA to be completed per CVC's Vegetation Assessment Tools) and an assessment of community condition will be documented. The vascular plant list will present the national, provincial, regional and SAR status of species recorded. The locations

of SAR, rare or uncommon species of plants will be documented by GPS and mapped where relevant/feasible. These surveys will occur during two seasons (spring and summer 2016), with a potential third survey in the fall of 2016 pending the results of the spring and summer surveys. Offsite vegetation resources adjacent to the study property will be visually verified as identified by CVC's ELC Community Series mapping.

b) A Butternut health assessment will be undertaken by a qualified assessor for the Butternut tree located approximately 20 m from the existing SWM outlet headwall.

4.4.3 Wildlife Resources

a) Breeding Bird Surveys in accordance with Ontario Breeding Bird Atlas (OBBA) standards, including two surveys conducted at least 10 days apart between late May and July 5, 2016. The surveys will be conducted in either the early morning and / or early evening depending on habitat and potential species present.

b) A habitat and reconnaissance-level wildlife assessment to screen for the potential presence of suitable habitat for Species at Risk (SAR) or other sensitive / key wildlife habitats. This includes documentation of all direct and indirect wildlife observations of birds, amphibians, mammals, reptiles and / or insects. These surveys will be completed concurrently with vegetation characterization surveys (spring / summer / fall 2016) and breeding bird surveys (spring / summer 2016).

c) Note that no amphibian breeding habitat (i.e., standing water) is present on the subject property so targeted amphibian surveys are not proposed.

4.4.4 Species at Risk (SAR) Screening

A SAR screening including the following will be prepared:

a) Secondary source data collection and agency liaison, assessment of SAR habitat potential within the study area, recording of SAR identified through standard surveys (i.e. those listed above), and standard screening table for SAR to review potential presence on the subject property.

b) Additional targeted SAR surveys are not proposed, based on site reconnaissance work completed to date

c) A Butternut Health Assessment will be completed for the one identified Butternut tree and others (if present and potentially impacted).

4.5 Biophysical Analysis

A description of the subject property characteristics that may pose constraints to the development with respect to typical construction and / or grading will be provided. The inter-relationship of the documented biophysical resources will be discussed and include other natural and cultural features onsite that may contribute to functions of the designated natural area's features and functions, both onsite and related to adjacent lands.

4.6 Development Proposal

MMM ecologists will list and describe activities associated with the proposed development, during construction and post-development, that may have an impact on natural area features and functions, including, but not limited to:

1) Stormwater management
2) Recreational uses
3) Urban barriers
4) Grading / filling
5) Sediment control, including interim sediment basins

4.7 Constraints and Opportunities

Field survey results, in addition to background information, supporting technical information and relevant information provided by agencies, will inform the identification of potential significant environmental issues / constraints to development. Features identified as constraints are those sensitive to disturbance based on the rarity or significance of the feature or the functions/processes and/or policies, legislation, or planning related studies that prohibit development to occur within them (i.e. PPS, Region of Peel Official Plan, City of Mississauga Official Plan, CVC Regulation 160/06). Buffers / setbacks will be reviewed and refined, as appropriate, through the completion of the EIS for the protection of the existing features and functions. Implications of development within or adjacent to identified natural features based on relevant policies will also be identified.

Areas which are less sensitive and do not contain significant species, habitats, or functions will be identified as areas of opportunity for the proposed development.

Opportunities and constraints mapping will be prepared as input to the development layout, with the objective of avoiding and reducing impacts to environmental features and functions. Feature boundaries will be clearly delineated and recommended buffers/setbacks shown.

4.8 Impacts Assessment, Mitigation and Enhancement

Site-specific consideration of impacts and mitigation measures will be provided. This will be undertaken through review of the proposed development including the development layout, details of the construction of proposed access roads, grading plans, functional service plans, and stormwater management plans in relation to the existing conditions on the subject property - to identify site specific potential impacts. This includes existing natural heritage, hydrogeological, and hydrological components. Potential impacts will be determined based on the direct, indirect, and induced effects of the proposed development.

Recommendations with regard to mitigation of impacts (e.g., storm water management – placement and discharge location(s), setbacks, buffers, sediment/erosion control, surface and groundwater management - including demonstration of water balance on a catchment/sub-catchment basis, etc.) will also be made. These will include measures to avoid or minimize impacts on natural heritage features and functions including any regionally or provincially significant flora or fauna. A 'Net Effects Assessment' will be completed to identify any residual effects after recommended mitigation/compensation is employed. Recommendations for enhancement opportunities (where applicable) and monitoring to evaluate mitigation and protection measures will also be provided.

5.0 Reporting

The EIS reports will be prepared in accordance with CVC, City of Mississauga and Region of Peel requirements and guidelines, as outlined above, and include the following:

a) Characterization of the existing natural features on and adjacent to the subject property

b) Summary of applicable policy

c) Analysis of opportunities and constraints

d) Details of the proposed development

e) Identification of the proposed development boundary

f) Detailed impact analysis of the proposed land use change to these features, and

g) Recommendations for mitigation and monitoring.

The reports will also include appendices, such as species lists, and photographs. Mapping of natural features identified and recommended buffers will be provided on an air photo base. A draft report for each EIS will be submitted to the City of Mississauga, Region of Peel and CVC for review and comment. The reports will subsequently be finalized based on agency comments.

Yours truly,
MMM Group

Jeff Gross

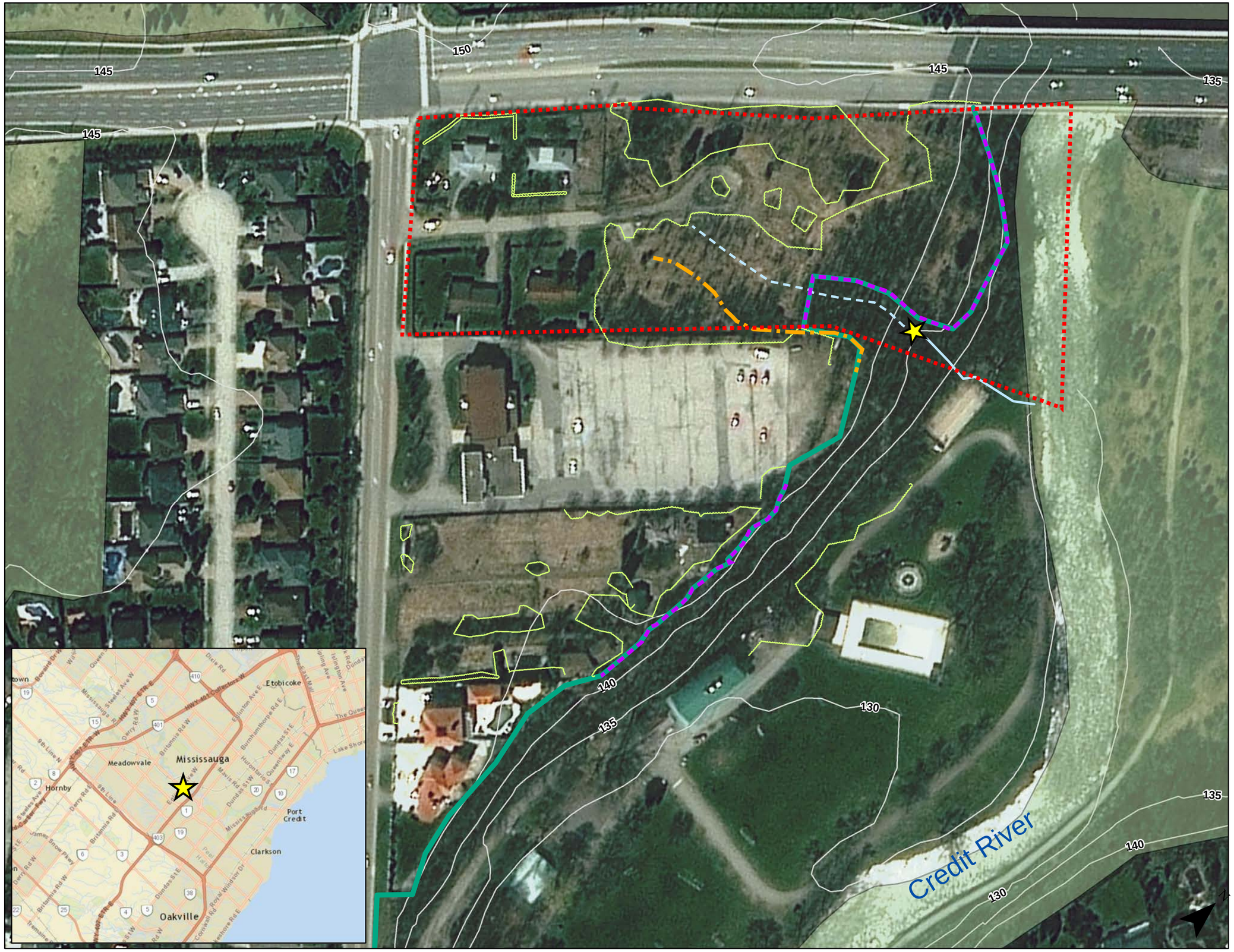
Senior Ecologist, Project Manager

Ecology

L:\Projects\2015\3315019_CreditRiverSWMOutfall\MXDs\3315019_CreditRiverSWM_KeyMap_2015Oct.mxd 20/05/2016

FIGURE 1

STUDY LOCATION
AND
EXISTING SWM OUTFALL



Legend

- Subject Property
- Existing SWM Outfall Location
- Natural Hazard (Approximate, City of Mississauga Official Plan, 2012)
- Significant Natural Areas (City of Mississauga, 2015)
- Contours (5m)

Schaeffer Dzaldov Bennett Ltd. Surveyed Limits (2015)

- Drainage Swale
- Outlet Channel
- Top of Slope
- Top of Bank (via CVCA, 2004)
- Dripline

0 25 50 m

1:1,500

Figure: 1
Project No.: 3315019
Date Created: 27/10/2015
Date Modified: 20/05/2016
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

MMM GROUP

APPENDIX B

FIELD SURVEY CHRONOLOGY

Table B.1. Thorny Brae Place Scoped EIS – Field Chronology

Date	Staff	Task	Total Hours	Coverage / Units
2015				
October 16, 2015	CL	SWM Outfall and Terrestrial assessment	3.5	Entire Site; SWM Outfall
October 29, 2015	JM	ELC and Botanical Inventory	2.5	Entire Site; SWM Outfall
December 14, 2015	JG	Agency site walk; site recon	2.5	Entire Site; SWM Outfall
2016				
May 20, 2016	JM	ELC, Botanical Inventory, and Butternut health assessment	2	Entire Site; SWM Outfall
June 23, 2016	JM	ELC and Botanical Inventory	2	Entire Site; SWM Outfall
June 23, 2016	SG	Breeding Birds / General Wildlife	2.5	Entire Site; SWM Outfall
July 4, 2016	SG	Breeding Birds / General Wildlife	2.5	Entire Site; SWM Outfall
August 9, 2016	CL	Aquatic Habitat and HDF	1	Drainage channel and outlet
September 7, 2016	JM	Butternut tree review	1	Butternut tree 1
2017				
February 22, 2017	CL	HDF Assessment	1	Drainage channel and outlet
2018				
July 6, 2018	SG	Breeding Bird and Hedgerow review	3	Entire Site; SWM Outfall
July 17, 2018	JG, JM	Site walk for woodland delineation	4	Entire Site; SWM Outfall
October 16, 2018	JM	Site visit	2	Entire Site; SWM Outfall
Total # field dates	**13**			
Total # hours	**29.5**			

APPENDIX C

BOTANICAL INVENTORY

Table C.1. Summary of plant species recorded within the study area

Common Name	Scientific Name	Unit 1a/b	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6a	Unit 6b / Hedgerow	cc[1]	cw[1]	grank[2]	Srank[3]	COSEWIC[4]	OMNRF[5]	GTA and Peel Region (Varga et al. 2000)[6]	Plants of the Credit River Watershed[7]	native status
Freeman's Maple	*Acer ×freemanii*					x					GNA	SNR			XSR	X	N
Manitoba Maple	*Acer negundo*		x			x	x		0	-2	G5	S5			X	X	N
Norway Maple	*Acer platanoides*					x	x		*	5	GNR	SNA			X	X	I
Sugar Maple	*Acer saccharum var. saccharum*				x	x			4	3	G5T5	S5			X	X	N
Common Yarrow	*Achillea millefolium*	x		x	x		x	x	*	3	G5T5?	SNA			X	X	I
Tall Hairy Agrimony	*Agrimonia gryposepala*					x			2	2	G5	S5			X	X	N
Tree-of-heaven	*Ailanthus altissima*		x						*	5		GNR			X	X	I
Garlic Mustard	*Alliaria petiolata*		x		x	x			*	0	GNR	SNA			X	X	I
Allegheny Serviceberry	*Amelanchier laevis*					x			5	5	G4G5	S5			U	X	N
Lesser Burdock	*Arctium minus*	x		x	x	x	x	x	*	5	GNR	SNA			X	X	I
Greater Burdock	*Arctium lappa*	x	x	x	x		x	x		0	GNR	SNA			X	X	I
Common Milkweed	*Asclepias syriaca*	x		x	x		x	x	0	5	G5	S5			X	X	N
Yellow Rocket	*Barbarea vulgaris*					x			*	0	GNR	SNA			X	X	I
Awnless Brome	*Bromus inermis ssp. inermis*	x		x	x		x	x	*	5	GNR	SNA			X	X	I
Sedge Species	*Carex sp.*		x			x										X	N
Bitternut Hickory	*Carya cordiformis*				x	x			6	0	G5	S5			X	X	N
Canada Thistle	*Cirsium arvense*	x		x	x		x	x	*	3	GNR	SNA			X	X	I
Field Bindweed	*Convolvulus arvensis*	x		x	x		x	x	*	5	GNR	SNA			X	X	I
Crown-vetch	*Coronilla varia*	x		x	x		x		*	5	GNR	SNA			X	X	I
Dotted Hawthorn	*Crataegus punctata*	x							4	5	G5	S5			X	X	N
Hawthorn Species	*Crataegus sp.*				x	x	x									X	N
Orchard Grass	*Dactylis glomerata*		x						*	3	GNR	SNA			X	X	I
Queen Anne's Lace	*Daucus carota*	x		x	x		x	x	*	5	GNR	SNA			X	X	I
Fuller's Teasel	*Dipsacus fullonum*	x	x	x	x		x	x	*	5	GNR	SNA			X	X	I
Creeping Wild Rye	*Elymus repens*	x		x	x						GNR	SNA			X	X	I
Daisy Fleabane	*Erigeron strigosus*	x		x	x		x	x	0	1	G5	S5			X	X	N
Yellow Trout-lily	*Erythronium americanum*					x			5	5	G5T5	S5			X	X	N
Woodland Strawberry	*Fragaria vesca ssp. americana*					x			4	4	G5T5	S5			X	X	N
Virginia Strawberry	*Fragaria virginiana*				x				2	1	G5T5	SU			X	X	N
White Ash	*Fraxinus americana*					x		x	4	3	G5	S5			X	X	N
Green Ash	*Fraxinus pennsylvanica*	x	x		x	x		x	3	-3	G5	S5			X	X	N
Catchweed Bedstraw	*Galium aparine*		x						4	3	G5	S5			X	R	N

Common Name	Scientific Name	Unit 1a/b	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6a	Unit 6b / Hedgerow	cc[1]	cw[1]	grank[2]	Srank[3]	COSEWIC[4]	OMNRF[5]	GTA and Peel Region (Varga et al. 2000)[6]	Plants of the Credit River Watershed[7]	native status
Wild Crane's-bill	*Geranium maculatum*					x			6	3	G5	S5			U	X	N
Yellow Avens	*Geum aleppicum*				x	x		x	2	-1	G5	S5			X	X	N
White Avens	*Geum canadense*	x		x	x	x	x		3	0	G5	S5			X	X	N
Clover-root	*Geum urbanum*							x	*	5	G5	SNA			X	X	I
Ground Ivy	*Glechoma hederacea*				x				*	3	GNR	SNA			X	X	I
Virginia Stickseed	*Hackelia virginiana*	x		x	x		x	x	5	1	G5	S5			U	X	N
Orange Daylily	*Hemerocallis fulva*		x						*	5	GNA	SNA			X	X	I
Virginia Waterleaf	*Hydrophyllum virginianum*					x			6	-2	G5	S5			X	X	N
St. John's-wort	*Hypericum perforatum*	x		x	x		x	x	*	5	GNR	SNA			X	X	I
Spotted Jewelweed	*Impatiens capensis*					x			4	-3	G5	S5			X	X	N
Elecampane Flower	*Inula helenium*	x							*	5	GNR	SNA			X	X	I
Butternut	*Juglans cinerea*				x				6	2	G4	S3?	END	END	X	X	N
Black Walnut	*Juglans nigra*			x		x	x	x	5	3	G5	X			X	X	N
English Walnut	*Juglans regia*				x				*	5	GNR	SNA			X		I
Common Motherwort	*Leonurus cardiaca*				x				*	5	GNRTNR	SNA			X	X	I
European Privet	*Ligustrum vulgare*				x	x		x	*	1	GNR	SNA			X	X	I
Morrow's Honeysuckle	*Lonicera morrowii*	x	x		x	x	x		*		GNR	SNA			X	X	I
Honeysuckle Species	*Lonicera sp.*			x											X		I
Tartarian Honeysuckle	*Lonicera tatarica*		x		x	x			*	3	GNR	SNA			X	X	I
Bird's-foot-trefoil	*Lotus corniculatus*	x		x	x		x	x	*		GNR	SNA			X	X	I
Purple Loosestrife	Lythrum salicaria	x							*	-5	G5	SNA			X	X	I
False Solomon's Seal	*Maianthemum racemosum*				x				4	3	G5T5	S5			X	X	N
Black Medic	*Medicago lupulina*	x		x	x				*	1	GNR	SNA			X	X	I
Thicket Creeper	*Parthenocissus vitacea*		x		x	x					G5	S5			X	X	N
Reed Canary Grass	*Phalaris arundinacea*	x				x			0	-4	G5	S5			X	X	N
Meadow Timothy	*Phleum pratense*	x		x	x				*	3	GNR	SNA			X	X	I
Colorado Spruce	*Picea pungens*			x			x				G5	SNA				X	I
Scotch Pine	*Pinus sylvestris*					x		x	*	5	GNR	SNA			X	X	I
Fowl Bluegrass	*Poa palustris*	x							5	-4	GNR	SNA			X	X	I
Kentucky Bluegrass	*Poa pratensis*	x		x	x		x	x	0		G5T5	S5				X	N
Bluegrass Species	*Poa sp.*					x									X	X	I
Downy Solomon's Seal	*Polygonatum pubescens*		x			x			5	5	G5	S5			X	X	N
Eastern Cottonwood	*Populus deltoides*	x		x							G5T5	SU			X	X	N

Common Name	Scientific Name	Unit 1a/b	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6a	Unit 6b / Hedgerow	cc[1]	cw[1]	grank[2]	Srank[3]	COSEWIC[4]	OMNRF[5]	GTA and Peel Region (Varga et al. 2000)[6]	Plants of the Credit River Watershed[7]	native status
Quaking Aspen	*Populus tremuloides*	x		x			x		2	0	G5	S5			X	X	N
Carolina Poplar	*Populus x canadensis*							x			GNA	SNA			X	X	I
Sweet Cherry	*Prunus avium*					x			*	5	GNR	SNA			XSR	X	I
Wild Black Cherry	*Prunus serotina*				x	x			3	3	G5	S5			X	X	N
Choke Cherry	*Prunus virginiana*				x	x			2	1	G5T5	S5			X	X	N
Common Pear	*Pyrus communis*	x							*	5	G5	SNA			X	X	I
White Oak	*Quercus alba*							x	6	3	G5	S5			X	X	N
Bur Oak	*Quercus macrocarpa*				x				5	1	G5	S5			X	X	N
Northern Red Oak	*Quercus rubra*					x			6	3	G5	S5			X	X	N
Buckthorn	*Rhamnus cathartica*		x		x	x			*	3	GNR	SNA			X	X	I
Staghorn Sumac	*Rhus typhina*	x	x	x		x	x		1	5	G5	S5			X	X	N
Northern Red Currant	*Ribes rubrum*					x			*	5	G4G5	SNA			X	X	I
Currant Species	*Ribes sp.*				x											X	N
Rambler Rose	*Rosa multiflora*					x			*	3	GNR	SNA			X	X	I
Allegheny Blackberry	*Rubus allegheniensis*	x	x	x	x		x	x	2	2	G5	S5			X	X	N
Red Raspberry	*Rubus idaeus*						x			0	G5T5	SNA			X	X	I
Black Raspberry	*Rubus occidentalis*			x		x			2	5	G5	S5			X	X	N
White Willow	*Salix alba*					x			*	-3	G5	SNA			X	X	I
Bloodroot	*Sanguinaria canadensis*					x			5	4	G5	S5			X	X	N
Bittersweet Nightshade	*Solanum dulcamara*	x		x	x				*	0	GNR	SNA			X	X	I
Tall Goldenrod	*Solidago altissima*	x		x	x	x	x	x	1	3	G5	S5			X	X	N
Canada Goldenrod	*Solidago canadensis*					x			1	3	G5	SNR			X	X	N
Broad-leaved Goldenrod	*Solidago flexicaulis*				x	x			6	3	G5	S5			X	X	N
Common Starwort	*Stellaria media*	x		x	x		x	x	*	3	GNR	SNA			X	X	I
Panicled Aster	*Symphyotrichum lanceolatum*	x	x								G5T5	S5			X	X	N
Calico Aster	*Symphyotrichum lateriflorum*	x	x	x	x	x	x	x	3	-2	G5T5	SNR			X	X	N
Heart-leaved Aster	*Symphyotrichum cordifolium*	x	x	x	x		x	x	5	5	G5	S5			X	X	N
Common Comfrey	*Symphytum officinale*		x						*	5	GNR	SNA			X	X	I
Common Lilac	*Syringa vulgaris*					x			*	5	GNR	SNA			X	X	I
Common Dandelion	*Taraxacum officinale*	x		x	x	x	x		*	3	G5	SNA			X	X	I
Northern White Cedar	*Thuja occidentalis*					x	x		4	-3	G5	S5			X	X	N
American Basswood	*Tilia americana*					x		x	4	3	G5	S5			X	X	N
Littleleaf Linden	Tilia cordata							x	*		GNR	SNA					I

Common Name	Scientific Name	Unit 1a/b	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6a	Unit 6b / Hedgerow	cc[1]	cw[1]	grank[2]	Srank[3]	COSEWIC[4]	OMNRF[5]	GTA and Peel Region (Varga et al. 2000)[6]	Plants of the Credit River Watershed[7]	native status
Eastern Poison Ivy	*Toxicodendron radicans ssp. negundo*					x			5	-1	G5T5	S5			X	X	N
Meadow Goat's-beard	*Tragopogon dubius*	x		x	x		x	x	*	5	GNR	SNA			X	X	I
Colt's Foot	*Tussilago farfara*	x		x	x		x	x	*	3	GNR	SNA			X	X	I
American Elm	*Ulmus americana*	x	x	x	x	x			3	-2	G5?	S5			X	X	N
Slippery Elm	*Ulmus rubra*	x							6	0	G5	S5			X	X	N
Blue Vervain	*Verbena hastata*	x		x	x		x	x	4	-4	G5	S5			X	X	N
White Vervain	*Verbena urticifolia*	x		x				x	4	-1	G5	S5			X	X	N
Nannyberry	*Viburnum lentago*				x				4	-1	G5	S5			X	X	N
Tufted Vetch	*Vicia cracca*	x	x	x	x		x	x	*	5	GNR	SNA			X	X	I
Lesser Periwinkle	*Vinca minor*						x		*	5	GNR	SNA			X	X	I
Riverbank Grape	*Vitis riparia*	x		x		x	x		0	-2	G5	S5			X	X	N
	Total = 109	**46**	**23**	**40**	**54**	**52**	**38**	**35**									

Legend

[1]Coefficient of Conservatism and Coefficient of Wetness
Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.

CC: Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.
CW: Coefficient of Wetness. Value between 5 and –5. A value of –5 is assigned to Obligate Wetland (OBL) and 5 to Obligate Upland (UPL), with intermediate values assigned to the remaining categories.

[2]G-Rank (Global Status from MNR Biodiversity Explorer September 2012)
Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

Global (G) Conservation Status Ranks
G1: Extremely rare – usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2: Very rare – usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
G3: Rare to uncommon – usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4: Common – usually more than 100 occurrences; usually not susceptible to immediate threats.
G5: Very common – demonstrably secure under present conditions.

Variant Ranks
G#G#: Range Rank – A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).
GU: Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.
GNR: Unranked – Global rank not yet assessed
GNA: Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Rank Qualifiers
?: Inexact Numeric Rank – Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.

Q: Questionable taxonomy that may reduce conservation priority – Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower priority (numerically higher) conservation status rank. The “Q” modifier is only used at a global level and not at a national or subnational level.

C: Captive or Cultivated Only – Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The “C” modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC. This is equivalent to “Extinct” in the Wild (EW) in IUCN’s Red List terminology (IUCN 2001).

[3]S-Ranks (Provincial)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.
(Provincial Status from MNR Biodiversity Explorer September 2012)

S1: Critically imperiled – Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2: Imperiled – Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3: Vulnerable – Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
X: Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5: Secure – Common, widespread, and abundant in the nation or state/province.
S#S#: Range Rank – A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1X).
SX: Presumed Extirpated – Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH: Possibly Extirpated (Historical) – Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
SE: Species is considered exotic in Ontario
SNR: Unranked – Nation of state/province conservation status not yet assessed.
SU: Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA: Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.[1]

[4]COSEWIC (Committee on the Status of Endangered Wildlife in Canada)
(federal status from COSEWIC November 2012)

EXT: Extinct – A species that no longer exists.
EXP: Extirpated – A species no longer existing in the wild in Canada, but occurring elsewhere.
END: Endangered – A species facing imminent extirpation or extinction.
THR: Threatened – A species likely to become endangered if limiting factors are not reversed.
SC: Special Concern (formerly vulnerable) – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
NAR: Not At Risk – A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD: Data Deficient (formerly Indeterminate) – Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

Implied COSEWIC Status Notations (Status Due to Taxonomic Relationships)[2]
value (Flagged Value) – The taxon itself is not named in the Canadian Species at Risk list, however, it does have status as a result of its taxonomic relationship to a named entity. For example, if a species has a COSEWIC status of “threatened”, then by default, all of its recognized subspecies that occur in Canada also have a threatened status. The subspecies in this example would have the value “T(2)” under COSEWIC. Likewise, if all of a species’ infraspecific taxa occurring in Canada have the same COSEWIC status, then that status appears in the entry for the “full” species as well. In this case, if the species name is not mentioned in the Canadian Species at Risk list, the status appears with a flag (2) in NatureServe Explorer.

value, value: (Combination values with flags) – The taxon itself is not named in the Canadian Species at Risk list, however, all of its infraspecific taxa occurring in Canada do have status but two or more of the taxa do not have the same status. In this case, a combination of statuses shown with a flag (7) indicates the statuses that apply to infraspecific taxa or populations within this taxon.

PS: Indicates “partial status” – in only a portion of the species’ range in Canada. Typically indicated for a “full’ species where at least one but not all of a species’ infraspecific taxa or populations has COSEWIC status.

PSvalue: Indicates “partial status” – status in only a portion of the species’ range. The value of that status appears because the entity with status (usually a population defined by geopolitical boundaries within Canada) does not have an individual entry in NatureServe Explorer. Information about the entity with status can be found in reports for the associated species.

[5]MNRF (Ministry of Natural Resources and Forestry)
(Provincial status from MNRF)
The provincial review process is implemented by the MNRF's Committee on the Status of Species at Risk in Ontario (COSSARO).

EXT: Extinct – A species that no longer exists anywhere.
EXP: Extirpated – A species that no longer exists in the wild in Ontario but still occurs elsewhere.
END: Endangered – A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act (ESA).
THR: Threatened – A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
SC: Special Concern (formerly Vulnerable) – A species with characteristics that make it sensitive to human activities or natural events.
NAR: Not at Risk – A species that has been evaluated and found to be not at risk.
DD: Data Deficient (formerly Indeterminate) – A species for which there is insufficient information for a provincial status recommendation.

[7] SARA (Species at Risk Act) Status and Schedule

The Act establishes Schedule 1, as the official list of species at risk. It classifies those species as being Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed species are implemented.
EXT: Extinct – A species that no longer exists.
EXP: Extirpated – A species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END: Endangered – A species that is facing imminent extirpation or extinction.
THR: Threatened – A species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC: Special Concern – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.

[1] Added on June 4, 2013 from http://nhic.mnr.gov.on.ca/glossary/srank.cfm
[2] Added on June 5, 2013 from http://www.natureserve.org/explorer/statusca.htm

Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.

Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Species at Risk.

Government of Canada. Species at Risk Public Registry. Website: [http://www.sararegistry.gc.ca/default_e.cfm September 27, 2012]
Glossary: http://www.sararegistry.gc.ca/about/glossary/default_e.cfm#e
Species Index A-Z: http://www.sararegistry.gc.ca/sar/index/default_e.cfm
Species Listing by Schedule: http://www.sararegistry.gc.ca/sar/listing/default_e.cfm

[6]Halton , Peel, Toronto, York, Durham, GTA, 6E7, 7E4

Varga, S., *et. al*. 2000. The Distribution and Status of the Vascular Plants of the Greater Toronto Area. Ontario Ministry of Natural Resources and Fprestry, Aurora, ON. 103 pp.
"Plant rarity is based on the number of locations for a native plant species" and also takes into account native species restricted to specialized rare habitats. For the Greater Toronto Area column, "A species is considered rare in the Greater Toronto Area if it is rare or uncommon in a least four of... Halton, Peel, Toronto, York, and Durham".

Codes are defined as follows:
X: Present
U: Uncommon native species
R: Rare native species
R#: Number of stations for a rare native species
E: Extirpated native species
+ or I: Introduced species
X+: Introduced in municipality
SR: Sight record
LR: Literature record

[7]Credit Valley Conservation 2002. Plants of the Credit River Watershed. Website [http://www.creditvalleyca.ca/wp-content/uploads/2011/02/PlantsoftheCRW.pdf]
X: Present
R: Rare native species

Native Status:
I: Introduced to Ontario
N: Native to Ontario

APPENDIX D

REPRESENTATIVE PHOTOGRAPHS

Photo 1: Reach 1, looking downstream (south) from the culvert on Thorny Brae Place. <2cm of standing water can be seen pooled at the culvert outlet.

Photo 2: Reach 2, Looking upstream (north) from the outlet and headwall at the swale through the woodlot.

Photo 3: Reach 3, looking upstream (north) from the bottom of the slope towards the outlet and headwall. Water was flowing at the time of assessment (February 23, 2017), with water depths within the reach measuring up to 10cm.

Photo 4: Reach 4, looking upstream (north) from the grass at the bottom of the slope. This photo was taken approximately 20m upstream of the

Photo 5: Vegetation Unit 3 / Unit 5—Raspberry Cultural Thicket in the foreground with Black Walnut Lowland Deciduous Forest in the background

Photo 6: Vegetation Unit 1 / 6a — Cultural Meadow in the foreground with Cultural thicket to the left and in the background

Photo 7: Vegetation Unit 2— Sumac Cultural Thicket with Tree of Heaven present

Photo 8: Vegetation Unit 4— Elm Lowland Deciduous Forest

Thorny Brae Place Scoped Environmental Impact Study

REPRESENTATIVE PHOTOGRAPHS

Date: March 2019

Project No: 16M-01600-01

Figure No: Appendix D

APPENDIX E

EVALUATION OF SIGNIFICANT WILDLIFE HABITAT

Appendix E – Significant Wildlife Habitat Evaluation

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
A. SEASONAL CONCENTRATION AREAS					
A1. Deer Wintering Area	White-tailed Deer	Not Specified	Not Specified	Deer wintering areas in the Region of Peel and Town of Caledon will be assessed and mapped by OMNR staff. According to OMNR, mapping will not be based on the traditional assessment methodology. Instead, it will be based on a detailed assessment of historic and recent motor vehicle accident data for Caledon in association with local expert knowledge.	**SWH Not Present** No Deer Wintering Areas are present (LIO/NRVIS)
A2. Colonial Bird Nesting Sites (e.g., heronry, gull colony)	Great Blue Heron, Great Egret, Black-crowned Night-Heron, Black Tern, Green Heron, Common Tern, Northern Rough-winged Swallow, Bank Swallow, Cliff Swallow, Barn Swallow, Sedge Wren, Marsh Wren	Not Specified	Not Specified for all species. Bank Swallow and Cliff Swallow: Any exposed soil banks, undisturbed for 10 years or more. Does not include man-made structures (bridges or buildings) or recently disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Also does not include an active Mineral Aggregate Operation. *	It is recommended that thresholds be based on the Significant Wildlife Habitat Technical Guide (OMNR 2000) and ORMCP TP2 (Queen's Printer for Ontario 2007a) supplemented by information from: • Atlas of the Breeding Birds of Ontario 2000 – 2005 (Cadman et al., 2007) • Breeding Birds of Ontario Vols. 1 & 2 (Peck and James 1983, 1987) • Communications with OMNR and Conservation Authority staff Therefore, it is recommended that any nesting colonies of the following species be considered SWH in the Region of Peel and Town of Caledon: Great Blue Heron, Great Egret, Black-crowned Night-Heron, and Black Tern. In addition, it is recommended that habitats that support the following number of nests/pairs be considered SWH in the Region of Peel and Town of Caledon: Green Heron, 2; Common Tern, 5; Northern Rough-winged Swallow, 5; Bank Swallow 30; Cliff Swallow, 8; Barn Swallow 3; Sedge Wren, 3; and Marsh Wren, 3. Note 1: Excluded areas include (a) actively used portions of recreational areas (e.g., sports fields, golf courses) and parks, and (b) lands permanently transformed for human services or infrastructure (e.g., roads, buildings, piers, active pits and quarries). Note 2: If fewer than 5 naturally occurring Bank Swallow colonies exist in any of the jurisdictions within the Region of Peel (e.g., Town of Caledon), all colonies should be considered significant	**SWH Not Present** Targeted breeding bird surveys were undertaken on two dates for the current survey (June23, 2016 and July 4, 2016), one date as part of previous work (Dougan & Associates 2009; June 18, 2007), with supplemental observations during other field work April 2005-November 2008 and October 2015 - September 2016: • Two of the listed bird species were recorded during previous work: Cliff Swallow (nesting on the Eglinton Ave. bridge) and Northern Rough-winged Swallow; • None of the listed species was recorded on the subject property during current surveys. • No colonial nesting sites are present.
A3. Waterfowl Nesting Habitat	American Wigeon, Am. Black Duck, Northern Pintail, Northern Shoveler, Gadwall, Blue-winged Teal, Green-winged Teal, Wood Duck, Hooded Merganser, Common Merganser, Mallard Ducks, Redhead, Ruddy Duck,	All upland habitats not protected as a Key Natural Heritage Feature or Hydrologically Sensitive Feature located adjacent to these wetland ELC Ecosites: MAS2, MAS3, SAS1, SAM1, SAF1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT2, SWD1, SWD2, SWD3, SWD4 *	A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. • Upland areas should be at least 120 m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. *	The recommended thresholds for Region of Peel and Town of Caledon are based on ORMCP TP2 (Queen's Printer for Ontario 2007a) but incorporate additions to the species list. Therefore, it is recommended that SWH be defined as waterfowl nesting areas that support: a) Any combination of 3 or more nesting pairs of Listed Species b) Any combination of 10 or more nesting pairs of listed species above, including Mallard Note: Waterfowl nesting areas generally correspond with upland habitats adjacent to marsh, swamp and shallow water ELC community classes, and generally extend out as far as 120 from the wetland (> 0.5 ha) or a cluster of 3 or more smaller wetlands (<0.5 ha) within 150 m of each other	**SWH Not Present** No candidate ecosites are present. Targeted breeding bird surveys and supplementary surveys were completed as described above: • One of the listed bird species was recorded during previous work: Mallard (likely associated with the river) • None of the listed species was recorded on the subject property during current surveys.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
A4i. Migratory Landbird Stopover Areas	All migratory songbirds and migrant raptor species+	All ELC communities in: • 'natural' terrestrial, wetland ecosites • 'cultural' woodlands, plantations, savannahs, thickets and meadows	'Natural areas' = all terrestrial and wetland communities as defined under the Ecological Land Classification (ELC) system (Lee et al. 1998), as well as cultural woodlands and plantations. 'Successional areas' = cultural savannahs, cultural thickets and cultural meadows. Excluded areas include (a) actively used portions of recreational areas (e.g., sports fields, golf courses) and parks, and (b) lands permanently transformed for human services or infrastructure (e.g., roads, buildings, piers, active pits and quarries).	It is recommended that all 'natural areas' be identified as SWH within: a) 2 km of Lake Ontario b) River and creek valleys within 5 km of Lake Ontario, and c) 500 m of a river valley, but within 5 km of Lake Ontario. 'Successional communities' are also to be identified as SWH if they are: • ≥ 5 ha in size and immediately on the lakeshore, or • ≥ 10 ha in size and within any of the zones (a, b, c) identified above. Note 1: SWH designation is not intended to limit existing agricultural activities from continuing. Note 2: It is suggested that the City of Mississauga consider reviewing their Tree Permit By-law Number 474-05 to regulate the cutting of trees within 2 km of the lakeshore more rigorously.	**SWH Not Present** No candidate habitat is present: subject property is approximately 8.5 km from Lake Ontario.
A4ii. Migratory Bat Stopover Areas	Migratory Bat Species	Not Specified	Large physical barriers such as the Great Lakes likely tend to concentrate migrating bats along their shores since they are regularly observed at these locations during the migration period. In addition to shoreline areas, migratory bats are also known to use forested ridges during migration	There is insufficient information currently available to suggest a threshold. However, in the not too distant future the OMNR Wind Resource Atlas (http://www.ontariowindatlas.ca/) will indicate areas considered important to bat migration. These areas should be considered candidate SWH in the Region of Peel and Town of Caledon. Further field studies will be required to confirm their significance. In the meantime, the protection of significant migratory bat stopover areas is probably accomplished by criterion A4i, at least along Lake Ontario. Note that the Ecoregion Criteria Schedule identifies Long Point as the only known bat migratory stopover.	**SWH Not Present** No thresholds recommended. Subject property is >8 km from Lake Ontario shoreline, therefore not likely Candidate SWH as described.
A4iii. Migratory Butterfly Stopover Ares	Painted Lady Red Admiral <u>Special Concern</u> Monarch +	Combination of ELC Community Series; need to have present one Community Series from each landclass: Field: CUM CUT CUS Forest: FOC FOD FOM CUP +	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie or Lake Ontario. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south. • The habitat should not be disturbed; fields / meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes +	There is insufficient information currently available to suggest a threshold. It is therefore recommended that the Region of Peel and Town of Caledon defer to the Significant Wildlife Habitat Technical Guide (OMNR 2000) approach, or guidelines for Eco-region 7E (in preparation by OMNR), until more data is gathered / analyzed. These areas are likely covered by criterion A4i along Lake Ontario. Note: According to CVC, migratory butterfly congregations have been observed along the Lake Ontario shoreline (e.g., Lakeside Park and Rattray Marsh) during the fall. Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100- 500/day; significant variation can occur between years and multiple years of sampling should occur. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. • SWH MIST Index #16 provides development effects and mitigation measures. +	**SWH Not Present** No candidate habitat is present: subject property is approximately 8.5 km from Lake Ontario and well below the size threshold (less than 2 hectares). None of the target species was observed on the subject property.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
A4iv. Migratory Waterfowl Stopover and/or Station (Terrestrial)	Wood Duck, Gadwall, American Wigeon, Am. Black Duck, Blue-winged Teal, Northern Shoveler, Northern Pintail, Green-winged Teal, Ring-necked Duck,	CUM1 *	Fields with sheet water during Spring (April/May). • Northern Pintail can be found in early spring on seasonally flooded fields. • Although agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH. *	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds (but incorporating 4 additional species) are recommended for the Region of Peel and Town of Caledon: • Annual aggregations (observed on a single day) of 100 individuals or more in any combination of the listed species. Note1: Annual habitat use can be based on background information or field studies conducted over at least a two-year period. Note 2: SWH designation is not intended to limit existing agricultural activities from continuing, or preventing built infrastructure (e.g., sewage lagoons) from functioning as required.	**SWH Not Present** No candidate habitat is present. The subject property contains very small areas of CUM. No large aggregations of migrant waterfowl would be possible.
A4v. Migratory Waterfowl Stopover and/or Staging	<u>Mainland species list:</u> Wood Duck, Gadwall, American Wigeon, Am. Black Duck, Blue-winged Teal, Northern Pintail, Northern Shoveler, Green-winged Teal, Ring-necked Duck, Lesser Scaup, Bufflehead, Common Goldeneye, Hooded Merganser, Common Merganser, <u>Nearshore species list:</u> Brant, Canvasback, Redhead, Greater Scaup, King Eider, Common Eider, Harlequin Duck, Surf Scoter, White-winged Scoter, Black Scoter, Long-tailed Duck, Red-breasted Merganser, Ruddy Duck, Horned Grebe, Red-necked Grebe.	MAM2 MAM3 MAM4 MAM5 MAM6 MAM1 SAS1 SAM1 SAF1*	• Ponds, marshes, lakes and watercourses used during migration. • Habitats with abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). *	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds are recommended for mainland portions of the Region of Peel and Town of Caledon • Annual aggregations of 100 or more individuals (observed during a single day), in any combination, included on the Mainland species list). Nearshore waters of Lake Ontario within the globally significant "The West End of Lake Ontario" Important Bird Area (IBA) should automatically be designated as SWH. However, for nearshore waters of Lake Ontario east of the IBA, it is recommended that areas that support annual aggregations of 250 or more individuals (observed during a single day), in any combination, included on the Nearshore species list be considered SWH. Note 1: Annual habitat use can be based on background information or field studies conducted over at least a two-year period. Note 2: SWH designation is not intended to limit existing agricultural activities from continuing or preventing built infrastructure (e.g., sewage lagoons) from functioning as required. Note 3: The nearshore waters of Lake Ontario are part of conservation authority jurisdiction under the Conservation Authorities Act and in an agreement with DFO for development planning review including municipal activities and approvals.	**SWH Not Present** **SWH Not Present** None of the suitable ecosites are present on the subject property, and no suitable candidate habitat (ponds, marshes, lakes, with vegetation in shallow water) is present.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
A4vi. Migratory Shorebird Stopover Areas	All Shorebirds	Not Specified	See Note 1 in Recommended Thresholds	It is recommended that sites that support annual aggregations of ≥75 individuals (observed on a single day during migration), of any combination of species, be considered SWH: Note 1: A site is defined as (a) a 100 m reach of shoreline (centered at any location), or (b) a habitat patch 0.2 ha in size (centered at any location). This is roughly equivalent to a circle with a 25 m radius or square with 45 m sides. Note 2: The determination of annual habitat use can be based on background information or field studies conducted over at least a two-year period. Note 3: These thresholds should be examined in the future and revised if necessary by consulting with local naturalist clubs and/or the Ontario Field Ornithologists. Note 4: The designation of SWH is not intended to limit the ability of existing, normal agricultural uses from continuing, or preventing existing municipal infrastructure (e.g., sewage lagoons, piers etc.) from functioning as required.	**SWH Not Present** No suitable candidate habitat (i.e., shoreline) is present.
A5. Raptor Wintering Areas (i.e. used for feeding and/or roosting)	Northern Harrier, Red-tailed Hawk, Rough-legged Hawk, American Kestrel, Short-eared Owl	Not Specified	Open fields, including hayfields, pastures, and meadows that support large and productive small mammal populations (mice, voles) are important to the winter survival of many birds of prey. Such fields usually have a diversity of herbaceous vegetation that provides food for mammals. Scattered trees and fence posts provide perches for hunting birds. Windswept fields in more open areas that are not covered by deep snow are preferred by raptors because hunting prey is easier. The best roosting sites will likely be found in relatively mature mixed or coniferous woodlands that abut these windswept fields. Some species, such as northern harriers and short-eared owls, roost in large grassy fields. Some feeding and roosting sites support many birds, especially in years when northern species are numerous. In areas with few remaining forested areas, woodlots with dense conifer cover may support numerous roosting birds, especially long-eared owls. Highway corridors appear to attract many hunting raptors throughout the year, because these areas are open and the vegetation is relatively low, making hunting easier.°	Until information specific to the Region of Peel and Town of Caledon becomes available, it is recommended that the provincial guidelines presented in the Significant Wildlife Habitat Technical Guide (OMNR 2000) be used in both jurisdictions. Accordingly, it is recommended that open fields >20 ha in size adjacent to woodlands be considered candidate SWH. Open fields generally correspond with cultural meadows or abandoned agricultural lands. Smaller sites should also be considered if there is any evidence or reasonable possibility of regular winter raptor activity. Confirmed sites should be occupied at least 60% of winters (almost 2 out of every 3 years), and based on suggestions made by OMNR staff, include 2 or more species and at least 10 individuals of the following species: Northern Harrier, Red-tailed Hawk, Rough-legged Hawk, or American Kestrel. Refer to Section 6.5.10 to see how occurrence data can be collected. Note 1: Any wintering sites used by Short-eared Owl (designated “Special Concern” in Ontario and Canada) should also be designated SWH. Note 2: SWH designation is not intended to limit the ability of existing, normal agricultural uses from continuing.	**SWH Not Present** No suitable candidate habitat is present; subject property includes very small woodland and very small meadow habitat components – well below the 20 ha size threshold in the SWH Criteria Schedule for Ecoregion &E (MRNF 2015).

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
A6. Snake Hibernacula	Eastern Gartersnake, Dekay's Brownsnake, Ring-necked Snake, Smooth Greensnake, Northern Watersnake, Red-bellied Snake	Not Specified	Hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line. For more detailed information refer to the SWH DSS. The proponent's knowledge of rock piles, stone fences, and crumbling foundations would identify these candidate SWH. *	It is recommended that sites that support the following conditions should be considered SWH in the Region of Peel and Town of Caledon. Thresholds are based on ORMCP TP2 (Queen's Printer for Ontario 2007a) and supplemented by Ontario Herpetofaunal Atlas data. • 10 or more Eastern Gartersnakes, or • 5 or more or DeKay's Brownsnakes, or • 2 or more of the following species: Ring-necked Snake, Smooth Greensnake, Northern Watersnake, and Red-bellied Snake, or • 2 or more of the above species. Note 1: Foundations of buildings in active use should be exempt. Any significant hibernacula associated with buildings / structures should however be considered for protection through some type of stewardship or mitigation measures. Note 2: Significant snake hibernacula associated with existing municipal infrastructure should be managed in such a way that maintains the function of the facility, but reduces its potential impact.	**Candidate SWH is Present** is present in the exposed rock areas on the valley slope, although it is shaded and not ideal. No suitable candidate habitat is present on the tablelands (i.e., within proposed development envelope). Wildlife surveys (including recon and incidental observations during other targeted surveys) were completed on 7 dates during previous work (April 2005 -Nov. 2008) and 8 dates during the current study (Oct. 2015 – Sept. 2016): • One of the listed species was recorded during previous work: Dekay's Brownsnake (1 individual dead on the road). • None of the listed species was recorded on the subject property during current or previous surveys, including periods when basking snakes would be evident **Confirmed SWH is not present.** **Conclusion / Mitigation:** no impact to candidate SWH. Note that the SWM outlet will have minimal impact to potential SWH, which is widespread in the local landscape along the valley slopes. The proposed works will not impact the overall hibernacula function in the broader landscape / valley corridor, consistent with the general principle of 'retaining habitat elements that will preserve functionality as hibernacula when complete avoidance is not possible' per Index #13 of the Significant Wildlife Habitat Mitigation Support Tool (MNRF 2014).

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
A7. Bat Maternal Roosts and Hibernacula	Big Brown Bat, Little Brown Bat, Eastern Pipistrelle, Silver-haired Bat, Long-eared Bat, Small-footed Bat	Not Specified in Peel-Caledon. Ecoregion Criteria Schedules: FOD FOM SWD SWM	Peel - Caledon: Potential habitats such as caves, if they are found in the planning area, should be considered significant.[o] Ecoregion Criteria Schedules: • Maternity colonies can be found in tree cavities, vegetation and often in buildlings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii]. • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii] • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 [ccxiv] or class 1 or 2 [ccxii] . • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx] SWH MiST Index #12: • Mature to over-mature mixed and deciduous stands with large diameter dead or dying trees with cavities	Until information specific to the Region of Peel and Town of Caledon becomes available, it is recommended that the provincial guidelines presented in the Significant Wildlife Habitat Technical Guide (OMNR 2000) be used in both jurisdictions. Therefore, the following numbers of bats should be considered significant at maternity colonies and winter roosts, respectively: • Big Brown Bat, 30, 30; • Little Brown Bat, 100, 50; • Eastern Pipistrelle, 10, 20; • Silver-haired Bat, 10, N/A; • Long-eared Bat, 10, 20; • Small-footed Bat, 10, all sites. However, with the discovery of White Nose Syndrome in neighbouring New York State in 2007, OMNR staff must be contacted to see if more restrictive thresholds are warranted. If so, these should supersede those in the Significant Wildlife Habitat Technical Guide (OMNR 2000). Note: The Natural Heritage Information Centre (OMNR) will be providing hibernacula habitat mapping in the future. However, due to its sensitive nature, specific location information will not be available. It is possible that larger patches will be shown on the MNR Wind Resource Atlas representing candidate SWH. It must also be understood that many hibernacula have not been found, therefore any known cave or crevice ecosites or old mine shafts should be considered candidate SWH and evaluated as such.	Habitat assessment surveys were undertaken in conjunction with other site surveys (vegetation, wildlife, aquatics) on multiple dates in 2016. Targeted maternal roost habitat assessments were undertaken on October 12, 2016. **Hibernacula – No SWH Present** • No candidate habitat (i.e. caves, mines) present on the subject property. **Maternal Roosts** • Candidate SWH within FOD7 on valley slope and the tablelands (FOD7-1 and FOD7-2), due to potential presence of mature FOD and wildlife trees in contiguous forest along valley slope off property. While candidate ELC habitat types are present within the development envelope (small portion of FOD7-2), this is not mature and nor does it have many large diameter wildlife trees. • 3 potentially suitable cavity trees are present on the subject property (Willow, Butternut and Basswood) • These are ranked as 'poor' (Butternut and Basswood) or 'moderate' (Willow) • All will be retained within protected areas **Conclusion**: **Candidate maternal roosting SWH habitat present in more mature forested areas along the Credit Valley slope we well as forest communities areas along the tablelands**. Consistent with Index #12 of the Significant Wildlife Habitat Mitigation Support Tool (MNRF 2014), development avoids significant habitat (i.e., mature forest on the valley slope) and retains other treed habitat in the buffer. Potential impacts to individuals will be mitigated through timing of works (i.e., tree removal during the bat hibernation period from October 1 to March 31).
A8. Bullfrog Concentration Areas	Bullfrog	MAM2 MAM3 SAS1 SAM1 SAF1*	• Large marshes or permanent waterbodies*	The thresholds recommended for the ORM (OMNR, 2007) will be incorporated in criterion B8ii (Amphibian breeding habitat – non-forested sites). That is, any sites supporting breeding Bullfrogs in the Region of Peel and Town of Caledon should be considered SWH.	**SWH Not Present** No candidate habitat is present. Bullfrog not recorded during current or previous site surveys.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
A10. Turkey Vulture Summer Roosting Areas	Turkey Vulture	Not Specified	Turkey vultures like to roost on rocky cliff ledges and large, dead or partially dead trees, preferably in undisturbed areas, and often near water. Preferred day roosting areas appear to be open areas where the birds can easily take flight or sunbathe. Cliff ledges have excellent rising air currents that are conducive for flight and soaring. Significant sites are those that are used consistently year after year.°	Insufficient information currently available to suggest a threshold.	**SWH Not present** No suitable candidate habitat is present: no rocky cliffs; woodlots young without many large trees), and subject property is previously disturbed and subject to ongoing extensive anthropogenic disturbance (busy roads, residential housing) Turkey Vulture was not recorded during current or previous site surveys.
B. RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITATS FOR WILDLIFE					
B1. Rare Vegetation Communities	N/A	FOC1-2 FOM2-2 FOM2-1 FOM6-1 FOD1-1 FOD1-2 FOD1-4 FOD2-2 FOD2-3 FOD6-2 MAM3-6 SWC3-2 SWT3-2	Not Specified	All communities ranked as S1, S2 or S3 by NHIC (as per Bakowsky 1996) Targeted vegetation communities ranked S3S4, S4 or S5 in Ecodistricts 6E-7 and 7E-4 in the Great Lakes Conservation Blueprint (Henson and Brodribb 2005), or identified as rare on the ORM in the ORMCP TP2 (Queen's Printer for Ontario 2007a): • Dry – Fresh White Pine – Red Pine Coniferous Forest Type (FOC1-2) • Dry – Fresh White Pine – Sugar Maple Forest Ecosite (FOM 2-2) • Dry – Fresh White Pine – Oak Mixed Forest Type (FOM2-1) • Moist – Fresh Hemlock – Sugar Maple Mixed Forest Type (FOM 6-1) • Dry – Fresh Red Oak Deciduous Forest Type (FOD1-1) • Dry – Fresh White Oak Deciduous Forest Type (FOD1-2) • Dry-Fresh Mixed Oak Deciduous Forest Type (FOD 1-4) • Dry-Fresh Oak-Hickory Deciduous Forest Type (FOD 2-2) • Dry-Fresh Hickory Deciduous Forest Type (FOD 2-3) • Fresh Sugar Maple-Black Maple Deciduous Forest (FOD 6-2) • Broad-leaved Sedge Organic Meadow Marsh Type (MAM3-6) • White Cedar – Conifer Organic Swamp Type (SWC3-2) • Willow Organic Thicket Swamp Type (SWT3-2) • All bog and fen wetland communities (considered rare in the Region of Peel and Town of Caledon) Note 1: The S3S4, S4 and S5 ranked woodland ELC Vegetation communities listed above are also captured by the significant woodlands criteria for significant communities (see Section 5.1.15). Note 2: The minimum size for rare vegetation communities is 0.5 ha.	**SWH Not Present** None of the specified ELC ecosites are present on the subject property.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
B2. Forests Providing a High Diversity of Habitats	N/A	All Woodland and Forest Ecosites	Relatively large and mature forests in a given jurisdiction. The guidelines indicate that forests with some of the following characteristics are likely to be more significant: • a variety of age classes; • a high proportion of mature trees; • uneven-aged stands; • presence of numerous tree cavities, more significant in living than dead trees and if large; • a variety of tree species; • near water; and • with little or no management.	It is assumed that all forests providing a high diversity of habitats (as described in the Significant Wildlife Habitat Technical Guide (OMNR 2000) will be captured by the suite of significant woodlands criteria (e.g., size/interior, proximity to a watercourse, and presence of significant habitats and/or species) even though the diversity criterion itself has not been recommended.	**SWH Not Present** Candidate habitat is not present. The FOD7-1 and FOD7-4 ecosites are small, young woodland patches dominated by a few species. Areas of these ecosites are highly disturbed by cultural influences (dumping, garbage) and invasive species. They are not particularly diverse, nor do they contain species of conservation concern (with the exception of Butternut).
B3. Old-Growth or Mature Forest Stands	N/A	Not Specified	Old-growth forests contain trees in all phases of their life cycle, from saplings to mature trees, as well as dead standing trees and rotting trees on the forest floor.	It is assumed that all old-growth and mature forests will be captured by the significant woodlands criteria for old-growth and size.	**SWH Not Present** Both forest ecosites on the subject property are young, disturbed stands.
B4. Foraging Areas with Abundant Mast	N/A	FOD1 FOD2 FOD9	Relatively large forests with numerous nut producing trees (e.g., beech, oak) and more open areas with large patches of berry-producing shrubs (e.g., blueberries, raspberries, serviceberries). • large sites with a high proportion and diversity of fruit-producing shrubs and nut-producing trees; • sites with abundant Red Oak trees in the Great Lakes-St. Lawrence forest region; and • sites that provide travel corridors for wildlife and that are well removed from people.	It has been assumed that most forests providing foraging areas with abundant mast (i.e., nuts like acorns and fruit bearing shrubs) will be captured by the significant woodlands criterion for size / interior, as well as the criterion for old growth (see Section 5.3.1 - 5.3.3). To capture some areas that may not be captured as significant woodlands, we are also recommending any ELC community that is: • FOD 1 (Dry-Fresh Oak Deciduous Forest Ecosite), • FOD 2 (Dry-Fresh Oak-Maple-Hickory Deciduous Forest Ecosite) or • FOD 9 (Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite) also be considered SWH under this criterion.	**SWH Not Present** Candidate habitat is not present. Forest ecosites on the subject property (FOD7) are small, young stands dominated by Elm, Ash, and Walnut. Nut producing trees are not abundant. Cultural thicket ecosites contain an abundance of blackberry shrubs, but sites are highly disturbed by cultural influences with low diversity.
B5. Highly Diverse Areas	N/A	FO- SW- MA- FE- BO- CUT CUS CUW CUP	Not Specified	The top 5% most diverse habitat patches in the Region of Peel (a) in the Rural System (i.e., the Town of Caledon) and (b) in the Urban System (i.e., the Cities of Brampton and Mississauga). Diversity was determined by the number of ELC community types (at the Community Series level) per habitat patch. Habitat patches were defined as continuous natural areas (i.e., all woodland – FOD, FOC, FOM; wetland – MA, SW, FE; and successional community polygon types – CUT, CUS, CUP, CUW) not separated by arterial or collector roads or built-up areas by more than 20 m gaps. Note: Cultural meadows (CUM) were excluded because of the difficulty in distinguishing them from active agricultural areas in air photo interpretation. All agricultural areas (AGR) were excluded as well. (Mapping provided to Region of Peel)	**SWH Not Present** Region of Peel has not yet mapped these areas.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
B6. Cliffs and Caves	N/A	Any of the following ranked as S1, S2, or S3 by NHIC: CLO CLS CLT TAO TAS TAT CCR CCA	Cliffs occur in the Region of Peel and the Town of Caledon along the Niagara Escarpment and include the natural cliff faces as well as the associates talus areas (at the base of the cliffs) and caves and crevices found within the cliffs.	Any cliff, talus, crevice or cave community (per ELC, Lee et al. 1998) ranked as S1, S2 or S3 by the NHIC. Note 1: No minimum size threshold is recommended. Note 2: Areas where quarry licenses are active are excluded.	**SWH Not Present** No candidate habitat is present. None of the target ecosites are present on the subject property.
B7. Seeps and Springs	Not Specified	Not Specified	Seepage areas are defined as areas where groundwater emerges from the ground over a diffuse area and springs are defined as points of natural, concentrated discharge of groundwater.	Site specific confirmation of presence through any of the following: • Visual confirmation of surface discharge or springs • Groundwater investigations or detailed vegetation assessments (e.g., confirmed presence of plant species known to be associated with seepage areas in southern Ontario such as Carex scabrata). • Areas with red or rust coloured stains on the soil surface (these are usually precipitates of iron hydroxides indicating areas of groundwater discharge). • Locating patches of ground that are free of ice and snow in winter and where there is evidence of seepage or springs, or where there are previously confirmed records for seeps or springs. • Presence of marl (i.e., precipitates of carbonates in solution where groundwater pathways go through areas of concentrated dissolved solids and come to the surface) The above site analysis needs to be completed in conjunction with evidence collected through background or current site-specific studies that concludes the seep or spring provides habitat for or otherwise supports other SWH criteria (as identified in this study). • e.g., Deer Wintering Areas, Wild Turkey Winter Range, Rare Vegetation Communities (mostly indirectly), Highly Diverse Areas, Amphibian Breeding Habitat (indirectly), and Habitat for Species of Conservation Concern. Note: In addition to protection of the specific seep or spring zone, there needs to be consideration for protection of the hydrologic dynamics within the groundwater catchment area in the Official Plan policies and/or supporting guidelines.	**SWH Not Present** Field surveys included targeted searches for areas of seepage / springs. No seeps or springs, or evidence of groundwater seepage were recorded on the subject property.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
B8i. Amphibian Breeding Habitat Forested Sites (e.g., vernal pools)	Group A: Red-spotted Newt, Blue-spotted Salamander, Jefferson Salamander complex 'hybrids' (where the Blue-spotted Salamander genome dominates), Spotted Salamander, Ambystoma sp., Gray Treefrog, Spring Peeper, and Wood Frog. Group B: Blue-spotted Salamander, members of the Jefferson Salamander complex or 'hybrids' where the Blue-spotted Salamander genome dominates, and Wood Frog.	Woodlands, not considered significant from; * FOC1, FOC2, FOC3, FOC4, FOM1, FOM2, FOM3, FOM4, FOM5, FOM6, FOM7, FOM8, FOD1, FOD2, FOD3, FOD4, FOD5, FOD6, FOD7, FOD8, FOD9, SWC1, SWC2, SWC3, SWC4, SWM1, SWM2, SWM3, SWM4, SWM5, SWM6, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7,	• Woodlands not considered significant in Technical Paper 1- • The Woodland and vernal pool would be the candidate SWH. • Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Refer to the Ontario Herpetofaunal Summary for historical records. • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • Breeding pools within the forest or the shortest distance from forest habitat are more significant because of reduced risk to migrating amphibians and more likely to be used. • Ontario Marsh Monitoring Program, Frog Watch (Toronto Zoo), Backyard Amphibian surveys, and Wetland Evaluations are potential sources of information. *	Based mostly on standards developed for the ORM (OMNR, 2007), it is recommended that sites that support the following conditions be considered SWH in the Region of Peel and Town of Caledon. • Breeding populations of 2 or more listed species in Group A with a combined total of at least 40 individuals present. • A combined total of at least 30 individuals from any species listed in Group B (i.e., species that tend to behave more like vernal pool obligates, at least in Peel Region). • All breeding populations of Four-toed Salamander regardless of number of individuals In addition, management recommendations in "Conserving Pool-breeding Amphibians ..." (Calhoun and Klemens 2002) should be followed (e.g., protect and maintain pool hydrology and water quality). Note 1: It is assumed that for every male frog heard calling a female frog is also present. That is, if 5 male frogs are heard calling, it is assumed 10 individuals are present. Note 2: In order to be sure how many individuals are present, field surveys must be conducted in a seasonally appropriate manner. Timing is critical. Refer to Section 6.5.23 for more information. Note 3: Larvae/egg masses numbers cannot reliably reveal how many individuals are present at a site. Documenting adults at the right time of year, under the right weather conditions, and using the right methodology should be the priority. Refer to Section 6.5.23 for more information. Note 4: The Great Lakes-St. Lawrence/ Canadian Shield population of the Western Chorus Frog, whose geographic range includes the Region of Peel, was designated "Threatened" by COSEWIC in April 2008. It is addressed under Criterion C1.	**SWH Not Present** No candidate habitat is present on the subject property. None of the listed species was recorded during current or previous site surveys.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
B8ii. Amphibian Breeding Habitat Not-Forested Sites (e.g. marshes)	<u>Group A</u>: Red-spotted Newt, Blue-spotted Salamander, Jefferson Salamander Complex 'hybrids' (where the Blue-spotted Salamander genome dominates), Spotted Salamander, Ambystoma sp., American Toad, Gray Treefrog, Spring Peeper, Green Frog, Pickerel Frog, Northern Leopard Frog, Mink Frog, and Wood Frog. <u>Group B</u>: Blue-spotted Salamander, Jefferson Salamander complex or 'hybrids' where the Blue-spotted Salamander genome dominates, and Wood Frog.	MAM2 MAM3 MAM4 MAM5 MAM6 MAM1 SAS1 SAM1 SAF1 SWTI*	• Wetland and pools supporting high species diversity are significant. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, and escape and concealment from predators. *	Based mostly on standards developed for the ORM (OMNR, 2007), it is recommended that sites that support the following conditions be considered SWH in the Region of Peel and Town of Caledon. • Breeding populations of 2 or more listed species in Group A with a combined total of at least 40 individuals present. • A combined total of at least 30 individuals from any species listed in Group B (i.e., species that tends to behave more like vernal pool obligates, at least in Peel Region). • All breeding populations of Bullfrog regardless of number of individuals • All breeding populations of Mudpuppy regardless of number of individuals In addition, wetland hydrology and water quality must be maintained. Protection must also be extended to adjacent upland habitats to appropriately accommodate the terrestrial portion of their life cycles. The size of the area protected must reflect the habitat requirements of the listed species present. Note 1: It is assumed that for every male frog or toad heard calling a female frog is also present. That is, if 5 male frogs or toads are heard calling, it is assumed 10 individuals are present. Note 2: In order to be sure how many individuals are present, field surveys must be conducted in a seasonally appropriate manner. Timing is critical. Refer to Section 6.5.24 for more information. Note 3: Larvae/egg masses numbers cannot reliably reveal how many individuals are present at a site. Documenting adults at the right time of year, under the right weather conditions, and using the right methodology should be the priority. Refer to Section 6.5.24 for more information. Note 4: The Great Lakes-St. Lawrence/ Canadian Shield population of the Western Chorus Frog, whose geographic range includes the Region of Peel, was designated "Threatened" by COSEWIC in April 2008. It is addressed under Criterion C1.	**SWH Not Present** No candidate habitat is present on the subject property. None of the listed species was recorded during current or previous site surveys.
B9. Turtle Nesting Habitat and Turtle overwintering Areas	Midland Painted Turtle	MAM2 MAM3 MAM4 MAM5 MAM6 MAM1 SAS1 SAM1 SAF1 BOO1 FEO1*	• Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in. • Beaches or sand bars adjacent to permanent water are preferred. • Overwintering sites area are permanent water bodies, large wetlands and bogs.	It is recommended that the thresholds developed for the ORM (OMNR, 2007), i.e., breeding or overwintering presence of 5 or more pairs/individuals of Midland Painted Turtle, apply to the Region of Peel and Town of Caledon. It is also recommended that the documentation required be expanded to include turtle nests, not just pairs. Note: Northern Map Turtle and Snapping Turtle were removed from the list since they are both designated Special Concern in Ontario and are therefore included under criterion C2.	**SWH Not Present** No candidate habitat is present on the subject property. None of the listed species was recorded during current or previous site surveys. Note that potential turtle nesting habitat is present along exposed banks and open grassy patches along the Credit River. However, these areas are likely not far enough out of the floodplain to provide successful nesting areas. Although Midland Painted Turtle is potentially present in the river, the steep heavily vegetated slope and unsuitable habitat (i.e., for digging) on the subject property suggest use is very unlikely.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
B10. Habitat for Area-Sensitive Forest interior Breeding Bird Species	Black-and-white Warbler Blackburnian Warbler Black-throated Blue Warbler Black-throated Green Warble Brown Creeper Hairy Woodpecker Northern Parula Ovenbird Pileated Woodpecker Red-breasted Nuthatch Scarlet Tanager Veery Winter Wren	FOC1, FOC2, FOC3, FOC4, FOM1, FOM2, FOM3, FOM4, FOM5, FOM6, FOM7, FOM8, FOD1, FOD2, FOD3, FOD4, FOD5, FOD6, FOD7, FOD8, FOD9, SWC1, SWC2, SWC3, SWC4, SWM1, SWM2, SWM3, SWM4, SWM5, SWM6, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7	• There should be several large forests (30 to 100+ ha) • Forests should comprise of a closed canopy of large trees. • Forests should have a variety of vegetation layers • The minimum interior forest habitat is at least 100 m for any edge habitat.	The recommended threshold is based on: 1. an analysis of the habitat requirements of area-sensitive forest interior species occurring in Peel, as well as forest interior patch size, and 2. the presence of species listed in the ORMCP TP2 (Queen's Printer for Ontario 2007a). Therefore, it is recommended that mature forests (i.e. greater than 60 years of age) with interior patch size ≥4 ha be considered SWH in the Region of Peel and Town of Caledon. In addition, habitats in either jurisdiction (including plantations) that support 3 or more listed species with probable or confirmed breeding evidence should be considered significant.	**SWH Not Present** No candidate habitat (i.e., large diverse forests with interior habitat) is present. Targeted breeding bird surveys and supplementary surveys were completed as described above: • None of the listed species was recorded during current or previous site surveys.
B11. Habitat for Open Country and Early Successional Breeding Bird Species	<u>Group A</u>: Bobolink Eastern Meadowlark, Grasshopper Sparrow Northern Harrier Savannah Sparrow Upland Sandpiper Western Meadowlark <u>Group B</u>: American Kestrel Brown Thrasher Clay-colored Sparrow Eastern Bluebird Eastern Kingbird Field Sparrow Horned Lark Sedge Wren Vesper Sparrow Willow Flycatcher	CUM1 CUT1 CUS1 *	• Large grassland areas (includes natural and cultural fields and meadows). • Grassland areas of at least 10 ha, with a variety of vegetation structure and density. • Larger grasslands up to 30 ha in size are most likely to support and sustain a diversity of these species. • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. *	Open country habitats ≥10 ha, not actively farmed for ≥5 years and with confirmed habitat utilization by: • at least 4 area-sensitive species from Group A, or • 3 area-sensitive species from Group A and 4 or more species from Group B	**SWH Not Present** No candidate habitat is present. CUT and CUT ecosites present are small and the result of fairly recent cessation of anthropogenic uses. Targeted breeding bird surveys and supplementary surveys were completed as described above: • None of the listed species was recorded during current or previous site surveys.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
B12. Habitat for Wetland Breeding Bird Species	<u>Group A:</u> American Bittern American Coot Black Tern Common Loon Common Moorhen Marsh Wren Pied-billed Grebe Sandhill Crane Sedge Wren Sora Virginia Rail Wilson's Phalarope Wilson's Snipe <u>Group B</u>: Black Tern Marsh Wren Sedge Wren	MAM2 MAM3 SAS1 SAM1 SAF1*	• Nesting occurs in wetlands with robust emergent vegetation. • Size of wetland is not important as long as there is shallow water with emergent aquatic vegetation present. *	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds are recommended for the Region of Peel and Town of Caledon: • 5 nesting pairs of any combination of species from Group A, or • 4 nesting pairs of any combination of species from Group B.	**SWH Not Present** No candidate habitat (i.e., wetland / open water) is present. Targeted breeding bird surveys and supplementary surveys were completed as described above: • None of the listed species was recorded during current or previous site surveys.
B13i. Raptor Nesting Habitat (Raptors associated with wetlands, ponds, and rivers)	Northern Harrier Osprey	Ecosites directly adjacent to riparian areas; stream, rivers, lakes, ponds, and wetlands CUM1, FOM8, FOD1, FOD2, FOD3, FOD4, FOD5, FOD6, FOD7, FOD8, FOD9*	• Nests are associated with lakes, ponds, rivers, or wetlands. • Osprey nests are along forested shorelines, on islands or on structure over water within dead trees; nests are usually at the top of the tree but occasionally are in crotches. • Harrier nests on wet ground in open areas including sedge marshes wand wet fields with sufficient ground cover for young and cover for food source (mice). *	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds are recommended for the Region of Peel and Town of Caledon: • the presence of one or more active nests of Northern Harrier or Osprey.	**Candidate SWH is Present** There is suitable nesting habitat for Osprey in trees along Credit River bank at the east edge of the property. This is not limiting in the local or broader landscape. **Confirmed SWH is <u>not</u> Present** Targeted breeding bird surveys and supplementary surveys were completed as described above: • Neither of the listed species was recorded during current or previous site surveys.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
B13ii. Raptor Nesting Habitat (Raptors associated with woodland habitats)	Barred Owl, Broad-winged Hawk, Cooper's Hawk Long-eared Owl Northern Goshawk Northern Saw-whet Owl Red-shouldered Hawk Sharp-shinned Hawk	FOM8, FOD2, FOD4, FOD6, FOD8, SWC1, SWC3, SWM1, SWM3, SWM5, SWD1, SWD3, SWD5, SWD7, FOD1, FOD3, FOD5, FOD7, FOD9, SWC2, SWC4, SWM2, SWM4, SWM6, SWD2, SWD4, SWD6	• Nests typically in intermediate aged to mature conifer, deciduous or mixed woodlands within tops or crotches of trees. • In undisturbed sites, nests may be used again or a new nest will be in close proximity to old nest.	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds are recommended for the Region of Peel and Town of Caledon, (i.e., the presence of one or more active nests from listed species).	**Candidate SWH Present,** Although there is some woodland on the subject property, it is predominantly immature and very small. More suitable habitat is found in the local landscape (i.e., larger blocks of more mature forest). Note that this woodland is well below the recommended size threshold in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF January 2015)(i.e., >30ha area with >4ha of interior habitat). **Confirmed SWH is not Present** Targeted breeding bird surveys and supplementary surveys were completed as described above: • One of the listed species was recorded as a 'possible' breeder: Cooper's Hawk. No nests or evidence of nesting in the immediate area were recorded. This could be a foraging individual using the property on occasion. Consistent with Index #27 of the Significant Wildlife Habitat Mitigation Support Tool (MNRF 2014), development avoids significant habitat and minimizes removal of mature trees (i.e., potential nesting trees). Other measures, including restricted access to the valley, mitigate potential impacts to breeding habitat.
B14. Mink, River Otter, marten, and Fisher Denning Sites	Mink River Otter Marten Fisher	Not Specified	Mink prefer shorelines dominated by coniferous or mixed forests for feeding and denning. Dens are usually located underground, especially where shrubs and deadfalls provide more cover for dens and habitat for prey. They also den in abandoned muskrat lodges. Since otters avoid humans, undisturbed shorelines with abundant shrubby vegetation and downed woody debris provide prime denning habitat. They often use old beaver lodges for dens and log jams and crevices in rock piles. Since this mammal eats primarily fish, it requires shoreline habitats that support large, productive fish populations. °	Based on available distribution and occurrence data, it is recommended that the following supporting habitats be considered SWH: • All River Otter, Marten and Fisher den sites (i.e., a min.10 x 10 m area around the den site); • Mink den sites in natural areas with low levels of disturbance (i.e., a min.10 x 10 m area around the den site) With respect to Mink and River Otter, it is also recommended that as much wetland and undeveloped, undisturbed shoreline is protected as possible by establishing a 30 m no-development buffer from the shoreline for a distance of up to 500 m in either direction upstream and downstream for Mink and 2 km in either direction upstream and downstream for River Otter. For Fisher, it is recommended that as many large blocks of contiguous mid-aged to mature forest as possible surrounding the den site is protected. Note: Marten is not found in the planning area.	**SWH Not Present** Suitable candidate habitat is not present on the subject property, but may be present in the local area along the Credit River. In the vicinity of the subject property, the shoreline of the Credit River is forested, but with young deciduous forest. May provide marginally suitable denning habitat, but not ideal as it lacks abundant cover (shrubs and deadfall). • None of the listed species was recorded during current or previous site surveys.
C. HABITAT FOR SPECIES OF CONSERVATION CONCERN					

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
C1. Species Identified as Nationally Endangered or Threatened by COSEWIC which are not listed as Endangered or Threatened under Ontario's Endangered Species Act.	As of November 2018, species in this category that occur or have occurred within the Region of Peel or Town of Caledon include: Monarch, Rapids Clubtail Western Chorus Frog Chimney Swift Red-headed Woodpecker Wood Thrush Golden-winged Warbler Canada Warbler and Lake Sturgeon.	Not Specified	To be determined on a case-by-case basis	The habitat for any species identified to be nationally Endangered or Threatened by COSEWIC that is not identified as an Endangered or Threatened species on the Species at Risk in Ontario (SARO) List under Ontario's Endangered Species Act should be designated as SWH. Requirements for habitat protection to be determined on a case-by-case basis in consultation with OMNR. Note: Does not include species that have been designated threatened or Endangered by OMNR. These species are protected under Ontario's Endangered Species Act and Section 2.1.3 (significant habitat of endangered and threatened species) of the Provincial Policy Statement (2005).	**Confirmed SWH is Present** One Monarch (Endangered - COSEWIC) was observed during a site visit on July 6, 2018. Low numbers of the larval host plant (Milkweed) are present (Veg. Unit 3), but there are no otherwise definable areas of Monarch habitat. **Conclusion/ mitigation:** No Monarch breeding habitat will be impacted as all significant natural areas are being retained with setbacks. In addition, areas that are currently open (i.e., no tree canopy) and outside of the development envelope will be enhanced with a native seed mix to increase foraging and breeding opportunities for Monarch
C2. Species Identified as Special Concern based on the Species at Risk in Ontario list that is updated annually by MECP.	All species listed as Special Concern on the Species at Risk in Ontario List	Not Specified	To be determined on a case-by-case basis	Per the Significant Wildlife Habitat Technical Guide (OMNR 2000), the habitat for any species designated Special Concern according to the Species at Risk in Ontario List should be identified and protected as SWH. Habitat requirements would need to be determined on a case-by-case basis. Note: Species of conservation concern do not include species that have been designated Threatened or Endangered by . These species are protected under Ontario's Endangered Species Act and Section 2.1.3 (significant habitat of endangered and threatened species) of the Provincial Policy Statement (2005).	**Confirmed SWH is Present** One Monarch was observed on the subject property on July 6, 2018. Low numbers of the larval host plant (Milkweed) are present (Veg. Unit 3), but there are no otherwise definable areas of Monarch habitat. **Conclusion/ mitigation:** No Monarch breeding habitat will be impacted as all significant natural areas are being retained with setbacks. areas that are currently open (i.e., no tree canopy) and outside of the development envelope will be enhanced with a native seed mix to increase foraging and breeding opportunities for Monarch
C3. Species that are listed as Rare (S1–S3) or Historical in Ontario based on records kept by the NHIC	All species listed as S1-S3 in the NHIC	Not Specified	To be determined on a case-by-case basis	Per the Significant Wildlife Habitat Technical Guide (OMNR 2000), habitat for any species listed as S1, S2 and S3 (based on the records kept by the NHIC), should be identified and protected as SWH. Habitat requirements would need to be determined on a case-by-case basis.	**Confirmed SWH is Present** One Butternut (ranked as S3?) is present in ELC Unit 4. Note that the tree is confirmed as Category 1 and not subject to the ESA. Habitat is within a 25m radius of the trunk. **Conclusion/ Mitigation**: no impact to habitat; the Butternut and 25m habitat will not be harmed by proposed development.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
C4. Species whose populations appear to be experiencing substantial declines in Ontario.	Not Specified	Not Specified	To be determined on a case-by-case basis	It is recommended that “substantial declines” be defined as significant declines at the p <0.10 (90%) confidence level. Breeding Birds Upon careful review of existing information sources such as the Breeding Bird Survey (BBS), Forest Bird Monitoring Program (FBMP), Marsh Monitoring Program (MMP), and the recently completed Atlas of the Breeding Birds of Ontario, the consultant team did not feel comfortable putting forward a threshold. Each had deficiencies or biases. Other Wildlife Groups Calling frog and toad population trend data gathered as part of the Marsh Monitoring Program, Frogwatch Ontario, Amphibian Road Call Count, and Backyard Frog Survey, could be utilized if deemed suitable. There is no Ontario-wide population trend data available for other wildlife groups in Ontario. Not Recommended	**SWH Not Present** No guidelines given. No Species of conservation concern or those with known population declines were recorded on the subject property. The Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF 2015) includes species with significant population declines under the “Special Concern and Rare Wildlife Species” criterion.
C5. Species that have a high percentage of their global population in Ontario and are Rare or Uncommon in the Regional Municipality of Peel/Town of Caledon.	Not Specified	Not Specified	To be determined on a case-by-case basis	An adequate analysis of what species should be considered needs to been undertaken before a threshold can be recommended for the Region of Peel or Town of Caledon.	**SWH Not Present** No guidelines given.

C6. Species that are Rare within the Regional Municipality of Peel/Town of Caledon, even though they may not be Provincially Rare.	Not Specified	Not Specified	To be determined on a case-by-case basis	Plants:
				
				It is recommended that Varga et al., 2000 be used to determine what species are rare in the Region of Peel and Town of Caledon.
				
				Wildlife:
				
				It is recommended that a composite TRCA/CVC list be prepared. However, CVC only has a list of species of conservation concern for birds, and that list is dated.
				
				Note: In addition, the significant species lists in Appendix A of the ORMCP TP6 should apply to areas on the ORM and should be considered during development of a wildlife list.
					No species considered *rare* in Peel region (per Varga et.al. 2000) were recorded.
					
					Three species ranked as *uncommon* in Peel were recorded:
					• Allegheny Serviceberry (*Amelanchier laevis*):
					  ○ Unit 5a
					• Wild Cranes’-bill (*Geranium maculatum*):
					  ○ Unit 5a and 5b
					• Virginia Stickseed (*Hackelia virginiana*):
					  ○ Units 1, 3, 4, 6a and 6b
					
					Confirmed SWH is Not Present

C7. Species that are subjects of Recovery Programs	In the Region of Peel or Town of Caledon as of April 2009, this applies to: Rapids Clubtail, the Great Lakes/St. Lawrence - Canadian Shield population of Western Chorus Frog, Common Nighthawk, Whip-poor-will, Chimney Swift, Olive-sided Flycatcher, and Canada Warbler.	Not Specified	To be determined on a case-by-case basis	This criterion applies to species that are designated as Threatened, Endangered or Extirpated by COSEWIC but not Special Concern, Threatened or Endangered in Ontario. Habitats that support any of these species in the Region or Town should be considered SWH. In addition, if any other species are subject to other recovery programs (such as Black Duck), habitats for these species should also be considered SWH. Note: COSEWIC and OMNR web sites should be checked regularly to ensure that the list of species that qualify for protection under criterion C7 is up-to-date.	**SWH Not Present** • None of the listed species was recorded during current or previous site surveys.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
C8. Species considered important to the Region of Peel/Town of Caledon, based on recommendations from a Local Conservation Advisory Committee	Not Specified	Not Specified	To be determined on a case-by-case basis	No list of species is being recommended since no Conservation Advisory Committee currently exists in Peel or Caledon. However, this criterion is recommended should a list of species ever be developed for the Region or Town. Note: The term "Conservation Advisory Committee" was taken verbatim from the Significant Wildlife Habitat Technical Guide (OMNR 2000). It generically describes a committee with membership of knowledgeable naturalists familiar with conditions and biota in the jurisdiction. Some 'Environmental Advisory Committees' possibly fall into this category although typically their role is to review planning submissions and they may not have the necessary field knowledge, or mandate to develop such specific lists. It is expected that a Conservation Advisory Committee would be aware of and consult status lists prepared by local conservation authorities, but would have the knowledge base to refine the use of such lists.	**SWH Not Present** No guidelines given.
D. ANIMAL MOVEMENT CORRIDORS					
Includes amphibian and White-tailed Deer movement corridors as well as more general animal and plant movement corridors	Amphibians, White-tailed Deer General wildlife	Not Specified	Not Specified	Thresholds for this criterion need to be developed in accordance with the Region's Greenlands System framework for both the Region of Peel and Town of Caledon and should incorporate three scales of corridors, as follows: • Primary (e.g., Niagara Escarpment) • Secondary (e.g., major river valleys) • Tertiary corridors (e.g., hedgerows) Note: While primary and secondary corridors can likely be identified and mapped at the municipal-wide scale, tertiary corridors will likely need to be identified through site-specific studies, although guidelines for their identification could be addressed in policy.	**Candidate SWH is Present** Although there are no specific criteria for confirming corridors as SWH, the Credit River valley, including the eastern edge of the property functions as a corridor for movement of wildlife and dispersal of plants. **Conclusion/Mitigation**: vegetation within the valley will be retained in full with development setbacks and other mitigation measures

* Oak ridges Moraine conservation plan – Technical paper series 2 – significant wildlife habitat (2007). Queen's Printer for Ontario
+ MNRF. 2015. Significant wildlife habitat criteria schedules for ecoregion 7e. Queen's Printer for Ontario
°OMNR. 2000. Significant Wildlife Habitat Technical guide. Queen's Printer for Ontario

APPENDIX F

SAR HABITAT EVALUATION

Table F.1. SAR Habitat Evaluation

Species At Risk Designations	
ENDANGERED	
THREATENED	
SPECIAL CONCERN	
EXTIRPATED	

Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence on Subject Property	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
AMPHIBIANS								
Jefferson Salamander (Ambystoma jeffersonianum)	**END**	Species Protection and Habitat Regulation	MNRF Website (August 2016)	Inhabit deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat present	General Habitat	Not recorded	**None** - no potential breeding habitat, no known records within the area.
BIRDS								
Barn Swallow (Hirundo rustica)	**THR**	Species and General Habitat Protection	MNRF Website (August 2016)	prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc. (MNRF Guelph - Waterloo List, 2014)	**Low** - very small amount of suitable foraging habitat in cultural meadow and thicket. No breeding habitat present.	General Habitat and Breeding Bird Surveys	Not recorded	**Minimal** - not recorded during field visits on the property or at the Eglinton Ave. / Credit River bridge. Habitat to be removed within the development area is suitable as foraging habitat only and is common in the wider landscape. No potential nesting habitat will be removed.
Bobolink (Dolichonyx oryzivorus)	**THR**	Species and General Habitat Protection	MNRF Website (August 2016)	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat present in study area	General Habitat and Breeding Bird Surveys	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Cerulean Warbler (Setophaga cerulea)	**THR**	Species and General Habitat Protection	MNRF Website (August 2016)	Generally found in mature deciduous forests with an open understory; also nests in older, second-growth deciduous forests (MNRF Guelph - Waterloo List, 2014)	**None** - Wooded habitat on the site are small isolated and young woodlands. This species requires large tracts of mature forest.	General Habitat and Breeding Bird Surveys	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Chimney Swift (Chaetura pelagica)	**THR**	Species and General Habitat Protection	MNRF Correspondence (August 2016)	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys (MNRF Guelph - Waterloo List, 2014)	**Low** - Suitable foraging habitat in cultural meadows and thickets within the study area. No breeding habitat present.	General Habitat and Breeding Bird Surveys	Not recorded	**Minimal** - not recorded during field visits. Vegetation to be removed within the development area is suitable as foraging habitat only and is common in the wider landscape. No potential nesting habitat will be removed.
Eastern Meadowlark (Sturnella magna)	**THR**	Species and General Habitat Protection	MNRF Website (August 2016)	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat present in study area	General Habitat and Breeding Bird Surveys	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Henslow's Sparrow (Ammodramus henslowii)	**END**	Species and General Habitat Protection	MNRF Website (August 2016)	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat present in study area	General Habitat and Breeding Bird Surveys	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Loggerhead Shrike (Lanius ludovicianus)	**END**	Species and General Habitat Protection	MNRF Website (August 2016)	Generally prefer a combination of pasture or other grassland with scattered low trees and shrubs. They build their nests in small trees or shrubs (MNRF Guelph - Wellington List, 2015).	**None** - No suitable habitat present in study area	General Habitat and Breeding Bird Surveys	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Peregrine Falcon anatum/tundrius (Falco peregrinus anatum/tundrius)	**SC**	N/A	MNRF Website (August 2016)	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat present in study area	General Habitat and Breeding Bird Surveys	Not recorded	**None** - No suitable habitat and not recorded during field surveys

FISH								
American eel (Anguilla rostrata)	END	Species and General Habitat Protection	MNRF Correspondence (Nov 2018); MNRF Regional SAR List on Website (2017)	All fresh water, estuaries and coastal marine waters that are accessible to the Atlantic Ocean; 12 Mile Creek Watershed and Lake Ontario (MNRF Guelph - Hamilton List 2013)	**Minimal** - no suitable habittat within subject property (contributing habitat only). Potential to use the Credit River as a migratory corridor to upstream habitat or as general habitat (no breeding habitat present)	General Habitat Assessment	No individuals observed	**Low** - Not present within the subject property; Mitigation measures will prevent downstream sedimentation and / or deleterious material from entering Credit River;
Lake Sturgeon (Great Lakes-Upper St. Lawrence) (Acipenser fulvescens)	END	Species and General Habitat Protection	MNRF Website (August 2016)	Freshwater lakes and rivers with soft bottoms of mud, sand or gravel at depths of five to 20 m. Spawning usually occurs in shallow, fast flowing water below dams, waterfalls or rapids with gravel and boulders (MNRF Species Profile Online 2014).	**None** - Habitat not present within study area	General Habitat	No fish recorded during current study; no historical records within study area	**None** - No suitable habitat and no known historical records within the study area or adjacent Credit River
Northern Brook Lamprey (Ichthyomyzon fossor)	SC	N/A	MNRF Website (August 2016)	Generally inhabits small rivers and clear streams of varying sizes. Adults spawn in gravelly riffles (MNRF Guelph - Waterloo List, 2014)	**None** - Habitat not present within study area	General Habitat	No fish recorded during current study; no historical records within study area	**Minimal** - not present within the subject property. Drainage channel provides contributing habitat to Credit River and a small length of potential Northern Brook Lamprey Habitat below the slope.
Redside Dace (Clinostomus elongatus)	END	Species Protection and Habitat Regulation	MNRF Website (August 2016)	Generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradient (MNRF Guelph - Hamilton List, 2013).	**None** - Habitat not present within study area	General Habitat	No fish recorded during current study; no historical records within study area	**Minimal** - not present within the subject property. Drainage channel provides contributing habitat to Credit River and small length of potential Redside Dace Habitat at the downstream end
INSECTS								
Monarch (Danaus plexippus)	SC	N/A	MNRF Website (August 2016)	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces (MNRF Guelph - Waterloo List, 2014)	**Moderate** - No suitable habitat present in study area in Cultural Thicket (Unit 3)	General Habitat	Not recorded	**Minimal** - One individual was observed flying within the subject property during the July 6, 2018 site visit. Minimal likelihood of presece and no reproduction habitat will be removed. Nectoring species are common throughout the broader landscape.
Rapids Clubtail (Gomphus quadricolor)	END	Species Protection and Habitat Regulation	MNRF Website (August 2016)	Clear, cool medium-to-large rivers with gravel shallows and muddy pools (MNRF Species Profile Online 2014).	**None** - No suitable habitat present in study area	General Habitat	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Rusty-patched Bumble Bee (Bombus affinis)	END	Species and General Habitat Protection	MNRF Website (August 2016)	Generally inhabits a range of diverse habitats including mixed farmland, sand dunes, marshes, urban and wooded areas. It usually nests underground in abandoned rodent burrows (MNRF Guelph - Waterloo List, 2014)	**Minimal** - Potential habitat may be present in the study area, however habitat is degraded and low quality. Presence is very unlikely due to extreme rarity in the province - no occurrences of the species have been recorded in the area in 10 years.	General Habitat	Not recorded	**Minimal** - Species was not observed during field visits. Minimal likelihood of presence and habitat to be removed is previously degraded, low quality.

MAMMALS								
Eastern Small-footed Myotis (Myotis leibii)	**END**	Species and General Habitat Protection	MNRF Website (2016)	Overwintering habitat: Caves and mines that remain above 0 Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark.	**Minimal -** Only suitable roosting habitat would be in wooded ecosites on east side of property, however woodlands are young with very few large trees to support suitable roosting cavities. Foraging habitat may be present in open ecosites on the west side of the property.	General Habitat	No Observations, Dusk surveys not conducted	**Minimal -** Low likelihood of maternal roosting on the subject property (i.e., few large diameter trees). Potential foraging habitat (young forest) will be removed, though this is common the in general area and along the Credit River and represents a very minor proportion of the overall woodland area.
Little Brown Bat (Little Brown Myotis) (Myotis lucifugus)	**END**	Species and General Habitat Protection	MNRF Correspondence (August 2016)	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh) (MNRF Guelph - Waterloo List, 2014)	**Minimal -** Only suitable roosting habitat would be in wooded ecosites on east side of property, however woodlands are young with very few large trees to support suitable roosting cavities. Foraging habitat may be present in open ecosites on the west side of the property.	General Habitat	No Observations, Dusk surveys not conducted	**Minimal -** Low likelihood of maternal roosting on the subject property (i.e., few large diameter trees). Potential foraging habitat (young forest) will be removed, though this is common the in general area and along the Credit River and represents a very minor proportion of the overall woodland area.
Northern Long-eared Bat (Northern Myotis) (Myotis septentrionalis)	**END**	Species and General Habitat Protection	MNRF Correspondence (August 2016)	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)(MNRF Guelph - Waterloo List, 2014)	**Minimal -** Only suitable roosting habitat would be in wooded ecosites on east side of property, however woodlands are young with very few large trees to support suitable roosting cavities. Foraging habitat may be present in open ecosites on the west side of the property.	General Habitat	No Observations, Dusk surveys not conducted	**Minimal -** Low likelihood of maternal roosting on the subject property (i.e., few large diameter trees). Potential foraging habitat (young forest) will be removed, though this is common the in general area and along the Credit River and represents a very minor proportion of the overall woodland area.
Tri-colored Bat (Perimyotis subflavus)	**END**	Species and General Habitat Protection	MNRF Correspondence (August 2016)	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Manmade structures or tree cavities. Foraging over still water, rivers, or in forest gaps (COSEWIC 2013f)	**Minimal -** Only suitable roosting habitat would be in wooded ecosites on east side of property, however woodlands are young with very few large trees to support suitable roosting cavities. Foraging habitat may be present in open ecosites on the west side of the property.	General Habitat	No Observations, Dusk surveys not conducted	**Minimal -** Low likelihood of maternal roosting on the subject property (i.e., few large diameter trees). Potential foraging habitat (young forest) will be removed, though this is common the in general area and along the Credit River and represents a very minor proportion of the overall woodland area.

PLANTS								
American Hart's-tongue Fern (Asplenium scolopendrium)	**SC**	N/A	MNRF Website (August 2016)	Grows on calcareous rocks in deep shade on slopes in deciduous forest. Most Ontario occurrences are in maple-beech forest. Established plants can grow in exposed, rocky crevices and on outcrops, but moist, mossy areas seem to be essential for spore germination and early plant development (MNRF Species Profile Online 2014).	**None** - Wooded slopes on property are young, not providing deep shade, or preferred forest type.	Three-Season General Botanical Inventory	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Hill's Pondweed (potamogeton hillii)	**SC**	N/A	MNRF Website (August 2016)	Found in slow-moving streams, ditches, ponds, lakes and wetlands. It grows in clear, cold alkaline waters (MNRF Species Profile Online 2014).	**None** - No surface water was observed in study area	Three-Season General Botanical Inventory	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Butternut (Juglans cinerea)	**END**	Species and General Habitat Protection	MNRF Correspondence (August 2016)	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows (MNRF Guelph - Waterloo List, 2014).	**High** - Suitable habitat is present throughout the broader landscape and in the vicinity of the proposed works.	Three-Season General Botanical Inventory	One Observation - ELC Unit 4. Non-retainable (Cat. 1)	**None** - No trees are present within or immediately adjacent to the development footprint. One tree is present in the FOD community near the SWM outlet, but outside of the propsoed disturbance area.
REPTILES								
Eastern Ribbonsnake (aka. Northern Ribbonsnake) (Thamnophis sauritus septentrionalis)	**SC**	N/A	MNRF Website (August 2016)	Generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting (MNRF Guelph - Waterloo List, 2014)	**Minimal** - Potential habitat present along shoreline of the Credit River at the east side of the property. However, presence in upland areas in the proposed development area is very unlikely.	General Habitat and incidental wildlife surveys	Not recorded	**Minimal** - Potential habitat at end of woodland at Shoreline of Credit Rvier will be retained, no impacts. Minimal potential to impact marginal upland habitat, however if species present, likely only transient.
Blanding's Turtle (Emydoidea blandingii)	**THR**	Species and General Habitat Protection	MNRF Website (August 2016)	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat present in study area	General Habitat and incidental wildlife surveys	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Northern Map Turtle (Graptemys geographica)	**SC**	N/A	MNRF Website (August 2016)	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat present in study area	General Habitat and incidental wildlife surveys	Not recorded	**None** - No suitable habitat and not recorded during field surveys
Snapping Turtle (Chelydra serpentina)	**SC**	N/A	MNRF Correspondence (August 2016)	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat present in study area	General Habitat and incidental wildlife surveys	Not recorded	**None** - No suitable habitat and no observations of this species during field survey

Status Sources:

[1]**ESA (Endangered Species Act) Status** (provincial status from MNRF May 2014)

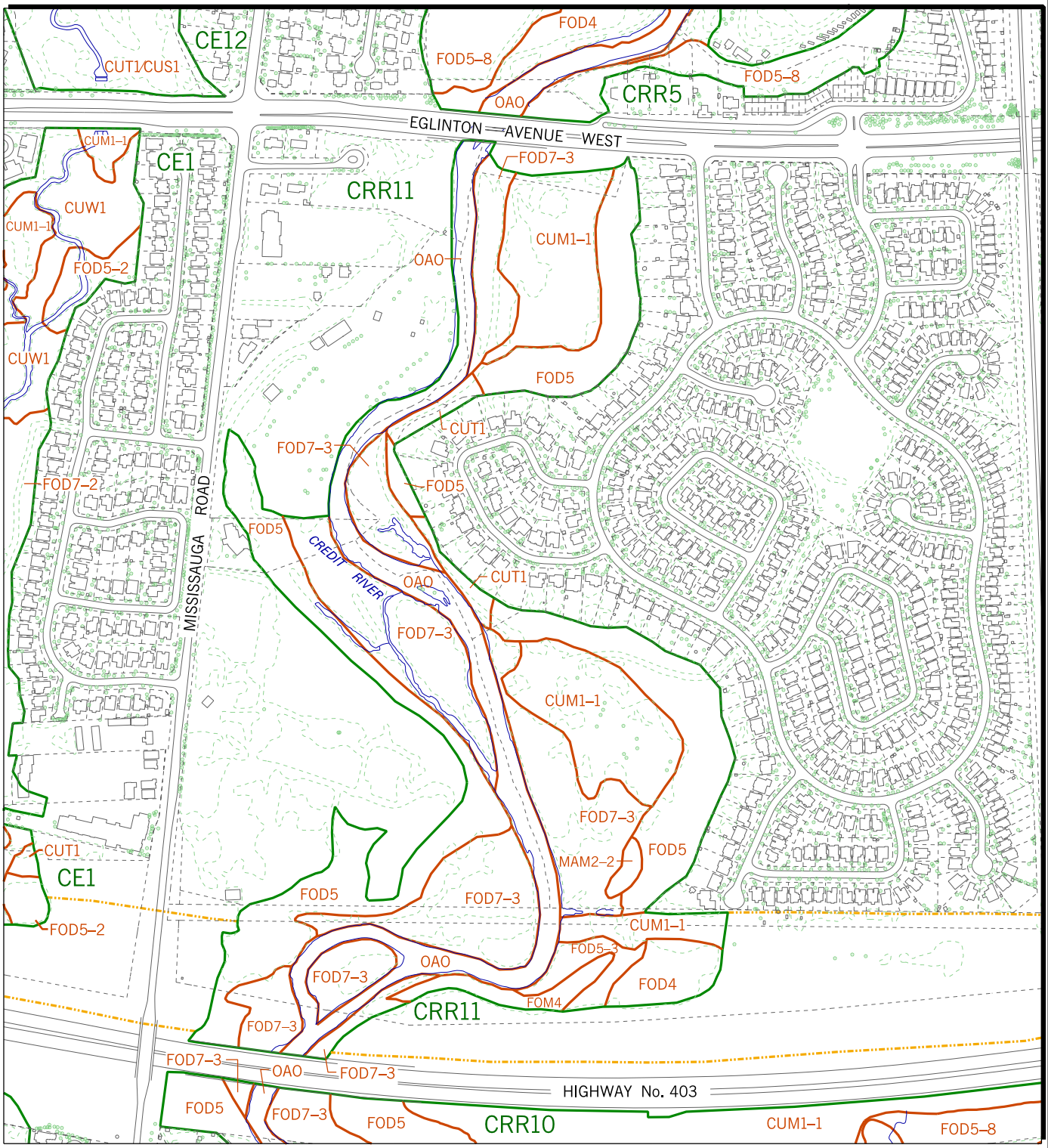
[2]**ESA (Endangered Species Act) Protection** (provincial status from MNRF May 2014)

[3]**COSEWIC (Committee on the Status of Endangered Wildlife in Canada)** (federal status from COSEWIC)

[4]**SARA (Species at Risk Act) Status** (federal status - listed)

APPENDIX G

CRR11 NATURAL AREAS FACT SHEET



City of Mississauga
Natural Areas Survey (2014)

N.T.S.

LEGEND:

- Natural Areas
- Vegetation Communities
- Special Management Areas
- Linkage

MISSISSAUGA
Planning and Building

Produced by T&W, GEOMATICS

City of Mississauga Natural Areas Survey (2014)

Natural Areas Fact Sheet

NATURAL AREA NAME	AREA (HA)	UTM GRID REFERENCE
CRR11	33.98	6059 48245

1. **LOCATION**

Along the Credit River from Highway 403 to Eglinton Avenue West. CRR11 is within 500 m of CE1 and is linked to CRR5 and CRR10 along the Credit River.

2. **CLASSIFICATION**

Significant Natural Area

3. **DESCRIPTION**

A. **Physical Features**

Topography varies from undulating floodplain and tableland to steep valley walls. Valley wall slopes range between 25-45 percent (occasionally reaching 75 percent) with heights between 9-24 m. The primary soil type is imperfectly drained Chinguacousy clay loam. Other soil types include Oneida clay loam, Cooksville clay loam, and Jeddo clay loam. All of these soils developed within the Halton till plain. Along various sections of valley walls, grey shales of the Georgian Bay Formation are exposed. Seepage areas are present along the valley slopes representing minor discharge of groundwater from the soils.

B. **Biota**

There are 264 floral species and 57 faunal species documented for this site. There are nine vegetation communities present at this site (see accompanying figure): dry-fresh deciduous forest ecosite (FOD4); dry-fresh sugar maple deciduous forest ecosite (FOD5); dry-fresh sugar maple-oak deciduous forest type (FOD5-3); fresh-moist willow lowland deciduous forest type (FOD7-3); dry-fresh white cedar mixed forest ecosite (FOM4); dry-moist old field meadow type (CUM1-1); mineral cultural thicket ecosite (CUT1); reed-canary grass mineral meadow marsh type (MAM2-2); open aquatic (OAO).

<u>Dry-Fresh Deciduous Forest Ecosite (FOD4)</u>

The canopy of this forest is dominated by Basswood (*Tilia americana*), Cottonwood (*Populus deltiodes*), Crack Willow (*Salix fragilis*), and the occasional Black Cherry (*Prunus serotina*). Canopy trees are 10-30 m in height and cover greater than 60% of the community. The sub-canopy consists of Green Ash (*Fraxinus pennsylvanica*), Manitoba Maple (*Acer negundo*), and Basswood. Sub-canopy trees are 2-10 m in height and cover greater than 60% of the community. The understory is sparse with Green Ash saplings as well as European Buckthorn (*Rhamnus cathartica*) that are 1-2 m in height and cover 10-25% of the community. The ground layer contains a variety of species including Ostrich Fern (*Matteuccia struthiopteris*), Sensitive Fern (*Onoclea sensibilis*), White Avens (*Geum canadensis*), and Inserted Virginia Creeper (*Parthenocissus inserta*). Ground vegetation is 0.2-1 m in height and covers greater than 60% of the community.

<u>Dry-Fresh Sugar Maple Deciduous Forest Ecosite (FOD5)</u>

Wooded slope is dominated by Sugar Maple (*Acer saccharum* ssp. *saccharum*) with the occasional Norway Maple (*Acer platanoides*). Canopy trees are 10-30 m in height and cover greater than 60% of the community. The sub-canopy consists primarily of Sugar Maple that are 2-10 m in height and cover greater than 60% of the community. The understory is sparse and is dominated by Choke Cherry (*Prunus*

virginiana) that are 0.5-2 m in height and cover greater than 10-25% of the community. The ground layer contains a variety of species including Sugar Maple seedlings, Inserted Virginia Creeper, Garlic Mustard (*Alliaria petiolata*), and May-apple (*Podophyllum peltatum*). Ground vegetation is less than 0.5 m in height and covers 25-60% of the community.

Dry-Fresh Sugar Maple-Oak Deciduous Forest Type (FOD5-3)

The canopy is dominated by Sugar Maple and Red Oak (*Quercus rubra*). Canopy trees are 10-30 m in height and cover greater than 60% of the community. The sub-canopy is also dominated by Sugar Maple with the occasional White Ash (*Fraxinus americana*). Sub-canopy trees are 2-10 m in height and cover greater than 60% of the community. The understory is dense (greater than 60% cover) and primarily contains Grey Dogwood (*Cornus foemina*) and the occasional European Buckthorn that are 0.5-2 m in height. Ground vegetation primarily consists of Rosey Sedge (*Carex rosea*), Tick-trefoil (*Desmodium glutinosum*), Wild Columbine (*Aquilegia canadensis*), and May-apple. Ground layer vegetation is less than 0.5 m in height and covers greater than 60% of the community. Several prairie indicators have been documented from the thicket at the edge of this community, including New Jersey Tea (*Ceanothus americanus*), Yellow Pimpernel (*Taenidia integerrima*) and Virginia Mountain-mint (*Pycnanthemum virginianum*).

Fresh-Moist Willow Lowland Deciduous Forest Type (FOD7-3)

The floodplain has a diverse canopy of Crack Willow, Manitoba Maple, Green Ash, and Black Walnut (Juglans nigra). Canopy trees are 10-25 m in height and cover greater than 60% of the community. The sub-canopy is dominated by Manitoba Maple that are 2-10 m in height and cover greater than 60% of the community. Dense pockets of Red-osier Dogwood (*Cornus stolonifera*), Riverbank Grape (*Vitis riparia*), and Staghorn Sumac (*Rhus typhina*) occur beneath the canopy, however the understory is primarily dominated by Reed-canary Grass (*Phalaris arundinacea*), Giant Ragweed (*Ambrosia trifida*), Great Manna Grass (*Glyceria maxima*), Spotted Joe-pye Weed (Eupatorium maculatum), and Stinging Nettle (*Urtica dioica*). Scattered along the river edge are pockets of Cattail (*Typha* spp.) and Purple Loosestrife (*Lythrum salicaria*). Understory species are 1-2 m in height and cover greater than 60% of the community. The ground layer is a diverse mixture of riparian species including Reed-canary Grass, Spotted Jewelweed (*Impatiens capensis*), and Rough Cocklebur (*Xanthium strumarium*). Ground vegetation is 0.5-1 m in height and covers greater than 60% of the community.

Dry-Fresh White Cedar Mixed Forest Ecosite (FOM4)

The canopy is patchy with greater than 60% cover of Red Oak that are 10-30 m in height. The sub-canopy is dense with Eastern White Cedar (*Thuja occidentalis*) that are 2-10 m in height and cover greater than 60% of the forest. The ground layer is sparse (10-25% cover) with Enchanter's Nightshade (*Circaea lutetiana*) and Bittersweet Nightshade (*Solanum dulcamara*) that are less than 0.5 m in height.

Dry-Moist Old Field Meadow Type (CUM1-1)

The meadow has an open canopy (less than 10% cover) with Manitoba Maple, Green Ash, Crack Willow, and Siberian Elm (*Ulmus pumila*). Canopy trees are 2-25 m in height. The sub-canopy is also sparse (10-25% cover) with Staghorn Sumac that are 1-2 m in height. The understory is dense (greater than 60% cover) with an abundance of Smooth Brome (*Bromus inermis* ssp. *inermis*), as well as Canada Goldenrod, and Field Milkweed (*Asclepias syriaca*). Understory vegetation is 0.5-1 m in height. The ground layer is dense with primarily Bird's-foot Trefoil (*Lotus corniculatus*). Ground vegetation is 0.2-0.5 m in height and covers greater than 60% of the community.

B. **Biota** (continued)

Mineral Cultural Thicket Ecosite (CUT1)

The thicket has an open canopy (10-25% cover) with Manitoba Maple and Green Ash. Canopy trees are 10-25 m in height. The sub-canopy is dense with Manitoba Maple and Riverbank Grape that are 2-10 m in height and cover greater than 60% of the community. The understory is also dense with Multiflora Rose (Rosa multiflora), Riverbank Grape, and Red-osier Dogwood. Understory vegetation is 0.5-2 m in height and covers greater than 60% of the community. The ground layer is dominated by Garlic Mustard that is less than 0.5 m in height and covers greater than 60% of the community.

Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2)

This community has an open canopy with an understory of Reed-canary Grass and the occasional Giant Bur-reed (*Sparganium eurycarpum*). Understory vegetation is 0.5-2 m in height and covers greater than 60% of the community. The ground layer contains a variety of wetland species including Devil's Beggarticks (*Bidens frondosa*), Northern Bugleweed (*Lycopus uniflorus*), Moneywort (*Lysimachia nummularia*), and Lesser Duckweed (*Lemna minor*). Ground vegetation is less than 0.5 m in height and covers greater than 60% of the community. An open aquatic inclusion exists in the central portion of this community and is dominated by Lesser Duckweed.

Open Aquatic (OAO)

The Credit River is classified as an open aquatic community. The vegetation associated with the Credit River is primarily located along the banks, in surrounding vegetation communities.

A total of 44 birds, 6 mammals, 4 amphibians and 3 reptiles have been recorded at this site. Most bird species noted are habitat generalists such as American Robin, Black-capped Chickadee and Northern Cardinal. Thicket-dependent bird species, such as Grey Catbird and Eastern Kingbird, have been noted. Tree Swallows and Barn Swallows were observed foraging over the Credit-River and nearby open areas. Area-sensitive birds including Black-and-white Warbler and American Redstart were documented from this natural area. Amphibians documented from the site include: Redback Salamander, Eastern American Toad, Green Frog, and Northern Leopard Frog. Three reptiles documented from this natural area include Common Snapping Turtle, Northern Water Snake, and Eastern Garter Snake.

4. **CONDITION**

This site is currently in good condition. Disturbances include: windthrow, extensive mountain bike and walking trails, soil compaction, many human-made structures, excessive noise from major roads, Canadian National Rail line and airplanes, erosion of valley walls and valley slopes where bare soil is present. Evidence of Emerald Ash Borer was noted on some ash trees in the natural area. Portions of the Credit River in this site have been engineered with gabion baskets and large armour stone. A sanitary sewer has been installed along the Credit River valley. Invasive plant species are prevalent and include Policeman's Helmut (*Impatiens glandulifera*), Garlic Mustard, European Buckthorn, Purple Loosestrife, and Norway Maple. Ninety-nine introduced plant species are present at this site (representing 37.60% of the total number of species present). The native FQI of 50.35 is a high value and the native mean coefficient of 3.92 is a medium value. The surrounding land use is residential and a park.

5. **SIGNIFICANCE**

- 1 flora "species at risk" within the province (COSSARO) and nationally (COSEWIC): Butternut (*Juglans cinerea*).
- 2 fauna "species at risk" within the province (COSSARO) and nationally (COSEWIC): Barn Swallow and Snapping Turtle.
- 6 plant species considered rare within the City (known from 3 or fewer locations): Slender Wood Sedge (*Carex gracilescens*), Hay Sedge (*Carex siccata*), Broad Waterweed (*Elodea canadensis*), Water loosestrife (*Lysimachia thyrsiflora*), Virginia Mountain-mint, and Least Bur-reed (*Sparganium natans*)
- 10 plant species documented for this site are considered uncommon within the City (known from 4 to 10 locations).
- Indicator species of prairie habitats in Ontario occur at the south end of the site, including New Jersey Tea and Virginia Mountain-mint. Prairie is considered a provincially significant vegetation community in the province of Ontario (S1 – S3)
- 57 Credit Valley Conservation flora Species of Conservation Concern (Tier 1-3).
- 29 Credit Valley Conservation fauna Species of Conservation Concern (Tier 1-3), including: 22 birds, 2 mammals, 4 amphibians, and 2 reptiles.
- Close proximity to several other natural areas.
- The local life science ANSI status was removed in 1998.
- Designated as an Environmentally Significant Area (Credit River, Eglinton Avenue to Dundas Street).
- Geologically important stratified bedrock exposed at several locations, containing many fossils of provincial significance.
- Large size (33.98 ha).
- Diversity of plant species (264 species).
- This site is part of the Credit River system that comprises the main natural corridor in the City, stretching from Lake Ontario to the northern boundary of the City and beyond.
- This site is recognized as a migration corridor for birds and animals.
- Floodplain provides floodwater storage for the Credit River.

6. **MANAGEMENT NEEDS**

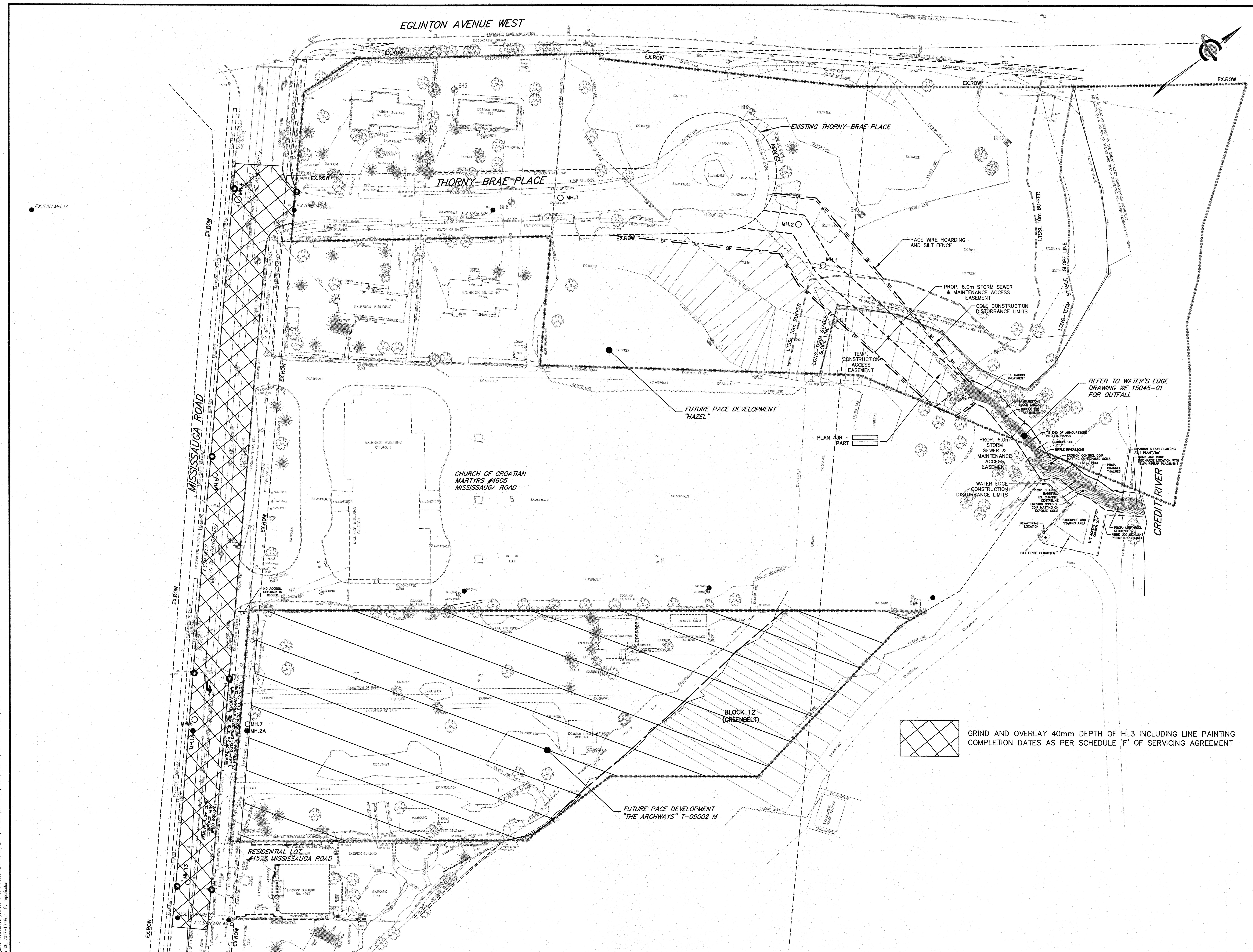
- The City park, Hewick Meadows, is included within this natural area.
- Removal and management for non-native invasive species including Garlic Mustard, Norway Maple and European Buckthorn.

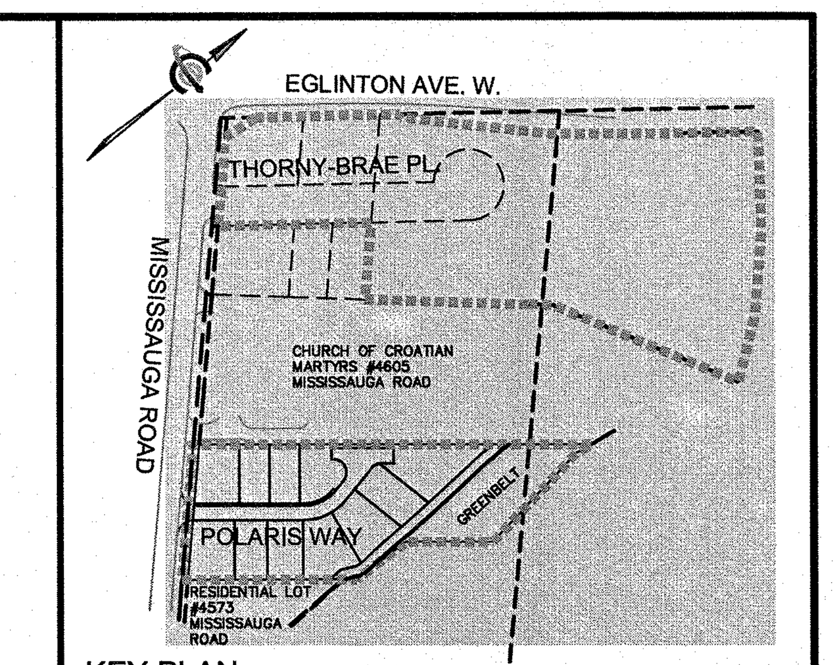
7. **PRINCIPLE REFERENCES**

Ecologistics Limited (1979)
Hanna (1984)

APPENDIX H

DESIGN & CHANNEL RESTORATION DRAWINGS





KEY PLAN
N.T.S.

LEGEND

- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED DOUBLE CATCH BASIN
- PROPOSED VALVE & BOX
- PROPOSED VALVE & BOX
- PROPOSED HYDRANT & VALVE
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- EX.CB. — EXISTING CATCHBASIN
- EX.V&C — EXISTING VALVE & CHAMBER
- EX.H&V — EXISTING HYDRANT & VALVE
- 135 — PROPOSED LOT NUMBERS
- PROPOSED 2.0m HIGH ACOUSTIC FENCE
- PROPOSED 2.0m HIGH LIGHT DUTY ACOUSTIC FENCE
- PROPERTY LINE (2462357 ONTARIO INC.)
- SF — PAGE WIRE HOARDING AND SILT FENCE
- CB SEDIMENT TRAP CITY STD. 2930.040

THE DEVELOPER TO VERIFY INVERT ELEVATION AND LOCATION OF ALL UNDERGROUND SERVICES AND UTILITIES PRIOR TO COMMENCING WORK.

LIST OF DRAWINGS

SITE PLAN INFORMATION

SCHAEFFER DZALDOV BENNETT LTD.
64 JARDIN DRIVE
CONCORD, ONTARIO L4K 3P3
PHONE: (416) 987-0101
FAX: (905) 761 - 0101

SURVEY INFORMATION

SCHAEFFER DZALDOV BENNETT LTD.
64 JARDIN DRIVE
CONCORD, ONTARIO L4K 3P3
PHONE: (416) 987-0101
FAX: (905) 761 - 0101

BENCHMARK

ELEVATIONS SHOWN HEREON ARE REFERRED TO CITY OF MISSISSAUGA BENCHMARK No. 970, HAVING A PUBLISHED ELEVATION OF 148.702 METRES.

NO.	REVISION	DATE	BY
6.	REVISED PER REGION AND CITY COMMENTS	MAR 01, 2017	S.G.
5.	REVISED PER REGION COMMENTS	DEC 12, 2016	S.G.
4.	PER REGION AND CITY COMMENTS	NOV 14, 2016	S.G.
3.	PER CVC COMMENTS	JUNE 13, 2016	S.G.
2.	FIRST ENGINEERING SUBMISSION	APR 26, 2016	S.G.
1.	PRE-SUBMISSION REVIEW	APR 13, 2016	S.G.

LICENSED PROFESSIONAL ENGINEER
P. FILIPTSEV
100146817
MAR. 01/17
PROVINCE OF ONTARIO

CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

2462357 ONTARIO INC. (PACE DEVELOPMENTS)
THE ARCHWAYS
4583, 4589, 4601 MISSISSAUGA ROAD,
MISSISSAUGA, ON

GENERAL ABOVEGROUND PLAN

COLE ENGINEERING
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6181 / 905.940.6161 F:905.940.2064

DESIGNED BY: P.F.	DATE: OCTOBER 2015	CHECKED BY: S.G.
DRAWN BY: P.F.	PROJECT No.	APPROVED BY: S.G.
SCALE: 1:500	UD15-0347 T-09002 M	DRAWING No. GA-01

SANITARY SEWERS

1. ALL SANITARY SEWER BEDDING AS PER STD. 2-3-1.
2. MAINLINE SANITARY SEWER PIPE SIZE SHALL BE MINIMUM 250mm IN DIAMETER INSTALLED AT THE APPROVED DESIGN GRADE. PIPE CLASS AND APPURTENANCES AS PER REGION'S SPECIFICATIONS.
3. ALL SEWERS CONSTRUCTED WITH GRADES 0.5% OR LESS SHALL BE APPROVED BY THE ENGINEER AND THE AGENCY PROJECT MANAGER OR DESIGNATE AND BE INSTALLED WITH LASER AND CHECKED PRIOR TO BACKFILL.
4. MINIMUM SANITARY SEWER PIPE SLOPE FOR LAST LEG SHALL BE 1% AND DESIRABLE SLOPE 2%.
5. ALL MANHOLES SHALL BE AS PER REGION STD. DWG. 2-1-1 AND 2-1-2 WITH BENCHING AS PER STD 2-1-4.
6. FRAME AND COVERS SHALL BE AS PER REGION STD. DWG. 2-2-2 AND 2-2-3.
7. MANHOLE STEPS SHALL BE AS PER REGION STD. DWG. 2-2-4.
8. MANHOLES DEEPER THAN 5.0m MUST BE EQUIPPED WITH SAFETY PLATFORMS, AS PER STD 2-2-1.
9. SANITARY SERVICE LATERALS SHALL BE MINIMUM 125mmDIAMETER.
   a. SANITARY SERVICE SHALL BE LOWER THAN AND TO THE RIGHT OF THE STORM SERVICE AT THE PROPERTY LINE WHEN FACING THE LOT FROM THE STREET.
   b. CONNECTIONS TO SEWERS SHALL BE MADE WITH MANUFACTURED TEES OR WYES WHERE APPLICABLE AND SHALL BE COLOUR CODED AS NONWHITE, AS PER STD. DWG. 2-4-1, 2-4-2, AND 2-4-4.

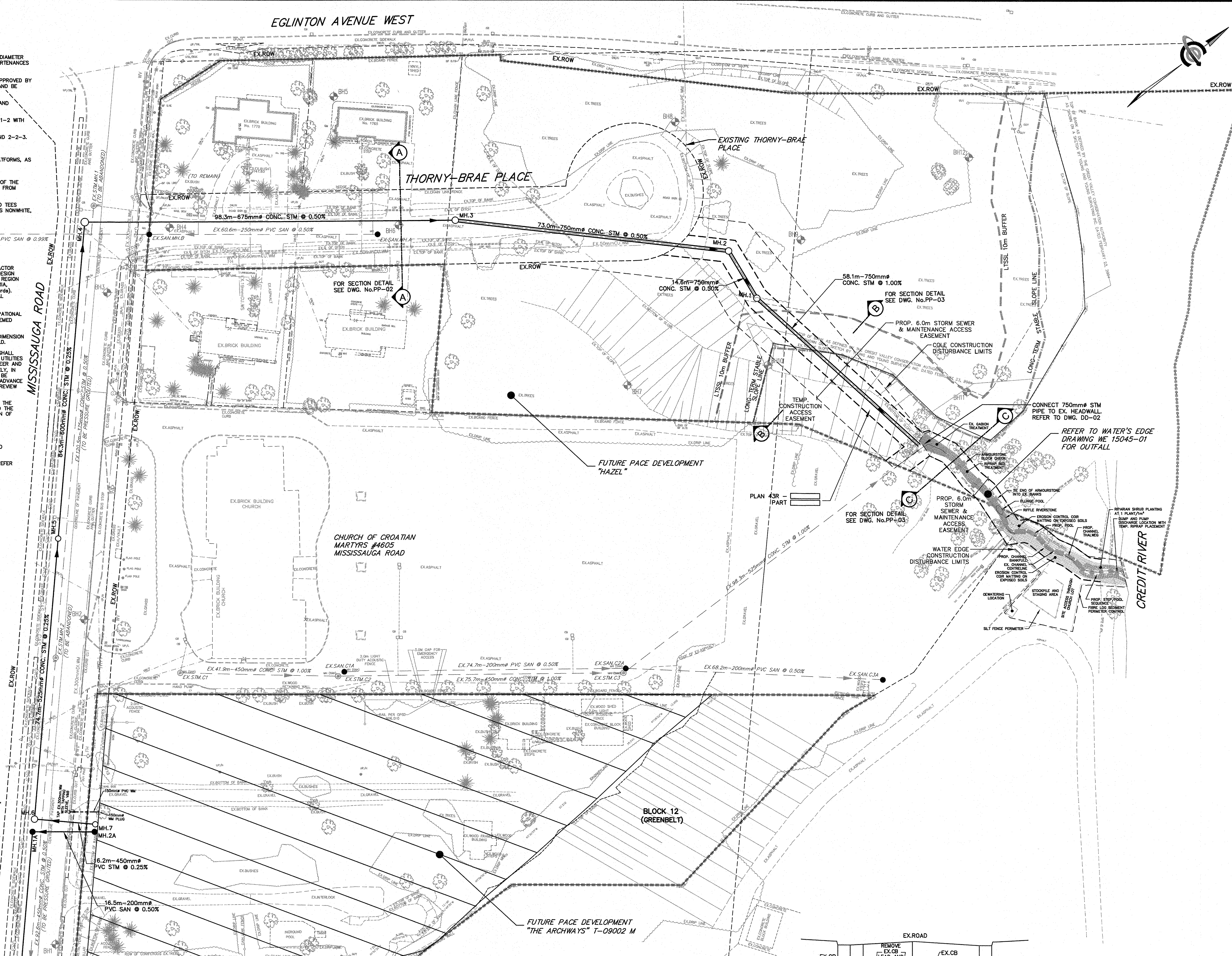
Region of Peel General Notes:

GENERAL

1. THE APPLICANT, APPLICANT'S REPRESENTATIVE, CONSULTANT, CONTRACTOR AND SUB CONTRACTORS ARE RESPONSfIlE TO ENSURE THAT THEIR DESIGN MATERIALS AND CONSTRUCTION PRACTICES CONFORM TO THE LATEST REGION OF PEEL STANDARDS, SPECIFICATIONS, MATERIALS AND DESIGN CRITERIA, POSTED ON REGION OF PEEL'S WEBSITE (www.peelregion.ca/pw/standards). IN THE ABSENCE OF REGION SPECIFICATIONS, THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) SHALL APPLY.
2. ALL WORKS SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT". THE GENERAL CONTRACTOR SHALL BE DEEMED THE CONSTRUCTOR AS DEFINED IN THE ACT.
3. THE CONTRACTOR AT THEIR EXPENSE SHALL VERIFY THE LOCATION, DIMENSION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES IN THE FIELD.
4. PRIOR TO EXCAVATION OR BORING CONTRACTOR AT THEIR EXPENSE SHALL EXPOSE AND VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES AND SERVICES TO BE CROSSED AND MUST NOTIFY THE DESIGN ENGINEER AND THE AGENCY FIELD INSPECTOR AND/OR PROJECT MANAGER IMMEDIATELY, IN WRITING, OF ANY CONFLICTS OR DISCREPANCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING THE EXISTING UTILITIES FAR ENOUGH IN ADVANCE OF CONSTRUCTION TO MAKE NECESSARY DESIGN MODIFICATIONS FOR REVIEW AND APPROVAL, IF REQUIRED, WITHOUT DELAYING THE WORK.
5. THE CONTRACTOR, AT THEIR EXPENSE AND TO THE SATISFACTION OF THE REGION OF PEEL, SHALL BE RESPONSIBLE FOR THE RESTORATION AND THE REPAIR OF THE EXISTING UTILITIES AND ALL AREAS BEYOND THE PLAN OF SUBDIVISION DISTURBED DURING CONSTRUCTION.
6. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
7. ALL BACKFILL FOR SEWERS, WATERMAINS AND UTILITIES ON THE ROAD ALLOWANCE MUST BE MECHANICALLY COMPACTED.
8. ALL BOREHOLES SHOWN ON DRAWING ARE FOR INFORMATION ONLY. REFER TO GEOTECHNICAL REPORT.
9. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.

WATERMAINS

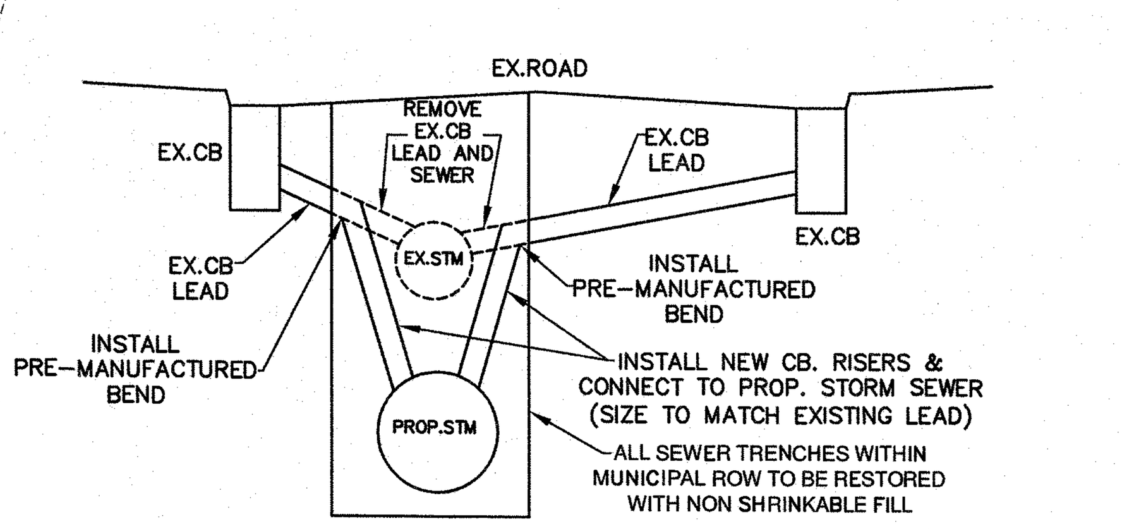
1. THE REGION OF PEEL SHALL CONDUCT THE OPERATION OF EXISTING VALVES AND HYDRANTS IF REQUIRED.
2. CONTRACTOR MUST USE BATTER BOARD OR ROD-AND-LEVEL METHOD FOR WATERMAIN INSTALLATION.
3. ALL WATERMAINS SHALL HAVE 1.70m MINIMUM COVER FOR URBAN ROAD DESIGN AND 2.1m MINIMUM COVER FOR RURAL ROAD DESIGN.
4. ALL WATERMAINS SHALL MAINTAIN A MINIMUM 1.5m CLEARANCE FROM ALL MANHOLES AND CATCH BASINS, WHERE APPLICABLE.
5. FOR WATERMAINS CROSSING OVER OR UNDER SEWERS A MINIMUM 0.5m VERTICAL CLEARANCE SHALL BE PROVIDED.
6. FOR WATERMAIN CROSSING A SANITARY SEWER, WATERMAIN JOINTS ARE TO BE OFFSET A MINIMUM OF 205m HORIZONTALLY FROM THE CENTERLINE OF THE SANITARY SEWER.
7. WATERMAIN BEDDING SHOULD BE AS PER BE AS PER STD. 1-5-1.
8. WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED PLANS, COPY OF GRADE SHEET MUST BE SUPPLIED TO THE REGION OF PEEL INSPECTOR PRIOR TO COMMENCEMENT OF WORK.
9. ANY JOINT DEFLECTION SHALL BE 50% OF MANUFACTURER'S SPECIFICATIONS. PIPE BARREL DEFLECTION IS PROHIBITED.
10. FIRE HYDRANTS SHALL BE INSTALLED AS PER REGION STD. DWG. 1-6-1 OR 1-6-2 WITH FLANGE SET BETWEEN 50mm AND 150mm ABOVE FINISHED GRADE.
11. ALL HYDRANTS SHALL HAVE 1.2m MINIMUM HORIZONTAL CLEARANCE FROM ALL OTHER UTILITIES AND STRUCTURES MEASURED FROM THE NEAREST POINT OF THE STRUCTURE.
12. MECHANICAL RESTRAINERS ARE REQUIRED FOR ALL FITTINGS, VALVES, DEAD ENDS, CAPS AND HYDRANTS ON ALL PVC WATERMAINS; MINIMUM RESTRAINED PIPE LENGTH AS PER REGION'S STANDARD.
13. STAINLESS STEEL NUTS AND BOLTS ARE TO BE USED ON ALL METALLIC FITTINGS AND JOINT RESTRAINTS.
14. ALL METALLIC VALVES, FITTINGS, THROUGH WALL METAL PIPING AND JOINT RESTRAINTS TO BE CfW DENSO PASTE, DENSO MASTIC & DENSO TAPE OR APPROVED EQUAL APPLIED TO MANUFACTURER'S RECOMMENDATIONS.
15. WHERE PLASTIC PIPE IS USED, INSTALL A 12 GAUGE TWU STRANDED COPPER, LIGHT COLOURED, PLASTIC COATED TRACER WIRE ATTACHED TO THE PIPE WITH APPROVED WIRE SPLICE. THE WIRE SHOULD BE BROUGHT TO THE SURFACE AT EACH SERVICE & VALVE BOX AND HYDRANT VALVES.
16. 50mm DIAMETER WATERMAIN SHALL BE TYPE K SOFT COPPER. WATERMAIN INSTALLATION IN CUL-DE-SACS AS PER REGION STD. DWG. 1-7-4.
17. A PHYSICAL SEPARATION MUST BE MAINTAINED AT ALL CONNECTION POINTS OF NEW WATERMAIN TO THE EXISTING SYSTEM UNTIL BACTERIOLOGICAL TESTS HAVE PASSED, AS PER STD. DWG 1-7-7 AND 1-7-8.
18. PROVISION FOR FLUSHING OF NEW WATERMAINS PRIOR TO TESTING MUST BE PROVIDED WITH AT LEAST 50mm OUTLET ON WATERMAINS SMALLER THAN 300mm IN DIAMETER, AND MINIMUM 100mm OUTLET ON WATERMAINS 300mm AND LARGER. COPPER WATERMAINS ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE WATERMAIN, AS PER STD. DWG. 1-7-7 AND 1-7-8.
19. ALL SERVICE CONNECTIONS TO PVC PIPES ARE TO BE MADE USING APPROVED WIDE BAND SERVICE SADDLE. DIRECT TAPPING IS NOT ALLOWED.
20. ALL WATER SEVICES SHALL BE MINIMUM 25mm DIA NOMINAL COPPER PIPE SIZE OR 32mm DIA POLYETHYLENE PIPE. IN GENERAL, NON METALLIC SERVICES SHALL BE ONE SIZE LARGER THAN THE NOMINAL COPPER PIPE SIZE AS PER LATEST APPROVED REGIONAL PRODUCT LIST AND SIZES CIW TRACER WIRE.
21. THE MINIMUM LATERAL DISTANCE BETWEEN WATER SERVICES AND OTHER UTILITIES SHALL BE 1.2m.
22. ALL RESIDENTIAL WATER SERVICE BOXES/CURB STOPS SHALL BE INSTALLED WITHIN SODDED AREAS WITH MINIMUM DISTANCE OF 1.0 METRES FROM THE EDGE OF THE DRIVEWAY, BE FLUSH WITH GRADE AND ACCESSfIlE AT ALL TIME.
23. VALVE AND BOXES SHALL BE CAST IRON SLIDING TYPE, COMPLETED WITH VALVE GUIDE PLATES AND INSTALLED AS PER REGION STD. 1-3-8. MAINLINE VALVES TO BE RESTRAINED AS PER REGION STD. 1-3-3A. VALVES SHALL OPEN TO THE LEFT (COUNTER-CLOCKWISE).
24. ALL WATER SERVICES BOXES SHOULD BE "LEAD FREE" AS PER REGION'S MATERIAL SPECIFICATIONS.
25. THE REGION WILL COMPLETE THE NECESSARY WATER TESTING (PRESSURE TEST, FLUSHING, CHLORINATION AND SAMPLING). CONTRACTOR MAY PROCEED WITH HIS OWN PRESSURE TEST AND FLUSHING PRIOR TO REGION'S TESTING.
26. CONNECT AS PER REGION OF PEEL STD. 1-7-7. TAP EX. 300mmø WATERMAIN WITH TAPPING SLEEVE VALVE AND BOX.



NOTE:
ALL SEWER TRENCHES WITHIN MUNICIPAL ROW TO BE RESTORED WITH NON SHRINKABLE FILL

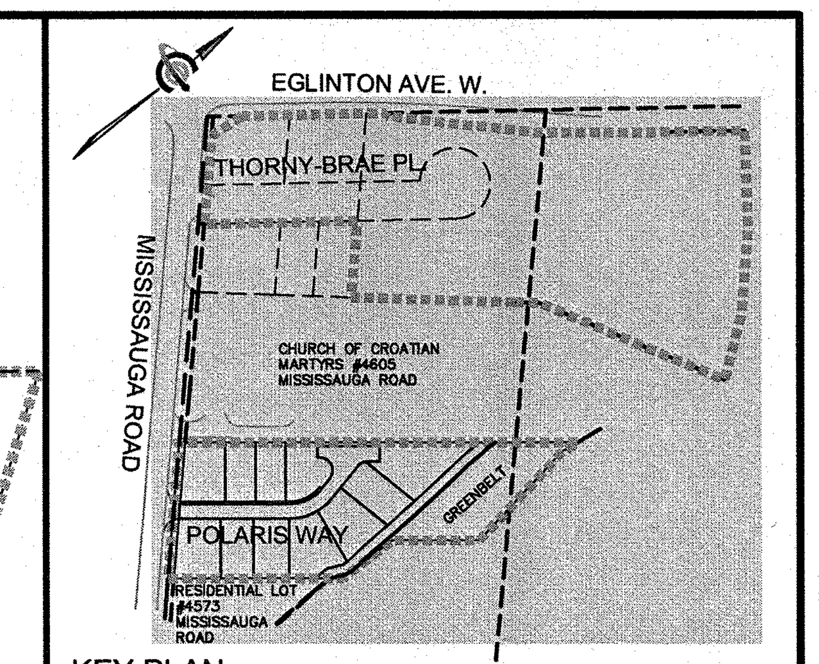
WATERMAIN IN FILL AREA

1. NO WATERMAIN TO BE LAID ON FILL UNTIL THE FIELD DENSITY TEST REPORTS HAVE BEEN SUBMITTED TO AND APPROVED BY THE REGION OF PEEL OR THE CONSULTING ENGINEER.
2. PIPE JOINTS DEFLECTIONS ARE NOT ALLOWED IN FILL AREA.
3. JOINTS SHALL BE MECHANICALLY RESTRAINED THE WHOLE LENGTH.
4. ALL HYDRANTS, TEE BRANCH VALVES AND HORIZONTAL BENDS ARE TO BE MECHANICALLY RESTRAINED WITH TIE RODS.
5. IN EXISTING MUNICIPAL RIGHT-OF-WAY OR EASEMENT, FILL TO BE PLACED TO 600mm MINIMUM ABOVE THE OBVERT OF THE WATERMAIN AND TO 300mm EITHER SIDE, COMPACTED TO MINIMUM 100% STANDARD PROCTOR DENSITY IN 300mm LIFTS; AND THEREAFTER, FOR EVERY 300mm LIFT ALONG THE CENTERLINE, AND 105m TO EITHER SIDE, OF WATERMAIN AT MAXIMUM INTERVAL OF 30.0m. TEST RESULTS MUST BE SUBMITTED TO AND APPROVED BY THE CONSULTANT OR AGENCY.



EX.CB RECONNECTION DETAIL
N.T.S

STATISTICS TABLE	
SAN SEWER LENGTH	73.6m
SAN MANHOLES	2
WATERMAIN LENGTH	0
HYDRANTS	0
WATERMAIN DIAMETERS	EX.300mm D.I.



KEY PLAN
N.T.S.

LEGEND

Symbol	Description
O	PROPOSED STORM MANHOLE
●	PROPOSED SANITARY MANHOLE
□	PROPOSED CATCH BASIN
◫	PROPOSED DOUBLE CATCH BASIN
⊗	PROPOSED VALVE & BOX
⋈	PROPOSED VALVE & BOX
—◇	PROPOSED HYDRANT & VALVE
○	EXISTING STORM MANHOLE
◉	EXISTING SANITARY MANHOLE
□ EX.CB.	EXISTING CATCHBASIN
⊗ EX.V&C	EXISTING VALVE & CHAMBER
—◇ EX.H&V	EXISTING HYDRANT & VALVE
135	PROPOSED LOT NUMBERS
—□—□—	PROPOSED 2.0m HIGH ACOUSTIC FENCE
—□—□—□—	PROPOSED 2.0m HIGH LIGHT DUTY ACOUSTIC FENCE
▪▪▪▪▪▪	PROPERTY LINE (2462357 ONTARIO INC.)

THE DEVELOPER TO VERIFY INVERT ELEVATION AND LOCATION OF ALL UNDERGROUND SERVICES AND UTILITIES PRIOR TO COMMENCING WORK.

LIST OF DRAWINGS

GA-01 (GENERAL ABOVEGROUND)
GU-01 (GENERAL UNDERGROUND)
ST-01 (STORM DRAINAGE PLAN)
SA-01 (SANITARY DRAINAGE PLAN)
TM-01 (TRAFFIC MANAGEMENT)
PM-01 (PAVEMENT MARKING)
PP-01 (MISSISSAUGA ROAD)
PP-02 (THORNY-BRAE PLACE)
PP-03 (STORM OUTFALL)
DD-01 (GENERAL NOTES)
DD-02 (STRUCTURAL DETAILS)
WE 15045-01 (OUTFALL CHANNEL)
WE 15045-02 (OUTFALL CHANNEL)

SITE PLAN INFORMATION

SCHAEFFER DZALDOV BENNETT LTD.
64 JARDIN DRIVE
CONCORD, ONTARIO L4K 3P3
PHONE: (416) 987-0101
FAX: (905) 761 - 0101

SURVEY INFORMATION

SCHAEFFER DZALDOV BENNETT LTD.
64 JARDIN DRIVE
CONCORD, ONTARIO L4K 3P3
PHONE: (416) 987-0101
FAX: (905) 761 - 0101

BENCHMARK

ELEVATIONS SHOWN HEREON ARE REFERRED TO CITY OF MISSISSAUGA BENCHMARK No. 970, HAVING A PUBLISHED ELEVATION OF 148.702 METRES.

NO.	REVISION	DATE	BY
6.	REVISED PER REGION AND CITY COMMENTS	MAR 01, 2017	S.G.
5.	REVISED PER REGION COMMENTS	DEC 12, 2016	S.G.
4.	PER REGION AND CITY COMMENTS	NOV 14, 2016	S.G.
3.	PER CVC COMMENTS	JUNE 13, 2016	S.G.
2.	FIRST ENGINEERING SUBMISSION	APR 26, 2016	S.G.
1.	PRE-SUBMISSION REVIEW	APR 13, 2016	S.G.

LICENSED PROFESSIONAL ENGINEER
P. FILIPTSEV
100146817
MAR. 01/17
PROVINCE OF ONTARIO

CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

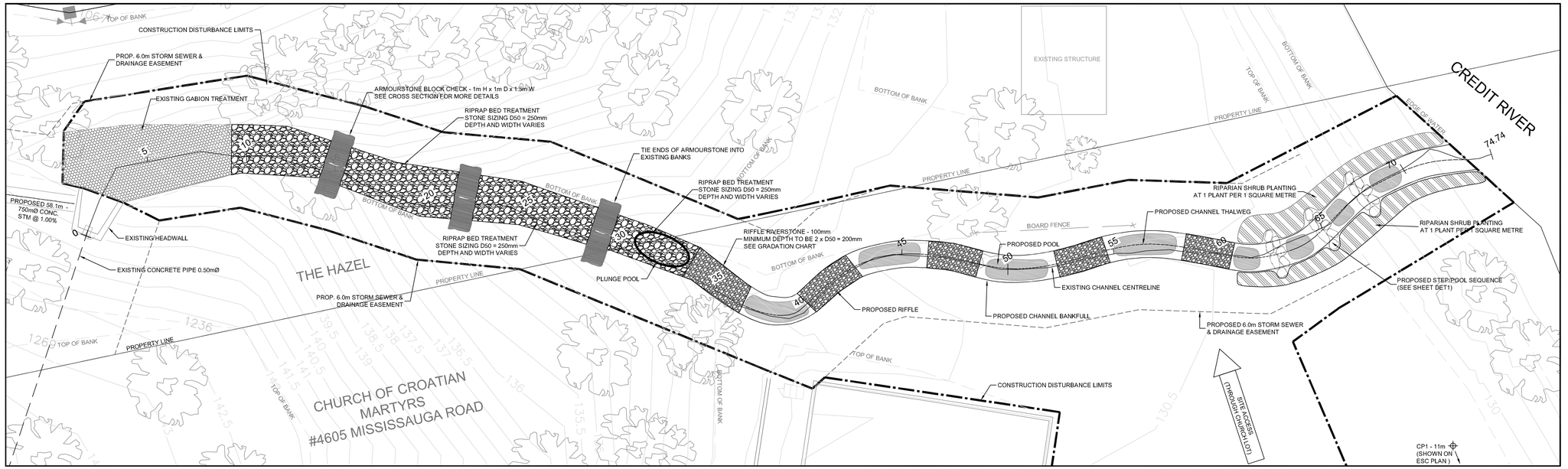
2462357 ONTARIO INC. (PACE DEVELOPMENTS)
THE ARCHWAYS
4583, 4589, 4601 MISSISSAUGA ROAD,
MISSISSAUGA, ON

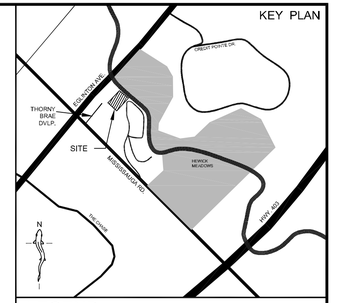
GENERAL UNDERGROUND PLAN

COLE ENGINEERING
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6161 / 905.940.6161 F:905.940.2064

DESIGNED BY: P.F.	DATE: OCTOBER 2015	CHECKED BY: S.G.
DRAWN BY: P.F.	PROJECT No.	APPROVED BY: S.G.
SCALE: 1:500	UD15-0347	DRAWING No.
	T-09002 M	GU-01

PLAN
SCALE - 1:100





LEGEND:

- EXISTING ELEVATION (160.00)
- PROPOSED ELEVATION (100.00)
- BENCHMARK LOCATION
- PROPOSED BANKFULL
- CONSTRUCTION DISTURBANCE LIMIT
- CONTOURS
- EASEMENT
- PROPERTY LINE
- TERRAIN LINES
- EXISTING CENTRELINE
- PROPOSED CENTRELINE
- SHRUB PLANTING ZONE
- PROPOSED STONE
- EXISTING TREE

SITE REVEGETATION:

ALL DISTURBED AREAS, INCLUDING ACCESS ROUTES, STAGING AREAS AND WORK ZONES ARE TO BE CLEARED PRIOR TO CONSTRUCTION.

EXISTING SOD AREAS ARE TO BE RE-SODDED AND NATURALIZED AREAS ARE TO BE SEEDED WITH NATIVE WOODLAND SEED MIX POST CONSTRUCTION.

CONSTRUCTION SUPERVISION:

THE PROJECT FLUVIAL GEOMORPHOLOGIST SHALL BE ON SITE OR AVAILABLE DURING ALL PHASES OF CONSTRUCTION OF THE CHANNEL AND IN-WATER WORKS.

AREA STABILIZATION:

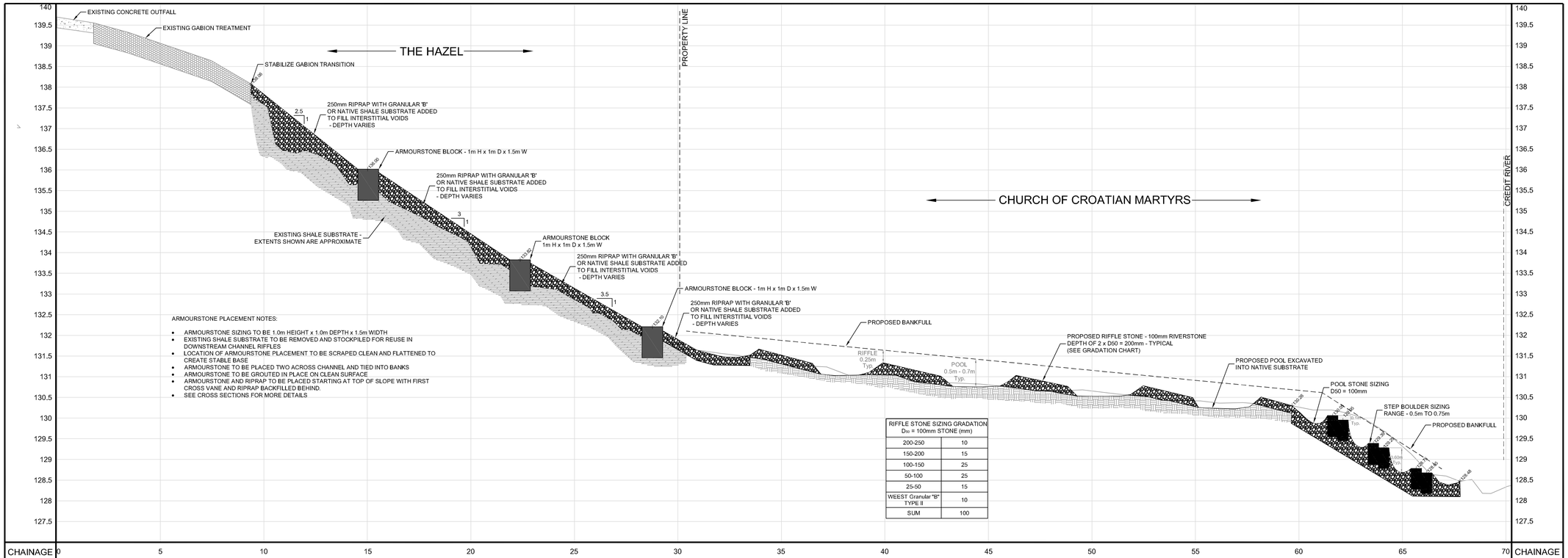
EROSION CONTROL BLANKETS ARE TO BE PLACED TO CONTROL EROSION AFTER SEEDING. ECB TO BE KoirMat 400 OR APPROVED EQUIVALENT AND INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS.

FISHERIES TIMING WINDOW:

TO ACCOMODATE BOTH SPRING (STEELHEAD / RAINBOW TROUT) AND FALL (PACIFIC SALMON) SPAWNING SPECIES IN THE CREDIT RIVER, BOTH A COLDWATER AND WARMWATER CONSTRUCTION TIMING WINDOW THAT PERMITS INSTREAM CONSTRUCTION FROM JUNE 15TH TO SEPTEMBER 15TH (I.E., NO IN-WATER WORKS BETWEEN SEPTEMBER 16TH AND JUNE 14TH) WILL BE IMPLEMENTED.

FOR ABOVE THE HIGH WATER MARK, STANDARD CONSTRUCTION MITIGATION AND PROPER ESC SHOULD BE USED TO PREVEN ENTRY OF SEDIMENT INTO THE CREDIT RIVER AND ASSOCIATED RIPARIAN AND FLOODPLAIN AREAS. THE TIMING RESTRICTION NEED NOT APPLY.

PROFILE
SCALE: VERTICAL - 1:200
HORIZONTAL - 1:100



ARMOURSTONE PLACEMENT NOTES:

- ARMOURSTONE SIZING TO BE 1.0m HEIGHT x 1.0m DEPTH x 1.5m WIDTH
- EXISTING SHALE SUBSTRATE TO BE REMOVED AND STOCKPILED FOR REUSE IN DOWNSTREAM CHANNEL RIFFLES
- LOCATION OF ARMOURSTONE PLACEMENT TO BE SCRAPED CLEAN AND FLATTENED TO CREATE STABLE BASE
- ARMOURSTONE TO BE PLACED TWO ACROSS CHANNEL AND TIED INTO BANKS
- ARMOURSTONE TO BE GROUTED IN PLACE ON CLEAN SURFACE
- ARMOURSTONE AND RIPRAP TO BE PLACED STARTING AT TOP OF SLOPE WITH FIRST CROSS VANE AND RIPRAP BACKFILLED BEHIND.
- SEE CROSS SECTIONS FOR MORE DETAILS

RIFFLE STONE SIZING GRADATION D_{50} = 100mm STONE (mm)	
200-250	10
150-200	15
100-150	25
50-100	25
25-50	15
WEEST Granular "B" TYPE II	10
SUM	100

CHAINAGE	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	CHAINAGE
FEATURE		RIPRAP BED PROTECTION WITH ARMOURSTONE CHECKS					P1	R1	P2	R2	P3	R3	P4	R4	P5	R5	Pool 1	Step 1	Pool 2	Step 2	Pool 3	Step 3	Pool 4		FEATURE

BENCHMARK:

CITY OF MISSISSAUGA No. 970 - PLATE MOUNTED IN CONCRETE PAD AT NORTH-EAST CORNER OF MISSISSAUGA RD. AND EGLINTON AVE. INTERSECTION - ELEVATION 148.702

HORIZONTAL CONTROL MONUMENT No. 075125016 - BRASS CAP SET IN SIDEWALK AT NORTH-WEST CORNER OF MISSISSAUGA RD. AND EGLINTON AVE. INTERSECTION - ELEVATION 148.323 - N 4824783.177, E 605294.687

LOCAL CONTROL:

CP1 - NAIL IN GROUND ON ASPHALT ROAD SURFACE - ELEVATION 130.48 (SHOWN ON PLAN)

No.	DATE	BY	REVISIONS
1	FEB. 22, 2017	NG	REVISED AS PER COMMENTS FROM CITY

APPROVALS

MUNICIPAL

MANAGER OF DEVELOPMENT, ENVIRONMENTAL & TRANSPORTATION ENGINEERING

DATE

REGIONAL

COMMISSIONER OF PUBLIC WORKS

DIRECTOR OF DESIGN & CONSTRUCTION

FIELD NOTES:

LICENSED PROFESSIONAL ENGINEER — E. GAZENDAM — PROVINCE OF ONTARIO

SCALE:	DATE:
1:100	Nov. 4, 2016

CONSULTANT

water's edge ENVIRONMENTAL SOLUTIONS TEAM LTD.

PACE DEVELOPMENTS

1745-1775 THORNY BRAE PLACE
"THE HAZEL"

CITY OF MISSISSAUGA

PLAN, PROFILE AND CROSS SECTION

DESIGN	CAD FILENAME
NG / EG	PP1
CHECKED	MUNICIPAL DRAWING NO.
EG	WE 15045-01

EROSION AND SEDIMENT CONTROL STRATEGY

1. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A DETAILED SCHEDULE AND WORK PLAN FOR REVIEW AND APPROVAL OF THE PROJECT MANAGER AND EXTERNAL AGENCIES AS REQUIRED, INDICATING HOW HE WILL IMPLEMENT SEDIMENT AND EROSION CONTROLS, AND HOW HE WILL CONTROL/DIVERT CHANNEL FLOWS AROUND OR THROUGH THE CONSTRUCTION AREA.

2. SEDIMENT AND EROSION CONTROL MEASURES MUST BE IMPLEMENTED PRIOR TO WORK, AND MAINTAINED DURING THE WORK PHASE, TO PREVENT ENTRY OF SEDIMENT INTO THE WATER OR RE-SUSPENDED SEDIMENT.

3. ANY STOCKPILED MATERIALS SHOULD BE STORED AND STABILIZED 30M AWAY FROM THE WATER. EXCESS MATERIAL SHALL BE REMOVED IMMEDIATELY FROM THE CHANNEL AREA AND TEMPORARILY STOCKPILED IN SUITABLE LOCATIONS IDENTIFIED BY THE DESIGN DRAWINGS AND ON-SITE AREAS APPROVED BY THE PROJECT MANAGER.

4. NO FLOW IS EXPECTED IN CHANNEL AS CHANNEL IS TYPICALLY DRY BUT ALL WORK IS TO BE PERFORMED DURING LOW FLOW CONDITIONS AND WORK IS NOT TO BE INITIATED WHEN WEATHER FORECASTS SUGGEST EXTENSIVE RAIN.

5. THE CONSTRUCTION ZONE IS TO BE ISOLATED FROM POTENTIAL STORM FLOWS USING A DAM & PUMP TECHNIQUE AND APPROPRIATE FIBRE LOG BUFFERS AS APPROVED BY THE PROJECT MANAGER.

6. ALL WORK IS TO BE COMPLETED AS EXPEDITIOUSLY AS POSSIBLE AND ANY WORK THAT HAS BEEN INITIATED MUST BE COMPLETED WITHIN THE WORKING DAY, IF THIS IS NOT POSSIBLE, THEN THE CONTRACTOR MUST ENSURE, TO THE SATISFACTION OF THE PROJECT MANAGER, THAT THE WORK SITE IS ADEQUATELY STABILIZED.

7. ONCE EACH GRADING COMPONENT OF THE PROJECT HAS BEEN COMPLETED BY THE CONTRACTOR, THE SITE IS TO BE REVEGETATED AS PER THE PLANS AND STABILIZED.

8. ANY EROSION AND SEDIMENT CONTROLS ARE TO BE REMOVED AT THE COMPLETION OF THE PROJECT AFTER A JOINT INSPECTION BY THE CONTRACTOR AND PROJECT MANAGER.

9. ANY DEVIATIONS FROM THE APPROVED STRATEGY MUST BE APPROVED BY THE PROJECT MANAGER.

10. CONTRACTOR TO AVOID ANY UNNECESSARY DISRUPTION OF THE EXISTING CHANNEL.

11. SEDIMENT LADEN DEWATERING DISCHARGE SHOULD BE PUMPED TO A SETTLING BASIN OR DEWATERING BAG WELL AWAY FROM THE WATERCOURSE AND ALLOWED TO SETTLE AND/OR FILTER THROUGH THE RIPARIAN VEGETATION BEFORE RE-ENTERING THE WATERCOURSE DOWNSTREAM OF THE CONSTRUCTION AREA.

GENERAL CREEK NOTES

1. THE REACH OF THE CREDIT RIVER AT THE OUTFLOW OF THE DRAINAGE CHANNEL IS A MIGRATORY ROUTE FOR BOTH FALL (PACIFIC SALMON, BROWN TROUT) AND SPRING (RAINBOW TROUT) SPAWNING SPECIES. TO PROTECT SPAWNING ACTIVITIES OF THESE SPECIES, A CONSTRUCTION TIMING WINDOW THAT PROHIBITS IN-WATER ACTIVITIES FROM SEPTEMBER 15TH TO JUNE 15TH (IN-WATER CONSTRUCTION PERMITTED FROM JUNE 16TH TO SEPTEMBER 14TH) WILL BE ENFORCED.

2. ALL CHANNEL ACTIVITIES MUST BE COMPLETED IN THE DRY USING CONVENTIONAL DAM AND PUMP METHODS (IN-STREAM PLUG AND BYPASS PUMPING), OR A COMBINATION OF DIVERSION PIPING AND DAM AND PUMP METHODS.

3. ANY FILL MATERIAL IS TO BE COMPACTED TO 95% SPD AND CONFIRMED WITH COMPACTION TESTING.

4. PROPER EROSION AND SEDIMENT CONTROL MEASURES TO BE USED AT ALL LOCATIONS TO PREVENT SEDIMENT FROM ENTERING DOWNSTREAM WATER COURSE.

5. BANKS TO BE REVEGETATED AS PER THE DESIGN DRAWINGS WITH ENVIROLOK, SEED AND STABILIZED WITH NATIVE VEGETATION AS PER SPECIFICATIONS.

6. BANKS TO BE FURTHER STABILIZED WITH EROSION CONTROL MATERIALS (ECM) WHILE VEGETATION IS ESTABLISHED.

7. CONTRACTOR TO RESTORE ANY DAMAGED AREAS TO THE EXISTING CONDITION OR TO THE SATISFACTION OF THE CLIENT AND PROJECT MANAGER.

ENVIRONMENTAL NOTES

1. REFUELLING ACTIVITIES SHOULD BE CONDUCTED IN AN ENVIRONMENTALLY RESPONSIBLE MANNER. THIS INCLUDES A KEEPING THE FUELLING OPERATIONS 30 M SETBACK FROM THE WATER'S EDGE, DRAINAGE PATHWAY OR UNLESS OTHERWISE DIRECTED BY THE PROJECT MANAGER. SPILL KITS AND SUFFICIENT AMOUNT OF SORBANT MATERIAL SHOULD BE AVAILABLE ON THE FUEL OR SERVICE VEHICLES.

2. ANY PART OF EQUIPMENT ENTERING THE WATER SHOULD BE FREE OF FLUID LEAKS AND EXTERNALLY CLEANED AND DEGREASED TO PREVENT ANY DELETERIOUS SUBSTANCES FROM ENTERING THE WATER.

3. ANY SPILLS RESULTING FROM REFUELLING OPERATIONS, HYDRAULIC LEAKS, MAINTENANCE ETC, MUST BE REPORTED IMMEDIATELY TO THE PROJECT MANAGER WHO WILL THEN NOTIFY THE SPILLS ACTION CENTRE IF REQUIRED.

4. ALL MATERIALS AND EQUIPMENT USED FOR THE PURPOSE OF SITE PREPARATION AND PROJECT COMPLETION SHOULD BE OPERATED AND STORED IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE (E.G. PETROLEUM PRODUCTS, SILT, DEBRIS, ETC) FROM ENTERING THE WATER.

5. THE AREA OF DISTURBANCE WITHIN THE CHANNEL AND ON THE STREAMBANKS MUST BE KEPT TO A MINIMUM. HEAVY EQUIPMENT TRAFFIC WILL BE RESTRICTED TO ESTABLISHED TRAVEL PATHWAYS.

6. STOCKPILE AND STAGING AREAS SHOULD BE WELL REMOVED FROM THE WATERCOURSE AND CONTAINED BY APPROPRIATE SEDIMENT AND EROSION CONTROLS.

7. SEDIMENT AND EROSION CONTROL MEASURES SHOULD BE INSTALLED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. THE INSTALLED MEASURES SHOULD BE ROUTINELY INSPECTED TO ENSURE THAT THEY ARE FUNCTIONING AS INTENDED. DISTURBED SOILS SHOULD BE STABILIZED IMMEDIATELY WITH SUITABLE PLANTINGS/SEED/MAT. MAINTENANCE SHOULD CONTINUE UNTIL SUCH TIME AS THE DISTURBED AREAS ARE SUFFICIENTLY STABILIZED THROUGH VEGETATIVE GROWTH.

8. WEATHER CONDITIONS SHOULD BE MONITORED TO ADEQUATELY PREPARE THE SITE FOR RAIN EVENTS.

9. AS CONSTRUCTION ACTIVITIES IN AND AROUND WATER IS CHALLENGING, WITH A SIGNIFICANT POTENTIAL FOR ENVIRONMENTAL EFFECT, IT IS RECOMMENDED THAT THE CONTRACTOR ORGANIZE AN IN-WATER CONSTRUCTION TEAM WHICH WILL CONSIST OF AN ENVIRONMENTAL MONITOR, SUPERVISOR, SELECTED MACHINE OPERATORS AND GENERAL LABOURERS. THIS TEAM WILL BE RESPONSIBLE FOR THE CONSTRUCTION ACTIVITIES WITHIN THE CHANNEL INCLUDING THE CONSTRUCTION OF THE CHANNEL AND RE-GRADING OF THE STREAMBANKS AND FLOODPLAINS.

10. THE PROPONENT/CONTRACTOR IS RESPONSIBLE FOR UNDERTAKING ACTIVITIES IN COMPLIANCE WITH THE MIGRATORY BIRDS CONVENTION ACT (1994).

CONSTRUCTION ACCESS:

1. ACCESS TO THE CONSTRUCTION SITE WILL BE THROUGH THE CROATIAN PARISH PARK - CHURCH OF THE CROATIAN MARTYRS PROPERTY.

2. ACCESS PATH IS TO FOLLOW ROUTE AS SHOWN ON PLANS.

3. TREES TO BE TRIMMED OR REMOVED FROM ACCESS AS APPROVED BY PROJECT MANAGER AND MUNICIPALITY.

4. SAFETY FENCE TO BE ERECTED AS REQUIRED TO LIMIT PUBLIC ACCESS TO TEMPORARY CONSTRUCTION ACCESS ROAD AND CONSTRUCTION SITE.

5. SITE CONSTRUCTION ACTIVITY WILL INCLUDE THE REPAIR OF THE CREEK ACCESS AND EGRESS AREA AS PER DESIGN.

6. UPON COMPLETION OF THE CONSTRUCTION, THE ACCESS WAY IS TO BE REPAIRED TO EXISTING CONDITIONS OR BETTER.

7. CONTRACTOR TO MEET ON SITE WITH THE PROJECT MANAGER, CONSERVATION AUTHORITY STAFF AND MUNICIPAL STAFF PRIOR TO INITIATION OF CONSTRUCTION.

LANDSCAPE NOTES:

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH BY-LAWS AND CODES HAVING JURISDICTION OVER SITE LOCATION.

2. COMPLETE ALL WORK TO THE SATISFACTION OF THE PROJECT MANAGER. REPORT ANY CHANGES, DISCREPANCIES OR SUBSTITUTIONS TO THE PROJECT MANAGER FOR REVIEW. OBTAIN APPROVAL FROM THE PROJECT MANAGER BEFORE PROCEEDING.

3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE EXISTING SERVICE LOCATIONS.

4. EXACT LOCATIONS OF PLANT MATERIAL WILL BE DETERMINED BY PLACEMENT OF SITE SERVICES SUCH AS HYDRO VAULTS, METERS, UTILITIES ROOF RAIN WATER LEADERS, DRIVEWAYS, LIGHT STANDARDS, ETC.

5. ALL PLANT MATERIAL LOCATIONS TO BE STAKED OR MARKED OUT AND APPROVED BY PROJECT MANAGER PRIOR TO INSTALLATION.

6. SUPPLY ALL PLANT MATERIAL IN ACCORDANCE WITH THE CANADIAN STANDARDS FOR NURSERY STOCK (7TH ED.).

7. INSTALL PLANT MATERIAL ACCORDING TO DETAILS SHOWN.

8. DISTURBED SOIL AREAS AROUND TREES AND SHRUBS ARE TO BE COVERED WITH SHREDDED CONIFER BARK MULCH SUCH AS CANADA RED OR GRO BARK. SPM MULCH, OR APPROVED EQUIVALENT. ALTERNATIVE MULCHES MUST BE APPROVED BY THE PROJECT MANAGER.

9. CONTRACTOR TO UTILIZE LAYOUT DIMENSIONS WHERE PROVIDED.

10. PROVIDE PLANTING BED AREA AS NOTED ON THE DRAWING OR TO ACCOMMODATE MATURE SIZE OF PLANT MATERIAL.

11. ALL SUPPORT SYSTEMS MUST BE REMOVED TO THE SATISFACTION OF THE PROJECT MANAGER ONCE THE TREE IS ESTABLISHED.

12. SUPPLY AND PLACE TOPSOIL IN ACCORDANCE WITH OPSS 570 TO A MINIMUM DEPTH OR 100MM UNLESS OTHERWISE SPECIFIED.

13. SUPPLY AND PLACE SOD IN ACCORDANCE WITH OPSS 571 UNLESS OTHERWISE SPECIFIED.

14. SUPPLY AND PLACE SEED IN ACCORDANCE WITH OPSS 572 UNLESS OTHERWISE SPECIFIED.

15. CONTRACTOR TO PROVIDE NECESSARY EROSION CONTROL PROTECTION AS REQUIRED TO ENSURE SOIL STABILIZATION AND PROPER SEED GERMINATION.

16. ALL DIMENSIONS IN MM UNLESS OTHERWISE NOTED.

17. IF DISCREPANCIES ARISE BETWEEN PLANT MATERIAL COUNT SHOWN ON DRAWING AND PLANT LIST THE DRAWING SHALL BE CONSIDERED CORRECT.

18. CONTRACTOR TO PROVIDE MINIMUM 1 YEAR WARRANTY FROM DATE ACCEPTED ON ALL WORK UNLESS OTHERWISE SPECIFIED.

19. ANY SITE PLAN OR GRADING AND SERVICING SHOWN IS FOR INFORMATION ONLY. REFER TO APPROVED DRAWINGS.

CONSTRUCTION SEQUENCING AND STAGING NOTES:

1. CONTRACTOR TO NOTIFY MUNICIPALITY, AGENCIES AND PROJECT MANAGER TWO (2) DAYS PRIOR TO ACTUAL CONSTRUCTION.

2. THE CONTRACTOR SHALL PROVIDE GENERAL ARRANGEMENT DRAWINGS AND A STAGING PLAN WITH THE PROPOSED BYPASS METHODOLOGY AND DEMONSTRATE THAT THE APPROACH CAN ADEQUATELY ADDRESS THE ENVIRONMENTAL AND EXISTING SITE CONDITIONS (VARYING FLOW CONDITIONS, CHANNEL CAPACITIES, WET WEATHER RESPONSE).

3. CONSTRUCTION STAGING MUST HAVE REGARD FOR THE ENVIRONMENTAL ASPECTS OF THE PROPOSED CONSTRUCTION. THIS WILL ENSURE THAT AMPLE TIME IS PROVIDED TO ENSURE THE TIMELY ARRIVAL OF REQUIRED EQUIPMENT AND MATERIALS AND THE APPROPRIATE ALLOCATION OF RESOURCES.

4. INSTALL CONSTRUCTION FENCING AND SILT FENCING AS PER SPECIFICATIONS. FENCE TO BE INSTALLED PRIOR TO CONSTRUCTION AND SHALL BE THE LIMIT OF CONSTRUCTION ACTIVITY.

5. PLACE DAM & PUMP CONTROLS IN DESIGNATED AREA.

6. REMOVE AND BANK MATERIALS AND REMOVED VEGETATION.

7. CONSTRUCT UPPER SLOPE ARMOURSTONE AND RIPRAP TREATMENT BEGINNING AT THE TOP OF THE CHANNEL AND WORKING DOWNSTREAM.

8. STRIP AND STOCKPILE TOPSOIL FROM MIDDLE SECTION OF CHANNEL.

9. CONSTRUCT MIDDLE SECTION (MEANDERING CHANNEL) OF CHANNEL AS SHOWN ON PLANS.

10. CONSTRUCT FINAL SECTION OF CHANNEL (STEP/POOL SEQUENCE)

11. COMPLETE SEEDING, COIR AND PLANTING AS PER APPROVED PLANS AND SPECIFICATIONS.

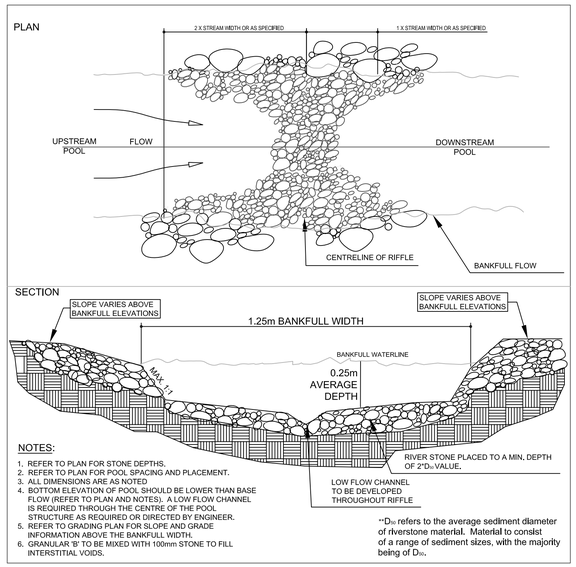
12. STABILIZATION OF ALL SLOPES SHOULD BE COMPLETED AFTER EACH SECTION OF CHANNEL IS COMPLETED, AS NOTED ON PLAN.

13. REMOVE ALL EXCESS MATERIAL STOCKPILED ON SITE.

14. REMOVE ANY EROSION AND SEDIMENT CONTROLS ONCE ALL VEGETATION HAS BECOME SUFFICIENTLY ESTABLISHED.

15. AFTER STABILIZATION OF THE BANKS IS CONFIRMED, FLOW IS TO BE REINITIATED INTO CHANNEL UNDER SUPERVISION OF THE PROJECT FLUVIAL GEOMORPHOLOGIST.

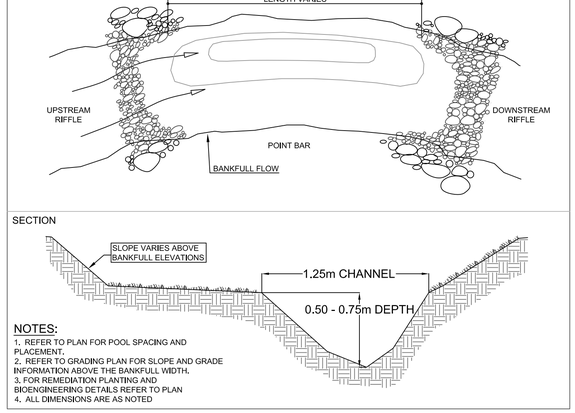
16. CONTRACTOR SHALL ENSURE THAT CHANNEL REMAINS ISOLATED FROM FLOWS UNTIL THE BANK WORK IS COMPLETE.



NOTES:
1. REFER TO PLAN FOR STONE DEPTHS.
2. REFER TO PLAN FOR POOL SPACING AND PLACEMENT.
3. ALL DIMENSIONS ARE AS NOTED
4. BOTTOM ELEVATION OF POOL SHOULD BE LOWER THAN BASE FLOW (REFER TO PLAN AND NOTES). A LOW FLOW CHANNEL IS REQUIRED THROUGH THE CENTRE OF THE POOL STRUCTURE AS REQUIRED OR DIRECTED BY ENGINEER.
5. REFER TO GRADING PLAN FOR SLOPE AND GRADE INFORMATION ABOVE THE BANKFULL WIDTH.
6. GRANULAR 'B' TO BE MIXED WITH 100mm STONE TO FILL INTERSTITIAL VOIDS.

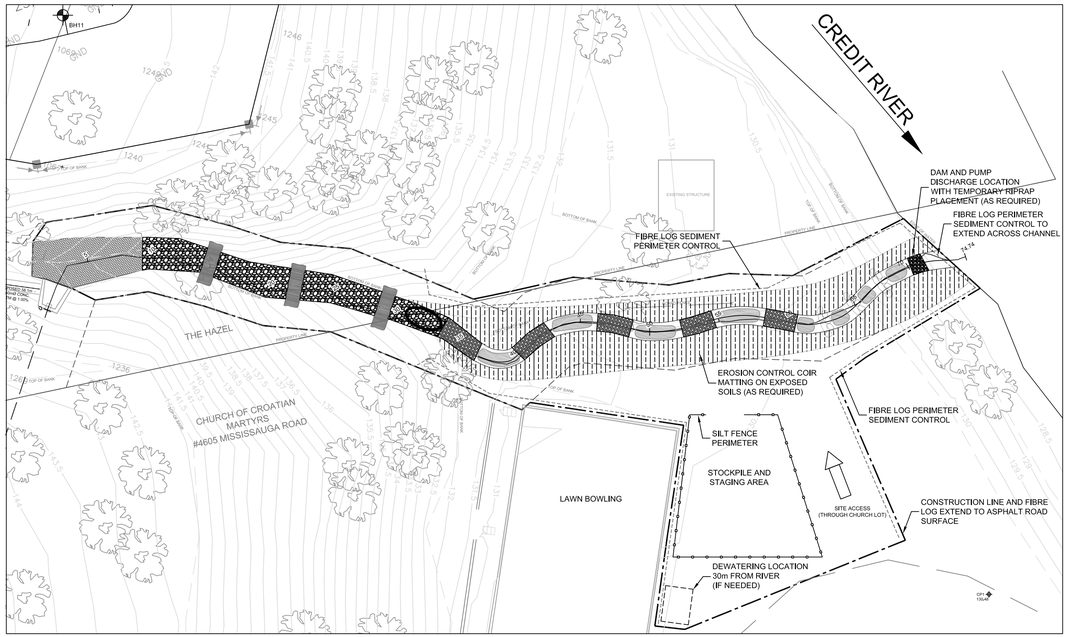
**Dn refers to the average sediment diameter of riverstone material. Material to consist of a range of sediment sizes, with the majority being of Dn.

D1 CHANNEL RIFFLE (TYPICAL)
N.T.S.

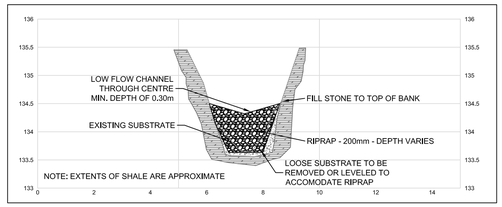


NOTES:
1. REFER TO PLAN FOR POOL SPACING AND PLACEMENT.
2. REFER TO GRADING PLAN FOR SLOPE AND GRADE INFORMATION ABOVE THE BANKFULL WIDTH.
3. FOR REMEDIATION PLANTING AND BIOENGINEERING DETAILS REFER TO PLAN
4. ALL DIMENSIONS ARE AS NOTED

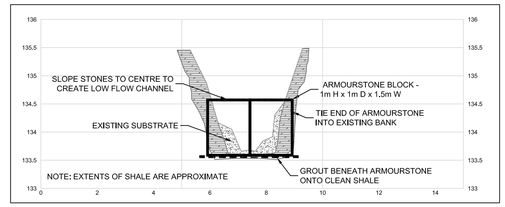
D2 CHANNEL POOL (TYPICAL)
N.T.S.



EROSION AND SEDIMENT CONTROL PLAN



TYPICAL RIPRAP CROSS SECTION



TYPICAL ARMOURSTONE CROSS SECTION

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	SIZE	CONT	MATURE HEIGHT (m)	MATURE SPREAD (m)	QNTY.
	SHRUBS						
cs	Cornus stolonifera	Red Osier Dogwood	50cm	#3cont	2.0	2.5	10
seq	Salix bebbiana	Bebb's Willow	50cm	#3cont	3.0	2.0	10
	TOTAL						20

SEED MIX NOTES:

1. CONTRACTOR TO SOW NURSE CROP OF OATS AND BARLEY OVER EXPOSED NATURAL AREAS. NURSE CROP TO CONSIST OF 50% OATS (Avena sativa) and 50% Buckwheat (Fagopyrum esculentum) - TO BE SEEDED AT A RATE OF 22kg/ HECTARE.

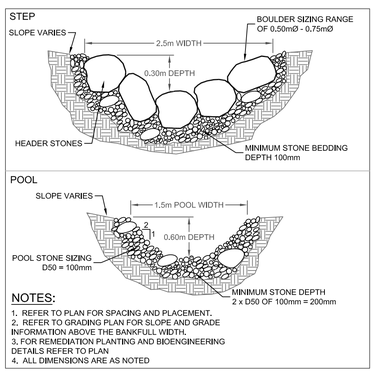
2. UPON COMPLETION OF WORK ANY DISTURBED AREAS ARE TO BE STABILIZED AND RESTORED WITH NATIVE SEED MIX ON 150mm TOPSOIL. SEE BELOW FOR SEED MIX:

NATIVE SEED MIX IS BASED ON CVC SEED MIX 7 - UPLAND NATIVE MEADOW MIX OR APPROVED EQUIVALENT. APPLY AT A RATE OF 22-25 KG/HECTARE.

- Blackeyed Susan (Rudbeckia hirta) 10%
- Blue Wood (Heart Leaved Aster) (Aster cordifolius) 1%
- Canada Anemone (Anemone canadensis) 1%
- Canada Goldenrod (Soldigado canadensis) 2%
- Common Milkweed (Asclepias syriaca) 2%
- Evening Primrose (Oenethera biennis) 25%
- Grass Leaved Goldenrod (Euthamia graminifolia) 1%
- Meadow/Open Feild Sedge (Carex granularis) 15%
- New England Aster (Aster novae-angla 1%
- Riverbank Wild Rye (Elymus riparius) 40%
- Virgins Bower (Clematis virginiana) 1%
- Wild Bergamot (Monarda fistulosa) 1%

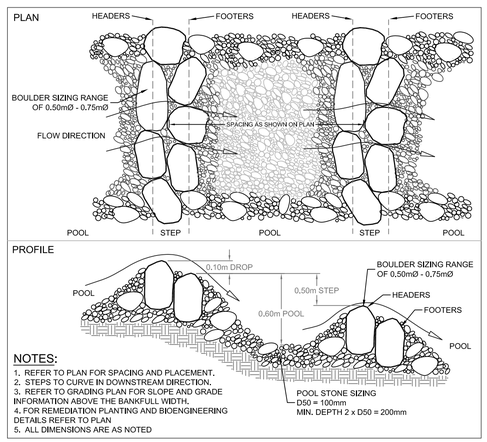
TOTAL - 100%, SEED RATE: 22-25kg/ha

USE OF HAND OPERATED OR PUSH SPREADER IS REQUIRED



NOTES:
1. REFER TO PLAN FOR SPACING AND PLACEMENT.
2. REFER TO GRADING PLAN FOR SLOPE AND GRADE INFORMATION ABOVE THE BANKFULL WIDTH.
3. FOR REMEDIATION PLANTING AND BIOENGINEERING DETAILS REFER TO PLAN
4. ALL DIMENSIONS ARE AS NOTED

D4 STEP / POOL CROSS SECTION (TYPICAL)
N.T.S.



NOTES:
1. REFER TO PLAN FOR SPACING AND PLACEMENT.
2. STEPS TO CURVE IN DOWNSTREAM DIRECTION.
3. REFER TO GRADING PLAN FOR SLOPE AND GRADE INFORMATION ABOVE THE BANKFULL WIDTH.
4. FOR REMEDIATION PLANTING AND BIOENGINEERING DETAILS REFER TO PLAN
5. ALL DIMENSIONS ARE AS NOTED

D3 STEP / POOL (TYPICAL)
N.T.S.

No.	DATE	BY	REVISIONS
1	FEB. 22, 2017	NG	REVISED AS PER COMMENTS FROM CITY

APPROVALS

MUNICIPAL

MANAGER OF DEVELOPMENT, ENVIRONMENTAL & TRANSPORTATION ENGINEERING

DATE

REGIONAL

COMMISSIONER OF PUBLIC WORKS

DIRECTOR OF DESIGN & CONSTRUCTION

FIELD NOTES:

LICENSED PROFESSIONAL ENGINEER — E. GAZENDAM — NOV. 15, 2016 — PROVINCE OF ONTARIO

SCALE:

DATE: Nov. 4, 2016

CONSULTANT

water's edge ENVIRONMENTAL SOLUTIONS TEAM LTD.

PACE DEVELOPMENTS

1745-1775 THORNY BRAE PLACE
"THE HAZEL"

CITY OF MISSISSAUGA

PLAN, PROFILE AND CROSS SECTION

DESIGN	CAD FILENAME
NG / EG	DET1
CHECKED	MUNICIPAL DRAWING NO.
EG	WE 15045-02

APPENDIX I

EVALUATION OF WOODLANDS AND CORE VALLEY & STREAM CORRIDORS

Table I.1 - Criteria and Thresholds for the Identification of Core, Natural Areas and Corridors (NAC) and Potential Natural Areas and Corridors (PNAC), and Significant *Woodlands* *(adapted from the Region of Peel Official Plan - Office Consolidation October 2014)*

ROP Category	Size	Age	Linkage	Proximity	Surface Water Quality	Significant Species and Communities (1)(2)(3)	Evaluation
Core Maintains Integrity of the System	Rural System: Any *woodland* =/> 16 ha Urban System: Any *woodland* =/> 4 ha	Any *woodland* =/> 4 ha containing at least 0.5 ha of w*oodland* in native trees older than 100 years and having late successional characteristics (excludes plantations)	N/A	N/A	N/A	Any *woodland* =/> 4 ha that supports any of the following: i. any G1, G2, G3, S1, S2 or S3 plant or animal species, or community as designated by NHIC; or ii. any species designated by COSEWIC or COSSARO as *Threatened, Endangered* or of Special Concern; or iii. The following forest communities: FOC 1-2, FOM 2-1, FOM 2-2, FOM 6-1, FOD 1-1, FOD 1-2, FOD1-4, FOD 2-2, FOD 2-3 or FOD 6-2	• Size ○ The property is in an urban area ○ Total woodland area on subject property (Units 2, 4, 5a, 5b, 5c, 6b): ~0.69 ha. ○ Total contiguous woodland area (incl. valley slope to the east/south): ~1.95 ha • Age. Immature to mid-aged; no older growth present on subject property and no late successional characteristics • SS&C: One S3 / Endangered species was recorded (Butternut). However, the woodland is well below the size threshold. **Conclusion**: does not meet any criteria
NAC Supports Integrity of the System	Rural System: Any *woodland* =/> 4 ha up to 16 ha Urban System: Any *woodland* =/> 2 ha up to 4 ha	Any *woodland* =/> 0.5 ha and less than 4 ha and containing at least 0.5 ha of *woodland* in native trees older than 100 years and having late successional characteristics (excludes plantations)	Any *woodland* =/> 0.5 ha supporting a *Significant* linkage function, as determined through a natural heritage study approved by the Region or area municipality	Any *woodland* =/> 0.5 ha within 100 m of another *significant Feature* supporting a *Significant* Ecological Relationship between the features	Any *woodland* =/> 0.5 ha within 30 m of a *watercourse*, *surface water features* or any *wetland that is or can be identified as a wetland in accordance with the Ontario Wetland Evaluation System (OWES).*	Any *woodland* =/> 0.5 ha up to 4 ha that supports any of the following: i. any G1, G2, G3, S1, S2 or S3 plant or animal species, or community as designated by NHIC; or ii any species designated by COSEWIC or COSSARO as *Threatened, Endangered* or of Special Concern; or iii. The following forest communities: FOC 1-2, FOM 2-1, FOM 2-2, FOM 6-1, FOD 1-1, FOD 1-2, FOD1-4, FOD 2-2, FOD 2-3 or FOD 6-2	• Size ○ The property is in an urban area ○ Total woodland area on subject property (Units 2, 4, 5a, 5b, 5c, 6b): ~0.69 ha. ○ Total contiguous woodland area (incl. valley slope to the east/south): ~1.95 ha • Age. Immature to mid-aged; no older growth present on subject property and no late successional characteristics • Linkage. Valley portion of the woodland provides a linkage function as part of the Credit River valley. Communities on the tablelands are within 100 m of the Credit River but do not support a significant ecological relationship between the two features. • Proximity. Woodland communities within the site are in proximity to or are included within a significant valleyland (Credit River). Woodland communities on the tablelands do not, however, provide support for a significant ecological relationship between the features. • Surface Water Quality. A portion of the woodland (i.e., Veg. Units 2, 5a and 5b) is within 30 m of the Credit River, while Veg. Units 4 and 6B are located greater than 30 m away. • SS&C: One S3 / Endangered species was recorded (Butternut) in Unit 5b (FOD7-2). **Conclusion**: The valley portion of the woodland (i.e., the valley portions of Veg. Units 5a and 5b) and a portion of 5b on the tablelands surrounding the Butternut meet 3 criteria (linkage, surface water quality, significant species and communities). The tableland communities Unit 2 (CUS1), Unit 4 (FOD7-1), Unit 5c (FOD7-2), and Unit 6b (CUW1) do not meet the criteria, even when combined with the communities along the valley as they do not provide an important ecological value to the existing valley forest. No NAC communities are present within the proposed development envelope.

ROP Category	Size	Age	Linkage	Proximity	Surface Water Quality	Significant Species and Communities (1)(2)(3)	Evaluation
PNAC May Support Integrity of the System	*Cultural woodlands* and *cultural savannahs* => 4 ha in the Rural System and => 2 ha in the Urban System and Rural Service Centres	Core and NAC criteria apply. Any *woodland* =/> 0.5 ha and less than 4 ha and containing at least 0.5 ha of *woodland* in native trees older than 100 years and having late successional characteristics (excludes plantations)	Core and NAC criteria Apply. Any *woodland* =/> 0.5 ha supporting a *Significant* linkage function, as determined through a natural heritage study approved by the Region or area municipality	Core and NAC criteria apply. Any *woodland* =/> 0.5 ha within 100 m of another *significant Feature* supporting a *Significant* Ecological Relationship between the features	Core and NAC criteria apply. Any *woodland* =/> 0.5 ha within 30 m of a *watercourse*, *surface water features* or any *wetland that is or can be identified as a wetland in accordance with the Ontario Wetland Evaluation System (OWES).*	Core and NAC criteria apply. Any *woodland* =/> 0.5 ha up to 4 ha that supports any of the following: i. any G1, G2, G3, S1, S2 or S3 plant or animal species, or community as designated by NHIC; or ii any species designated by COSEWIC or COSSARO as *Threatened, Endangered* or of Special Concern; or iii. The following forest communities: FOC 1-2, FOM 2-1, FOM 2-2, FOM 6-1, FOD 1-1, FOD 1-2, FOD1-4, FOD 2-2, FOD 2-3 or FOD 6-2	Evaluation assumes that Units 5a, and 5b are NACs; the remaining features under evaluation are Unit 2 (CUS1), Unit 4 (FOD7-1), Unit 5c (FOD7-2, and Unit 6b (CUW) • Size ○ Site is in an urban area ○ Excluding Units 5a and 5b, the total remaining woodland area on subject property (Units 2, 4,, 5c, 6b): ~0.46 ha. • Age. Immature; no older growth present on subject property and no late successional characteristics. • Linkage. No linkage function. Former farmstead adjacent to vacant residential lands, with no natural features to the north / west. • Proximity. Within 100 m of the NAC, but outside of the Credit River valley and does not support a significant ecological relationship between the features. Does not meet size threshold on its own, but would meet the threshold when combined with the adjacent tablelands woodlands • Surface Water Quality. Not within 30 m of the Credit River and below the size threshold. • SS&C. No significant species or communities present. **Conclusion**: When combined with the adjacent tableland valleylands, the tablelands meet the criteria for inclusion as a PNAC based on size and proximity, but would not meet the criteria on its own.
	all other *woodlands* > 0.5 ha	N/A	N/A	N/A	N/A	N/A	• No other woodlands >0.5 ha are present. **Conclusion**: does not meet criterion

Table H.2. Criteria and Thresholds for the Identification of Core Valley and Stream Corridors *(adapted from the Region of Peel Official Plan - Office Consolidation October 2014)*

Core Valley and Stream Corridor Component	*Mapping Criteria*	*Evaluation*
▪ Main branches, *major tributaries*, other tributaries and identified watercourses draining directly to Lake Ontario ▪ *Valley and stream corridors* are the natural resources associated with the river systems characterized by their landform, features and functions, and include associated ravines.	▪ Main branches, *major tributaries* and watercourses having direct drainage to Lake Ontario are to be mapped from their outlet to the furthest upstream extent of their defined valley landform (i.e., mapped to limit of crest of slope) ▪ Other tributaries are to be included and mapped to the limit of their defined valley portion if they meet the following criteria: • contains habitat of aquatic *endangered or threatened species*; or • watercourse crosses municipal boundaries and provides linkage to other Core Areas of the Greenlands System. ▪ Excludes ill-defined *headwater* drainage features including created *headwater valley/stream corridors*, discontinuous defined valley features and other non-valley landforms	▪ Credit River valley is a Core Valley and Stream Corridor – mapped on Schedule A of the ROP as coincident with the top of valley slope ▪ It is unclear if the associated un-named tributary is mapped as Core valleyland **Conclusion**: Credit River valley meets criteria as a *Core Valley and Stream Corridor*
▪ Ill-defined sections of major valleys	▪ Ill-defined sections are to be illustrated using regulatory floodplain and meander belt hazards whichever is greater unless site specific assessment has determined valley width in accordance with the text of this Plan ▪ Shown schematically and subject to site specific evaluation to confirm width of Core *valley and stream corridor*	▪ Top of valley slope is defined / clear. ▪ Confirmed by CVC 2004, with updated LTSSL as part of current study (Soil-Eng; March 2019).
▪ Associated Ravines	Associated ravines within the Urban System are to be included if meeting one of the following criteria: • important ecological functions related to the valley landform; • habitat for endangered/threatened species; • linkage to other natural features of the Greenlands System; • flood and erosion hazards; or • restoration potential. Associated ravines within the Rural System are not considered Regional Core valley and stream corridors ▪ significance is determined in accordance with the Town of Caledon Official Plan policies.	▪ The portion of the un-named tributary ravine, as defined by the confirmed top of valley slope (2004) is defined / clear. Confirmed by CVC 2004, with updated LTSSL as part of current study (Soil-Eng; March 2019). ▪ It is contiguous with the Credit River valley to the east, but does not provide a linkage to other natural heritage features to the west / north due to major road barriers and development. ▪ This feature does provide habitat for an endangered species within the defined valley portion: Butternut **Conclusion**: associated un-named tributary ravine (i.e., within the defined valley portion) meets criteria as a *Core Valley and Stream Corridor*

APPENDIX J

TREE INVENTORY & PRESERVATION PLAN

Baker Turner inc

Landscape Architecture | Site Design

Edwin S. Baker BLA.OALA.FCSLA
Timothy Turner BLA.OALA.CSLA
Michael Thistle BLA.OALA.CSLA

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8501 Mississauga Road
Brampton ON L6Y 5G8

Tel: (905) 453.9398
E: tba@bakerturner.com
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2462357 Ontario Inc.
Attn: Peter Sciavilla
30 Wertheim Court, Bldg A unit 3
Richmond Hill, ON

March 25, 2019

Re: 1745, 1765 & 1775 Thorny Brae Place - Tree Inventory & Preservation Plan (For Development Site)

Baker Turner Inc completed a tree inventory for lands at 1745, 1765 & 1775 Thorny Brae Place in support of a proposed residential infill development. Information for this plan was derived from data gathered on site using accepted arboricultural practices. This includes a visual examination of all above ground parts of the tree for structural defects and signs of health and vigour. All examinations took place from the ground plane; no trees were cored, probed or climbed. There was also no detailed inspection of the root crown where excavation would have been required. The inventory describes the health, structural stability of the trees and identifies the potential hazards of the trees (to a reasonable extent).

Tree preservation guidelines that are provided in this report are generally suitable for the trees as determined by the visual assessment however, even with complete supervision, roots in an urban environment are unpredictable and the assessment in this inventory is valid only at the time of inspection.

In total 144 trees are recommended for removal, 97 of which to be removed due to construction on the subject property:

80 private trees between 10-30cm DBH are recommended for removal:

- 44 trees due to construction
- 36 trees due to poor condition

- 39 private trees over 31cm DBH are recommended for removal:
  - 28 trees due to construction
  - 11 trees due to poor condition
- 25 City owned trees between 10-30cm DBH (including 1 ash tree) are recommended for removal due to construction

Nick Taylor
Baker Turner Inc.
ISA Certified Arborist, ON-2068A

TREE PROTECTION RECOMMENDATIONS:

- Install hoarding for subsequent municipal review/approval.
- Hoarding may be moved temporarily to provide access for tree removal only. These trees should be infilled away from protected areas to avoid pulling and breaking of roots of trees to remain.
- Pruning, if required, should be done prior to construction and in accordance with current arboricultural practices.
- Storage of any materials, fill, vehicles/equipment, and disposal of liquids is not permitted within 1m of protected areas.
- Excavation in close proximity to protected areas are to be undertaken with a certified arborist present.
- Roots encountered due to excavation are to be cut with a clean sharp blade. Tearing and ripping of roots is not permitted.
- Hydrovacing is recommended as the preferred method for excavation. within 1m of protected areas.
- Exposed roots are to be covered immediately with mulch or topsoil and watered thoroughly. A light coloured tarpaulin may also be used to prevent root desiccation.
- Deep root fertilize (3:1:1) following backfilling.
- Trees should be re-assessed periodically in order to maintain an up to date understanding of health and structure.

TREE INVENTORY

Tree No.	Species	dBh (cm)	Measure to Drip Line diameter (m)	Biological Health	Structural Condition	Recommended Action	Comments	Location: Municipal Property	Location: Subject Property or Neighbouring Property Near the Improvement	Location: Boundary (5m to PL)
1	Pinus nigra	44	8	ML	M	RC	2L, DB (med), PL, slumped branches, diplodia		X	
2	Pinus nigra	32	8	L	ML	RC	DB (high), UB (S), low vigor, sparse canopy		X	
3	Picea pungens	45	6	M	M	RC	15'LS, leaking sap		X	
4	Pinus sylvestris	38	8	M	M	RC	DB (med), MB, XB		X	
5	Fraxinus pennsylvanica	22	6	L	L	R	EAB		X	
6	Fraxinus pennsylvanica	27	6	L	L	R	EAB		X	
7	Picea glauca	31	8	M	M	RC	PL, DB (small), TB, chloratic		X	
8	Ulmus pumila	54	12	ML	ML	R	Dutch Elm Disease, 2L, TB, requires emergency pruning		X	
9	Malus spp.	26	7	ML	ML	RC	50% TD (rot, large wound), MB		X	
10	Ulmus laevis	23	7	ML	ML	R	Dutch Elm Disease, TB, DB (med)		X	
11	Ulmus laevis	23	7	ML	ML	R	Dutch Elm Disease, TB, DB (med)		X	
12	Fraxinus pennsylvanica	35	7	L	L	R	EAB		X	
13	Pinus nigra	44	8	MH	M	RC	20'LSE, DB (small)		X	
14	Fraxinus pennsylvanica	18	6	L	L	R	EAB		X	
15	Picea glauca	12,15	5	H	MH	RC	2L		X	
16	Fraxinus pennsylvanica	16,15	7	L	L	R	EAB		X	
17	Fraxinus pennsylvanica	13,8	5	L	L	R	EAB		X	
18	Juniperus virginiana	15	3	M	M	RC	dead tips		X	
19	Thuja occidentalis	11,15,16	5	M	M	RC	3L, 5'LS		X	
20	Ulmus laevis	54	13	ML	M	R	Dutch Elm Disease, MB, DB (small), TB		X	
21	Morus alba 'Pendula'	22	3	M	ML	RC	TD 50% (large & small wounds)		X	
22	Morus alba (reverted)	36	6	M	ML	RC	MB		X	
23	Malus spp.	39,42	8	M	M	RC	2L, MB, WS, 50% TD (rot), large wound		X	
24	Malus spp.	16	4	M	M	RC	MB, 15'LS		X	
25	Acer ginalla	17	6	M	ML	R**	MB	X		
26	Elaeagnus angustifolia	8,11	6	M	ML	R**	2L, PL, WS, WB	X		
27	Elaeagnus angustifolia	18	6	M	ML	R**	MB, PL, WS	X		
28	Elaeagnus angustifolia	16	6	M	ML	R**	MB, PL, WS, WB	X		
29	Elaeagnus angustifolia	13	6	M	L	R**	MB, PL, WS, 45'LS	X		
30	Elaeagnus angustifolia	13.5	5	M	M	R**	PL, WS	X		
31	Elaeagnus angustifolia	18	7	ML	L	R**	2L, TB, WS, WB, TD 25%	X		
32	Elaeagnus angustifolia	16	6	ML	ML	R**	PL, WS, UBS	X		
33	Elaeagnus angustifolia	16	5	M	ML	R**	PL, WS	X		
34	Acer ginalla	15	6	M	M	R**		X		
35	Elaeagnus angustifolia	10	3	ML	ML	R**	PL, WS	X		
36	Elaeagnus angustifolia	20	7	M	ML	R**	WS, UBS	X		
37	Elaeagnus angustifolia	12	6	ML	L	R**	WS, 60'LS	X		
38	Elaeagnus angustifolia	20	7	M	ML	R**	WS, WB, UBS	X		
39	Elaeagnus angustifolia	14	6	M	ML	R**	WS, WB, UBS	X		
40	Elaeagnus angustifolia	14	5	M	ML	R**	WS, WB, UBS	X		
41	Elaeagnus angustifolia	16	6	M	ML	R**	WS, WB, UBS	X		
42	Elaeagnus angustifolia	15,19	7	M	ML	R**	2L, DB, WS, 15'LS	X		
43	Fraxinus pennsylvanica	16	4	L	L	R**	EAB	X		
44	Ulmus laevis	15,18x2,24	12	ML	ML	R	Dutch Elm Disease, 4L, 30'LS		X	
45	Ulmus laevis	17,20,29,33	13	ML	ML	R	Dutch Elm Disease, 4L, IB		X	
46	Ulmus laevis	17	6	ML	ML	R	Dutch Elm Disease, 20'LNW		X	
47	Ulmus laevis	15	6	ML	ML	R	Dutch Elm Disease, MB		X	
48	Ulmus laevis	16	6	ML	ML	R	Dutch Elm Disease, 2L, MB		X	
49	Acer platanoides	16	5	ML	M	R**	Dutch Elm Disease, MB	X		
50	Ulmus laevis	21	4	ML	M	R	Dutch Elm Disease		X	
51	Acer platanoides	20	6	MH	MH	R**		X		
52	Ulmus laevis	13,13	6	ML	M	R	Dutch Elm Disease		X	
53	Acer platanoides	17	6	M	M	R**	frost crack	X		
54	Ulmus laevis	14	5	M	M	R	Dutch Elm Disease		X	
55	Acer platanoides	21	6	MH	MH	R**		X		
56	Acer platanoides	19	6	MH	MH	R**		X		
57	Ulmus laevis	14,5	4	ML	M	R	Dutch Elm Disease		X	
58	Ulmus laevis	20	6	ML	M	R	Dutch Elm Disease		X	
59	Acer platanoides	27	8	MH	M	R**	MB	X		
60	Ulmus laevis	20	6	ML	M	P	Dutch Elm Disease, MB		X	
61	Populus tremuloides	22	5	H	H	RC			X	
62	Pinus sylvestris	16	6	M	M	RC	TB, sup		X	
64	Thuja occidentalis	18	3	M	H	RC	DB (small)		X	
65	Thuja occidentalis	14,16,21,22	4	H	M	RC	4L		X	
66	Thuja occidentalis	14,16,19	4	H	M	RC	3L		X	
67	Thuja occidentalis	9,13x3,16,19	4	H	M	RC	6L		X	
68	Thuja occidentalis	20,21,21	4	H	H	RC	3L, DB (small)		X	
69	Pinus nigra	41	8	M	H	RC	DB (small), dead tips		X	
70	Picea pungens	32	6	M	M	RC	DB (small), UC (S)		X	
71	Picea pungens	32	6	M	H	RC	DB (small)		X	
72	Picea pungens	39	6	M	H	RC	DB (small)		X	
73	Pinus sylvestris	30	6	L	L	R	Dead		X	
74	Pinus sylvestris	28	6	L	L	R	Dead		X	
75	Pinus sylvestris	22	4	L	L	R	Dead		X	
76	Ulmus americana	15	8	ML	ML	R	Dutch Elm Disease, 15'LW		X	
77	Pinus sylvestris	27	6	M	M	RC	DB (small)		X	
78	Pinus sylvestris	26	4	M	M	RC	DB (small)		X	
79	Pinus sylvestris	28	6	M	M	RC	DB (small)		X	
80	Pinus sylvestris	32	6	M	M	RC	DB (small)		X	
81	Pinus sylvestris	40	6	M	M	RC	DB (small)		X	
82	Pinus sylvestris	21	4	ML	M	RC	DB (med), sparse canopy		X	
83	Pinus sylvestris	24	4	M	M	RC	DB (med)		X	
84	Pinus sylvestris	38	6	ML	M	RC	DB (med), sparse canopy		X	
85	Pinus sylvestris	32	6	L	L	R	90%D		X	
86	Pinus sylvestris	28	6	L	L	R	Dead		X	
87	Juglans nigra	16	6	M	M	RC	2L, WS		X	
88	Juglans nigra	18,30	10	H	H	RC	2L, WS		X	
89	Ulmus laevis	12,18,28	6	L	L	R	Dutch Elm Disease, 90%D		X	
90	Juglans nigra	15	5	M	M	RC			X	

TREE INVENTORY LEGEND

Biological Health
H (High) - No apparent diseases or symptoms, moderate to high vigour.
M (Medium) - Minor diseases and/or symptoms, moderate vigour.
L (Low) - Major disease and/or symptoms, poor vigour.

Structural Condition
H (High) - No defects, well-developed crown.
M (Medium) - Minor structural defects.
L (Low) - Major structural defects.

Recommended Action
P - Preserve
R - Remove for Poor Condition
RC - Remove for Construction
R** - Remove with Town's Approval

Comments
BF Backfilled
CS Compacted soil
DB Dead branches
EAB Emerald Ash Borer
G Girdling
HA Hazard
IB Included bark
LS Lean showing direction
2L 2 leaders or codominant stems
MB Multibranched node
MS/ML Multistem

Trees #63, 137, and 198 were skipped during the tagging process.
Trees #241-270 are not relevant to the proposed development work.

Trees less than 15cmØ caliper, and large shrubs exist on site. These non-regulated trees should be considered when reading this plan. For any work that may be done it is the contractors responsibility to determine the extent of possible removals by field review prior to submission of quotations for removals work.

91	Juglans nigra	12,12,15	5	H	M	RC	18		X
92	Populus canadensis	22	3	M	M	-			X
93	Juglans nigra	13,20	5	MH	ML	-	2L, grafting		X
94	Ulmus americana	15	5	M	M	-			X
95	Ulmus americana	19	6	M	M	-			X
96	Ulmus americana	12,17	6	M	M	-	IB		X
97	Ulmus americana	9,10,11,15	5	ML	M	R	Dutch Elm Disease, ML		X
98	Pinus sylvestris	20	4	M	M	RC			X
99	Picea pungens	42	8	MH	MH	P			X
100	Acer negundo	19	7	M	ML	P	UBS, V		X
101	Ulmus americana	26,28	6	M	M	P	Dutch Elm Disease, ML, IB, B		X
102	Juglans nigra	11x2,14,15,17	7	M	ML	P	ML, V, IB		X
103	Ulmus americana	15	3	ML	M	P	Dutch Elm Disease		X
104	Ulmus americana	19	4	ML	M	P	Dutch Elm Disease		X
105	Ulmus americana	11,13	4	ML	M	P	Dutch Elm Disease		X
106	Ulmus americana	18	3	ML	M	P	Dutch Elm Disease		X
107	Ulmus americana	15	3	ML	M	P	Dutch Elm Disease		X
108	Ulmus americana	13,4	4	ML	M	P	Dutch Elm Disease, 2L, V, IB		X
109	Ulmus americana	14,16,20	6	ML	M	P	Dutch Elm Disease		X
110	Ulmus americana	16	4	L	L	P	Dead		X
111	Ulmus americana	13,13	4	ML	M	P	Dutch Elm Disease, 2L		X
112	Picea pungens	16	3	MH	MH	P			X
113	Picea pungens	25	4	MH	MH	P			X
114	Picea pungens	23	4	M	M	P			X
115	Picea pungens	21	5	M	ML	P	45'LE, straighten		X
116	Fraxinus pennsylvanica	34	5	L	L	P	Hole, EAB		X
117	Fraxinus pennsylvanica	14,16	3	L	L	P	EAB		X
118	Juglans nigra	21	4	MH	H	P			X
119	Acer negundo	35	8	ML	ML	P	15'LW		X
120A	Pinus sylvestris	19	3	M	M	P	UB(N)		X
120B	Pinus sylvestris	34	4	M	M	P			X
121	Pinus sylvestris	29	4	M	M	P	SS, UB(S), TD 25%		X
122	Pinus sylvestris	18	2	ML	ML	P	SU		X
123	Pinus sylvestris	29	4	M	M	P	UB(SW)		X
124	Pinus sylvestris	23	3	M	M	P	sparse canopy		X
125	Pinus sylvestris	31	4	M	M	P			X
126	Acer negundo	23	7	M	ML	P	40'LW		X
127	Pinus sylvestris	30	4	ML	ML	P	DB (med), 30% D		X
128	Tilia americana	16	2	MH	H	P			X
129	Juglans nigra	17	5	MH	MH	P	2L		X
130	Tilia americana	32	8	M	M	P			X
131	Tilia americana	24,25,42	9	ML	ML	P	ML, IB, hole at union, TB (high), top dead on one branch		X
132	Juglans nigra	15,16,18	5	MH	M	P	ML, grafting		X
133	Picea pungens	54	8	M	M	P			X
134	Juglans nigra	16	3	MH	MH	P	UBE		X
135	Salix alba	53	9	ML	ML	P	20'LE, many broken tips, only one leader remaining		X
136	Tilia americana	21,24	7	M	M	P	2L, IB, V		X
138	Fraxinus pennsylvanica	31,33	10	L	L	P	2L, IB, EAB		X
139	Quercus rubra	12,17	5	M	M	P	2L, UB(W)		X
140	Fraxinus pennsylvanica	15,20	5	L	L	P	Dead		X
141	Crataegus spp.	8,10,13	5	M	M	P	large dead fallen leader, TB (high)		X
142	Fraxinus pennsylvanica	25	6	L	L	P	EAB		X
143	Crataegus spp.	14,18	7	M	M	P	2L, TB (high)		X
144A	Juglans nigra	12,16,17,17,19	9	MH	M	P	ML, IB		X
144B	Juglans nigra	24	7	H	H	P	(((not surveyed, 5m from 144A)))		X
145	Crataegus spp.	11,13	4	ML	ML	P	30'LNW, 50% TD base		X
146	Prunus serotina	36	6	M	M	P	2L, DB (med)		X
147	Prunus serotina	28	4	ML	M	P	DB (large)		X
148	Crataegus spp.	15	5	M	M	P	10'L (over slope)		X
149	Prunus serotina	27	6	ML	ML	P	DB (large), 30% TD		X
150	Ulmus pumila	23	6	ML	M	P	Dutch Elm Disease		X
151	Juglans cinera	24	8	ML	ML	P	DB (large), 50% D		X
152	Juglans nigra	19	4	M	M	P	DB (small)		X
153	Ulmus americana	13,15	5	ML	M	P	Dutch Elm Disease, ML		X
154	Ulmus americana	16	3	ML	M	P	Dutch Elm Disease, V, UBE		X
155	Fraxinus pennsylvanica	16	3	L	L	P	V, EAB		X
156	Ulmus americana	16	3	ML	M	P	Dutch Elm Disease, V		X
157	Prunus serotina	35	6	M	ML	P	wound with rot, DB (high), canopy)		X
158	Prunus serotina	25	4	M	M	-	DB (high), wounds on base (rot)		X
159	Juglans nigra	28	5	MH	M	-	V		X
160	Fraxinus pennsylvanica	13,16	6	L	L	-	V, EAB		X
161	Fraxinus pennsylvanica	9,10,12	5	L	L	P	ML, V, EAB		X
162	Fraxinus pennsylvanica	12,13	3	L	L	P	V (heavy), EAB		X
163	Ulmus americana			L	L	P	Dead		X
164	Juglans nigra	12x2,14,15,16	9	MH	M	P	ML		X
165	Ulmus americana	15	3	ML	M	P	Dutch Elm Disease, 20'LE		X

166	Ulmus americana	19	4	ML	M	P	Dutch Elm Disease, woodpecker damage		X
167	Fraxinus pennsylvanica	20	4	L	L	P	EAB		X
168	Ulmus americana		-	L	L	P	ML, Dead		X
169	Juglans nigra	19	5	M	M	-			X
170	Ulmus americana	22,23,23	8	M	MH	M	ML, IB		X
171	Fraxinus pennsylvanica	15	3	L	L	-	V, EAB		X
172A	Ulmus americana	10,10,14,16	5	M	ML	M	P	Dutch Elm Disease, ML, V		X
172B	Ulmus americana	15	3	ML	M	P	Dutch Elm Disease (((not surveyed, 2m away to SE)))		X
173	Ulmus americana	17	3	L	L	P			X
174	Ulmus americana	17	4	ML	M	P	Dutch Elm Disease		X
175	Juglans nigra	19	7	ML	M	P	Dutch Elm Disease		X
176	Juglans nigra	11,17	5	MH	MH	-			X
177	Juglans nigra	29	8	H	H	-			X
178	Ulmus americana	12,5	2	M	M	-			X
179	Juglans nigra	16	4	H	H	-			X
180	Juglans nigra	16	4	H	H	P			X
181	Juglans nigra	10,11,12,13	5	M	M	RC	ML		X
182	Juglans nigra	15,17	6	MH	MH	RC	2L		X
183	Ulmus americana	8,10,14	4	ML	M	R	Dutch Elm Disease, DB (med), IB, ML		X
184	Juglans nigra	10,13	4	M	M	RC	ML, V		X
185	Ulmus americana	12,14	3	M	M	-	2L, IB		X
186	Ulmus americana	15	3	M	M	-			X
187	Juglans nigra	19	5	M	M	RC	V		X
188	Ulmus americana	17	3	ML	ML	R	Dutch Elm Disease, V		X
189	Fraxinus pennsylvanica	14,10	4	L	L	R	2L, IB, 10%TD, EAB		X
190	Acer negundo	10	4	M	ML	-	20'LW		X
191	Crataegus spp.	<10x10	6	M	M	-	center leader dead & fallen		X
192	Fraxinus pennsylvanica	20	4	L	L	-	V, EAB		X
193	Crataegus spp.	12,13	5	M	ML	-	V, IB, grafting		X
194	Acer negundo	14	5	ML	L	-	V, TB		X
195	Acer negundo	25	7	M	ML	-	DB (med)		X
196	Fraxinus pennsylvanica	16	5	L	L	-	EAB		X
197	Acer negundo	20	5	M	ML	-	40'L (down slope)		X
199	Acer negundo	30	8	M	M	-	DB (high)		X
200	Acer negundo	16	6	M	ML	-	45'LE		X
201	Fraxinus pennsylvanica	21	5	L	L	-	EAB		X
202	Acer negundo	17,18	7	M	M	-	3L, DB (med)		X
203	Acer negundo	30	8	M	M	-	10'L (down slope)		X
204	Fraxinus pennsylvanica	20	4	L	L	-	V, EAB		X
205	Fraxinus pennsylvanica	15	3	L	L	-	TB, V, EAB		X
206	Ulmus pumila	26	7	M	ML	-	V, DB		X
207	Fraxinus pennsylvanica	15	3	L	L	-	V, EAB		X
208	Fraxinus pennsylvanica	17	4	L	L	-	EAB		X
209	Ulmus pumila	28	5	M	ML	-	V		X
210	Fraxinus pennsylvanica	14,15,16,18	5	L	L	-	4L, V, BB, EAB		X
211	Acer negundo	28,29	7	M	M	-	30'LS		X
212	Juglans nigra	31	9	H	H	-			X
213	Fraxinus pennsylvanica	33	8	L	L	-	V, EAB		X
214	Acer saccharinum	21	7	M	M	-	V		X
215	Fraxinus pennsylvanica	16	4	L	L	-	V		X
216	Fraxinus pennsylvanica	16,20	8	L	L	-	V, 2L		X
217	Fraxinus pennsylvanica	18	5	L	L	-	EAB		X
218	Fraxinus pennsylvanica	23,25	8	M	M	-			X
219	Carya cordiformis	16,22	7	M	M	-	2L, IB		X
220	Acer negundo	47	8	L	L	P	EAB, 20"L south		X
221	Fraxinus pennsylvanica	37	7	L	L	P	EAB		X
222	Fraxinus pennsylvanica	37	7	L	L	P	EAB		X
223	Prunus serotina	28	6	M	M	P	SU, 50% Dead		X
224	Fraxinus pennsylvanica	20	5	L	L	P	SU, 75% Dead, large ripping		X
225	Prunus serotina	33	10	M	MH	P	med. DBs, offset canopy to south		X
226	Prunus serotina	18	4	M	M	P	50% Dead		X
227	Crataegus sp.	22	7	M	M	P	small DBs and BBs, large wound at 1m		X
228	Crataegus sp.	19	6	M	M	P	small wound at base, large BB		X
229	Prunus serotina	20	5	M	MH	P	SU, med DBs, large wound at base		X
230	Crataegus sp.	15	6	M	M	P	small holes		X
231	Fraxinus pennsylvanica	37	10	L	L	P	EAB		X
232	Juglans nigra	43	9	M	M	P	Canopy mostly west side, very large and poorly executed pruning wounds, rot is showing through cracks in one location.		X
233	Juglans nigra	71	15	M	ML	P	Many cracks up lower trunk with rot showing. Further investigation of structural integrity should be done. Small hanging branches		X

234	Fraxinus pennsylvanica	29	7	L	L	P	EAB, vine		X
235	Quercus macrocarpa	27	7	MH	H	P	V		X
236	Fraxinus pennsylvanica	28	7	L	L	P	EAB		X
237	Prunus serotina	40	8	M	MH	P	large DBs, 25% Dead		X
238	Juglans nigra	28	9	MH	MH	P	growing through canopy of #237, canopy offset to south		X
239	Ulmus pumila	19	5	ML	M	P	Dutch Elm Disease, V		X
240	Ulmus americana	17,20	5	MH	MH	P	V, ML		X
270.5	Ulmus pumila	10,10	5	ML	M	R	Dutch Elm Disease, 2L, DB(small)	X	
271	Ulmus pumila	12	6	ML	M	R	Dutch Elm Disease, 30'LS), DB(small)	X	
272	Ulmus pumila	10.5	4	ML	M	R	Dutch Elm Disease, SU, DB(small)	X	
273	Ulmus pumila	16	6	M	MH	R	Dutch Elm Disease, UB(E), DB(small)	X	
274	Ulmus pumila	12	4	ML	M	R	Dutch Elm Disease, DB(small)	X	
275	Acer negundo	17,15,13	7	MH	M	RC	MB, growing through fence	X	
276	Acer negundo	16	5	MH	M	RC	LS'(S)	X	
277	Fraxinus pennsylvanica	18	5	L	L	R	DEAD	X	
278	Fraxinus pennsylvanica	16	4	L	L	R	DEAD	X	
279	Fraxinus pennsylvanica	16	4	L	L	R	DEAD	X	
280	Juglans nigra	10	5	MH	M	RC		X	
281	Juglans nigra	9,7	5	MH	M	RC		X	
282	Ulmus pumila	11	4	ML	M	R	Dutch Elm Disease	X	
283	Acer negundo	10.5	5	MH	MH	RC	DB(small)	X	
284	Populus nigra	19	4	M	H	RC		X	
285	Populus nigra	10.5	3	H	H	RC		X	
286	Tilia cordata	12	4	M	M	RC	DB(small)	X	
287	Tilia cordata	16,10	5	ML	M	RC	2L, DB(small)	X	
288	Juglans nigra	13	6	MH	M	RC		X	
289	Juglans nigra	16,11.5	6	MH	M	P		X	
290	Ulmus pumila	11.5	5	ML	M	P	Dutch Elm Disease, DB(small)	X	
291	Ulmus pumila	11	4	ML	M	P	Dutch Elm Disease, DB(med)	X	
292	Ulmus pumila	12	5	ML	M	P	Dutch Elm Disease, DB(med)	X	
293	Juglans nigra	14	6	M	ML	P	V(grape), DB(small)	X	
294	Juglans nigra	19	6	M	ML	P	V(grape), DB(small)	X	
295	Acer negundo	10	5	M	M	P	DB(small)	X	
296	Juglans nigra	12	5	M	M	P	DB(small)	X	
297	Acer platanoides	10	4	ML	ML	P	TD50%, DB(med)	X	
298	Juglans nigra	16,17	7	H	H	RC		X	
299	Salix sp.	14.5,8x2,10x3	8	M	M	RC	MB, DB(med)	X	
300	Crataegus sp.	12,8x4	6	ML	M	RC	DB(med), BB	X	
301	Pinus sylvestris	17	6	H	H	RC		X	
302	Pinus sylvestris	16	5	H	H	RC		X	
303	Juniperus virginiana	13	3	H	H	RC		X	
304	Juglans nigra	10	4	H	H	RC		X	
305	Tilia cordata	10	4	H	H	RC		X	
306	Tilia cordata	13	5	H	H	RC		X	
307	Tilia cordata	10.5	4	H	H	RC		X	
308	Juglans nigra	15.5	6	H	H	RC	V(grape)	X	
309	Juglans nigra	11	5	H	H	RC		X	
310	Juglans nigra	17	7	MH	H	RC	DB(small)	X	
311	Ulmus americana	12	4	ML	M	R	Dutch Elm Disease	X	
312	Fraxinus pennsylvanica	10.5	5	L	L	R	EAB	X	
313	Fraxinus pennsylvanica	10	5	L	L	R	EAB	X	
314	Juglans nigra	13,10	6	M	MH	RC	DB(med)	X	
315	Fraxinus pennsylvanica	11	5	L	L	R	EAB	X	
316	Juglans nigra	10	5	MH	MH	RC		X	
317	Ulmus americana	12.5	5	ML	M	R	Dutch Elm Disease	X	
318	Ulmus pumila	13.5	5	ML	M	R	Dutch Elm Disease	X	
319	Populus tremuloides	14	5	H	H	RC		X	
320	Acer negundo	11,11	7	MH	H	RC		X	
321	Juglans nigra	11	5	H	H	RC		X	
322	Fraxinus pennsylvanica	14	6	L	L	R		X	
323	Juglans nigra	12	5	H	H	RC		X	
324	Quercus bicolour	14	5	H	H	RC		X	

LEGEND

- Property line
- Tree protection - framed hoarding
- Existing tree to be preserved
- Existing tree to be removed
- Existing tree to be removed. Dead, girdled or dangerous.
- Existing tree to be removed as part of seperate submission: "Construction of Proposed Storm Sewer"

LIMITING CONDITIONS:

This tree inventory was derived from data gathered on the site using accepted arboricultural practices. This includes a visual examination of all above ground parts of the tree for structural defects and signs of health and vigour. All examination took place from the ground plane and no trees were cored, probed or climbed. There was also no detailed inspection of the root crown where excavation would have been required.

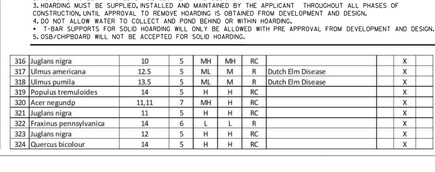
This inventory describes the health, structural stability and identifies potential hazards of the trees to a reasonable extent. Where dead branches or other are identified in the notes it is the owners responsibility to take action. This inventory does not provide or imply a guarantee that these trees or branches will remain standing intact. The stability of any tree or branches of a tree cannot be predicted with absolute certainty under all circumstances.

There is, likewise, no guarantee of survival for those trees to be preserved during construction but which are subject to injury. Tree preservation guidelines that are provided in this report are generally suitable for the tree as determined by the visual assessment. However, there is no guarantee that these guidelines will be followed throughout construction unless an arborist is retained for complete supervision of the site at all times. Even with complete supervision, roots in an urban environment are unpredictable. Guidelines, that suppose an even distribution of roots may not be effective in cases where roots have clustered in small areas.

The assessment in this inventory is valid only at the time of inspection.

Nick Taylor
ISA Certified Arborist
ON-2068A
Baker Turner Inc.

Jon Woodside
ISA Certified Arborist
ON-1439A
Baker Turner Inc.



FRAMED HOARDING DETAIL (nts)

1. HOARDING DETAILS TO BE DETERMINED FOLLOWING INITIAL SITE INSPECTION.
2. HOARDING TO BE APPROVED BY DEVELOPMENT AND DESIGN.
3. HOARDING MUST BE SUPPLIED, INSTALLED AND MAINTAINED BY THE APPLICANT THROUGHOUT ALL PHASES OF CONSTRUCTION, UNTIL APPROVAL TO REMOVE HOARDING IS OBTAINED FROM DEVELOPMENT AND DESIGN.
4. DO NOT ALLOW WATER TO COLLECT AND POND BEHIND OR WITHIN HOARDING.
- T-BAR SUPPORTS FOR SOLID HOARDING WILL ONLY BE ALLOWED WITH PRE APPROVAL FROM DEVELOPMENT AND DESIGN.
5. OSB/CHIPBOARD WILL NOT BE ACCEPTED FOR SOLID HOARDING.

REVISIONS

DATE	DESCRIPTION
25 Mar 19	Reissued for Submission
29 Nov 17	Issued for Submission

NOTE: Contractor is to check and verify all dimensions and conditions on the project, and is to immediately report any discrepancies to the landscape architect before proceeding with the work.

BTi Baker Turner inc.
Landscape Architecture I Site Design
Suite 300
8501 Mississauga Road
Brampton Ontario L6Y 5G8
Tel: (905) 453-9398
Fax: (905) 453-9376
email: tba@bakerturner.com

Project Title

PACE DEVELOPMENTS

THORNY-BRAE PLACE EXTENSION
MISSISSAUGA, ONTARIO

TREE INVENTORY & PRESERVATION PLAN (FOR DEVELOPMENT SITE)

Date	Issued
January 2016	
Job Number	Drawn By
BTI-603	NT
Scale	Checked By
1:400	TT
Sheet Number	File Number
TS. 1 of 1	

MMM Group Limited
582 Lancaster Street West
Kitchener, ON Canada N2K 1M3
T: +1 519.743.8777 x2268 | F: +1 519.743.8778
mcpheej@mmm.ca

www.mmmgrouplimited.com | www.wspgroup.ca

September 6, 2016

2462357 Ontario Inc.
3-30 Wertheim Court, Bldg. A
Richmond Hill, ON L4B 1B9
c/o Pace Developments

Dear Mr. Sciavilla

Please find enclosed a Butternut Heath Assessment Report documenting the results of my Butternut Heath Assessment completed on the 1745 to 1775 Thorny Brae Place property in Mississauga, Ontario.

Yours truly,

MMM Group, a WSP Company

Jennifer McPhee, M.Sc
Ecologist – Botanist
Ecology Department

Enclosures:

1. Information from the Ministry of Natural Resources and Forestry about Butternut and the *Endangered Species Act, 2007*
2. Butternut Health Assessor's Report
3. Original data forms
4. Electronic and printed copies of the Excel data spreadsheet (BHA Tree Analysis)

Ministry of Natural Resources and Forestry

Species At Risk
P.O. Box 7000, 300 Water Street
Peterborough ON K9J 8M5

Ministère des Richesses naturelles et des Forêts

Espèces en péril
C.P. 7000, 300, rue Water
Peterborough ON K9J 8M5

The enclosed Butternut Health Assessor's Report documents the results of the Butternut health assessment that was conducted by the designated Butternut Health Assessor (BHA) identified in the top section of the report. If there are other Butternut trees (of any size or age) at the site that may be affected by the activity and they are not identified in the enclosed BHA Report, they too must be assessed by a designated BHA.

Butternut is listed as an endangered species on the Species at Risk in Ontario List, and as such, it is protected under the *Endangered Species Act, 2007* (ESA) from being killed, harmed, or removed. If you are planning to undertake an activity that may affect Butternut, you may be eligible to follow the requirements set out in section 23.7 of Ontario Regulation 242/08 under the ESA, or you may need to seek an authorization under the ESA (e.g., a permit).

Please visit e-laws at the link provided below for the legal requirements of eligible activities under section 23.7 of Ontario Regulation 242/08 and conditions that must be fulfilled. Information about Butternut is also available at: http://www.ontario.ca/environment-and-energy/butternut-trees-your-property.

If you are eligible to kill, harm or take Butternut under section 23.7 of the regulation, your first step is to submit the BHA Report and the original data forms enclosed in this package to the local Ministry of Natural Resources and Forestry (MNRF) District Manager. Note that MNRF cannot accept photocopies or scanned electronic copies of the data forms.

Note regarding changes:

If the enclosed BHA Report does not identify which Butternut tree(s) are proposed to be killed, harmed, or taken in Table 1 (i.e., if "unknown" is indicated in the second last column of Table 1), or, if the information in the last two columns of Table 1 has changed since the date this BHA Report was produced, **do not make any edits to the BHA Report**. Instead, please attach a cover letter that identifies which Butternut tree(s) are proposed to be killed, harmed, or taken (by referencing the tree identification numbers) when you submit the enclosed BHA Report to the local MNRF District Manager.

The BHA Report must be submitted at least 30 days prior to registering an eligible activity to kill, harm, or remove a Butternut tree. During this 30 day period, no Butternut trees (of any category) may be killed, harmed, or removed, and MNRF may contact you for an opportunity to examine the trees. If MNRF chooses to examine the trees, a representative of MNRF will contact you using the information you supplied when you submitted the BHA Report.

If you are eligible to follow the rules in regulation under section 23.7, you may register your activity using the "Notice of Butternut Impact" form on the MNRF Registry **after the 30 day period has elapsed**.

If you are **not** eligible to follow the rules in regulation under section 23.7, please contact the local MNRF district office to determine whether you will need to seek an authorization (e.g., a permit). A link to the directory of MNRF offices is provided below.

Note that municipal by-laws and legislation other than the ESA may also be applicable to the removal or harming of trees.

Please retain this information and a copy of the BHA Report (including copies of all data forms) for your records, along with any other documentation you may receive from MNRF should an examination of the trees occur. If you have any questions, please contact your local MNRF district office.

Links:

Endangered Species Act, 2007:
http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_07e06_e.htm

Ontario Regulation 242/08 (refer to section 23.7):
http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080242_e.htm

MNRF Office Locations:
https://www.ontario.ca/government/ministry-natural-resources-and-forestry-regional-and-district-offices

Butternut Health Assessor's Report Number: 602-002

Jennifer McPhee, #602
582 Lancaster Street West
Kitchener, Ontario, N2K 1M3
519-743-8777

2462357 Ontario Inc.
3-30 Wertheim Court, Bldg. A
Richmond Hill, ON L4B 1B9
c/o Pace Developments

Site location: 1745 to 1775 Thorny Brae Place, Mississauga, Ontario

Date(s) of Butternut health assessment: May 20, 2016
Date BHA Report prepared: September 6, 2016

Map datum used: ☒ NAD83 ☐ WGS84

Total number of trees assessed in this BHA Report: 1

The assessed trees were numbered on site using white paint. The numbers at the site correspond to the tree numbers referenced in this report.

This BHA Report includes the following tables:

- Table 1: Butternut Trees Assessed
- Table 2: Trees Determined by BHA to be Butternut Hybrids
- Table 3: Summary of Assessment Results

Table 1: Butternut Trees Assessed

Tree #	UTM coordinates	Category[1] *(1, 2, or 3[2])*	dbh[3] (cm)	Cultivated? *(Y/N)*	Proposed to be: *(enter one: unknown[4], killed, harmed or taken)*	If tree is proposed to be killed, harmed, or taken, indicate reason tree is proposed to be killed, harmed or taken:
001	17 T 605533 E, 4824880 N	1	34	N	Harmed / Unknown	Stormwater Management Outlet and development construction may or may not impact Butternut habitat within 50 m of the bole.

[1] The extent to which the tree is affected by Butternut Canker is presented in the Excel document titled, "BHA Tree Analysis" that accompanies this BHA Report.
[2] Category 3 trees are not eligible to be killed, harmed or taken under section 23.7 of Ontario Regulation 242/08.
[3] dbh: diameter at breast height, rounded to nearest cm (if tree is shorter than breast height, enter zero)
[4] In this column, "unknown" indicates that at the time of assessment, there are no proposals to kill, harm or take this tree that are known to the BHA.

Tree #	UTM coordinates	Category[1] *(1, 2, or 3[2])*	dbh[3] (cm)	Cultivated? *(Y/N)*	Proposed to be: *(enter one: unknown[4], killed, harmed or taken)*	If tree is proposed to be killed, harmed, or taken, indicate reason tree is proposed to be killed, harmed or taken:

Table 2: Trees Determined by BHA to be Butternut Hybrids

Tree #	UTM coordinates	Method used (genetic testing or field identification):
	N/A	

Table 3: Summary of Assessment Results

Result:	**Total #:**	**Important information for persons planning activities that may affect Butternut:**
Category 1	1	• A Category 1 tree is one that is affected by butternut canker to such an advanced degree that retaining the tree would not support the protection or recovery of butternut in the area in which the tree is located; and is considered “non-retainable”. • During the 30 day period that follows your submission of this BHA Report to the MNRF District Manager, no Butternut trees (of Category 1, 2, or 3) may be killed, harmed, or taken, and MNRF may contact you for an opportunity to examine the trees. • Category 1 trees may be killed, harmed or taken **after** the 30 day period that follows submission of this BHA Report to the MNRF District Manager, unless the results of an MNRF examination indicate that the assessment has not been conducted in accordance with the document entitled “Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the *Endangered Species Act, 2007”*.
Category 2	0	• A Category 2 tree is one that is not affected by Butternut Canker, or is affected by Butternut Canker but the degree to which it is affected is not too advanced and retaining the tree could support the protection or recovery of butternut in the area in which the tree is located, and is considered “retainable”. • During the 30 day period that follows your submission of this BHA Report to the MNRF District Manager, no Butternut trees (of Category 1, 2, or 3) may be killed, harmed, or taken, and MNRF may contact you for an opportunity to examine the trees. • Activities that may kill, harm or take up to a **maximum of ten (10)** Category 2 trees may be eligible to follow the rules in section 23.7 of Ontario Regulation 242/08, in accordance with the conditions and requirements set out in the regulation.

Result:	Total #:	Important information for persons planning activities that may affect Butternut:
		• Refer to e-Laws for the legal requirements of eligible activities under section 23.7 of Ontario Regulation 242/08 and conditions that must be fulfilled: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080242_e.htm • Activities that may kill, harm or take more than ten (10) Category 2 trees are not eligible to follow the rules in section 23.7 of Ontario Regulation 242/08. Contact the local MNRF district office for information on how to seek an ESA authorization (e.g., a permit) or consider an alternative that would be eligible for the regulation.
Category 3	0	• A Category 3 tree is one that may be useful in determining sources of resistance to Butternut Canker, and is considered "archivable". • Category 3 trees are not eligible to be killed, harmed or taken under section 23.7 of Ontario Regulation 242/08. • Contact the local MNRF district office for information on how to seek an ESA authorization, or consider an alternative that will avoid killing, harming or taking any Category 3 trees.
Cultivated	0	• An activity that involves killing, harming, or taking a cultivated Butternut tree that was not required to be planted to fulfill a condition of an ESA permit or a condition of a regulation, may be eligible for the exemption provided by subsection 23.7 (11) of O. Reg. 242/08. • Prior to undertaking the activity, the owner or occupier of the land on which the Butternut is located (or person acting on their behalf) will need to determine whether the exemption for cultivated trees is applicable by determining whether or not the tree was cultivated as a result of the requirements for an exemption under O. Reg. 242/08 or a condition of a permit issued under the ESA. This information can be accessed by contacting the local MNRF district office. • The owner or occupier of the land on which the Butternut is located (or person acting on their behalf) is encouraged to append the details regarding whether the tree was planted to satisfy a requirement (e.g., the permit number or registration number) to this BHA Report for their records.
Hybrid	0	• Hybrid Butternut trees are not protected under the ESA, but their removal may be subject to municipal by-laws and other legislation.

Butternut Health Assessor's Comments:

Field characteristics were not able to be examined to determine hybrid status, as limbs were too high to collect from. Observations from the ground using binoculars indicate pure Butternut, but low levels of canker along the length of the tree may indicate some degree of hybridicity

This concludes the summary of the BHA Report. A complete BHA Report must also include:

1. All original (hard copy) data forms (i.e., all completed sets of Form 1 and Form 2), and
2. Electronic and printed copies of the Excel data analysis spreadsheet.

0cm 3cm 15cm

Butternut Data Collection Form 1 - 2010 Edition

Surveyor ID or BHA #: 602

(PLEASE USE BLOCK LETTERS)

Date (dd/mm/yyyy): 20 - 05 - 2016

Shaded fields are mandatory for Butternut Health Assessments

Surveyor Contact

First: Jennifer Last: McPhee

Email: mcpheej@mmm.ca

Telephone: (902) 371-2572 Telephone Other: (519) 743-8772 x 2268

Property Owner (check if same as surveyor) ☐

First: - Last: -

or Company: 2462357 Ontario Inc.

Email:

Telephone: ( ) - Telephone Other: ( ) - x

Property Owner's Mailing address

Address: 3-30 Werthelm Court Bldg A Postal Code: L4B 1B7 Prov.: ON

City: Richmond Hill

Tree Location (if different from mailing address)

Address/(911#): 1745-1755 Thorny Brae Place

Township: - Lot: - Con: -

City: Mississauga

Directions

Tree #151 on tree inventary

☐ Yes ☒ No Can Share Location Information with other Butternut Recovery Organizations?

☐ Yes ☐ No Site visits OK? (prior arrangments will always be made for a site vist)

> (Greater than)
< (Less than)

Butternut Trees Tally by Diameter Class

(Do a dot tally in blank space; write total# in box for each)

Tree Condition	< 3 cm	3-15 cm	16-30cm	>30 cm
Vigorous: > 50% Live Crown Minor or no cankers				
Poor Vigor: <50% Live Crown or >50% Live Crown + heavily cankered stem				01
Dead				

Historically, do some trees produce seeds? ☒ Y ☐ N ☐ Unkown

Estimated area containing butternut for properties > 1 acre (0.4 hectares): 41 ☐ Acres ☒ Hectares

Overall Property Description (area(s) containing Butternut)

- ☐ Rolling Upland
- ☐ Bottomland
- ☐ Valley Slope
- ☐ Variable
- ☒ Tableland
- ☐ Unknown

Vegetation Community/ies

- ☐ Open
- ☐ Fencerow
- ☐ Shrubland
- ☐ Roadside
- ☒ DeciduousForest
- ☐ Quary
- ☐ ConiferForest
- ☐ UrbanYard
- ☐ MixedForest
- ☐ UrbanPark

Other

Soil Drainage

- ☐ Well Drained
- ☒ Moderately Drained
- ☐ Poorly Drained
- ☐ Unknown

Soil Texture

- ☐ Clay
- ☐ Sand
- ☐ Clay Loam
- ☐ Variable
- ☐ Loam
- ☒ Unknown
- ☐ Loamy Sand

Soil Depth

- ☒ > 1metre
- ☐ 30 - 99cm
- ☐ < 30cm
- ☐ Variable
- ☐ Unknown

Please enter matching numerical page link code on forms 1 and 2

Page Link: 605533

(Contact Information follows all applicable privacy policies and guidelines)

Please return forms to:
Forest Gene Conservation Association
Suite 233, 266 Charlotte St.
Peterborough, ON, K9J 2V4
www.fgca.net

49731

Butternut Data Collection FORM 2 (2010 Edition)

(PLEASE USE BLOCK LETTERS)

Fill when Form 1 indicates canker is well established. The information opn Form 2 must be filled out for all trees when doing a Butternut Health Assessment.

Shaded fields are mandatory for Butternut Health Assessments

Site Code(A,B,...Z, AA...): 001

Surveyor ID or BHA #: 602

Surveyor Last Name: McPhee

Date (dd/mm/yyyy): 20-05-2016

Tree ID Numbering: 1,2,3,...Starting from 1 for each site

Tree 1

Tree #: 001 | Zone: 17 | Easting: 605533 | Northing: 4824880

Crown Class: C | Live Crown %: 90 | Main Stem Length(m) Below crown: 3

Twig Dieback ☐ | Branch Dieback ■ | Defoliation ■ | Discolouration ■

#Stems: 1 | DBH(cm): 34

Butternut Origin: ■ Natural ☐ Planted ☐ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ■ Seed Set ☐ None

Assess below live crown:

		#Open	#Sooty
0	#Epic-Live		
1	#Epic-Dead		
D	Bark Type		
0	# Callused Wounds		
	Root	2	3
	=<2m	3	2
	>2m	3	2

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ■ None Found

Competing Species: VITRIPA, FRAAMEP, PRUVIRG

Photos 111-118, Seeds on ground, Marked as 127 & 151, Cankers above 3m

Tree 2

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Live Crown %: | Main Stem Length(m) Below crown:

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐

#Stems: | DBH(cm):

Butternut Origin: ☐ Natural ☐ Planted ☐ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

Assess below live crown:

		#Open	#Sooty
	#Epic-Live		
	#Epic-Dead		
	Bark Type		
	# Callused Wounds		
	Root		
	=<2m		
	>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

Tree 3

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Live Crown %: | Main Stem Length(m) Below crown:

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐

#Stems: | DBH(cm):

Butternut Origin: ☐ Natural ☐ Planted ☐ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

Assess below live crown:

		#Open	#Sooty
	#Epic-Live		
	#Epic-Dead		
	Bark Type		
	# Callused Wounds		
	Root		
	=<2m		
	>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

Tree 4

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Live Crown %: | Main Stem Length(m) Below crown:

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐

#Stems: | DBH(cm):

Butternut Origin: ☐ Natural ☐ Planted ☐ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

Assess below live crown:

		#Open	#Sooty
	#Epic-Live		
	#Epic-Dead		
	Bark Type		
	# Callused Wounds		
	Root		
	=<2m		
	>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

Tree 5

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Live Crown %: | Main Stem Length(m) Below crown:

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐

#Stems: | DBH(cm):

Butternut Origin: ☐ Natural ☐ Planted ☐ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

Assess below live crown:

		#Open	#Sooty
	#Epic-Live		
	#Epic-Dead		
	Bark Type		
	# Callused Wounds		
	Root		
	=<2m		
	>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

Please enter matching page link code on forms 1 and 2

Page Link: 605533

(Contact Information follows all applicable privacy policies and guidelines)

Please return forms to:
Forest Gene Conservation Association
Suite 233, 266 Charlotte St.
Peterborough, ON, K9J 2V4
www.fgca.net

49731

BHA Tree Analysis (version: December 2013)

This table is to be completed by a designated Butternut Health Assessor (BHA).

BHA Report #	1	Assessment Date(s)	20-May-16	Total # Butternut Trees in BHA Report	1
BHA ID #	602	BHA Name	Jennifer McPhee		
Landowner / Client Name			Pace Developments		
Property Location			1745-1775 Thorny Brae Place, Mississauga		

input field data										automatic calculations from field data						Categories: 1: non-retainable, 2: retainable, 3: archivable				
			# bole cankers				# root flare (RF) cankers													
Tree #	Live Crown %	Tree dbh (cm)	sooty (S) (will be assigned 2.5 cm per canker)		open (O) (will be assigned 5 cm per canker)				<40 m from cankered tree? (Y or N)	**Circ.** (cm) = Pi x dbh	total **bole canker width** (sooty x 2.5 + open x 5)	total **RF canker width** (sooty x 2.5 + open x 5)	bole canker **% of** circ.	RF canker **% of** circ.	total bole & root canker % of 2xCirc	LC% >/= 50 & BC% = 0	LC% >70 & BRC % <20	LC % >70 & BC % <20	**Preliminary tree call**	**FINAL TREE CALL** a Cat 2, dbh>20cm <40m from a Cat 1
			S <2 m	S >2 m	O <2 m	O >2 m	RF S	RF O		**Circ** (cm)	**BC** (cm)	**RC** (cm)	**BC%**	**RC%**	**BRC%**					
1	90	34	4	3	2	0	3	2	n	106.8	27.5	17.5	**25.8**	**16.4**	**21.1**	1	1	1	**1**	**1**

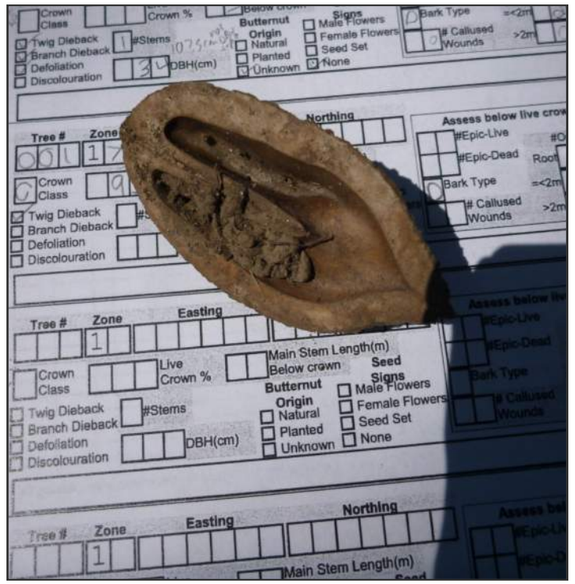


Photo 1: Seed half found along the base of the butternut tree. May 20, 2016

Photo 2: Seeds found along the base of the butternut tree. May 20, 2016

Photo 3: Base of the Butternut tree trunk. May 20, 2016

Photo 4: Mid-portion of the Butternut tree trunk (northwestern face). May 20, 2016

Photo 5: Upper portion of the Butternut tree. May 20, 2016

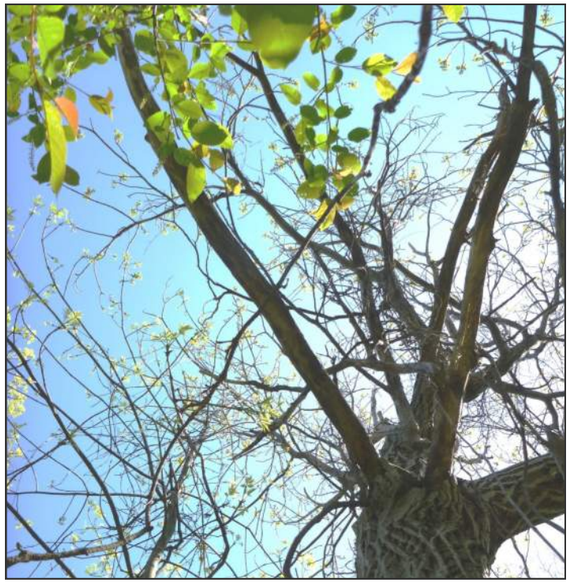


Photo 6: Crown portion of the Butternut tree. May 20, 2016

Photo 7: Mid-portion of the Butternut tree trunk (southeastern face). May 20, 2016

Photo 8: Canker sore along mid-portion of the Butternut tree trunk. May 20, 2016

WSP | MMM GROUP

1745 to 1775 Thorny Brae Place Butternut Health Assessment

REPRESENTATIVE SITE PHOTOGRAPHS

Date: Sept 2016

Project No: 3316536

BHA Report: 602 - 002

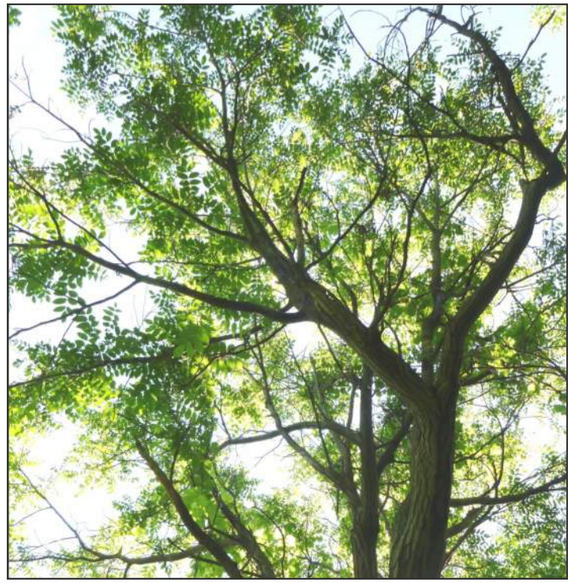


Photo 9: Crown portion of the Butternut tree (northwest). Jun 23, 2016.

Photo 10: Mid-portion of the Butternut tree trunk (western face). Jun 23, 2016.

Photo 11: Mid-portion of the Butternut tree trunk (southeastern face). Oct 29, 2015

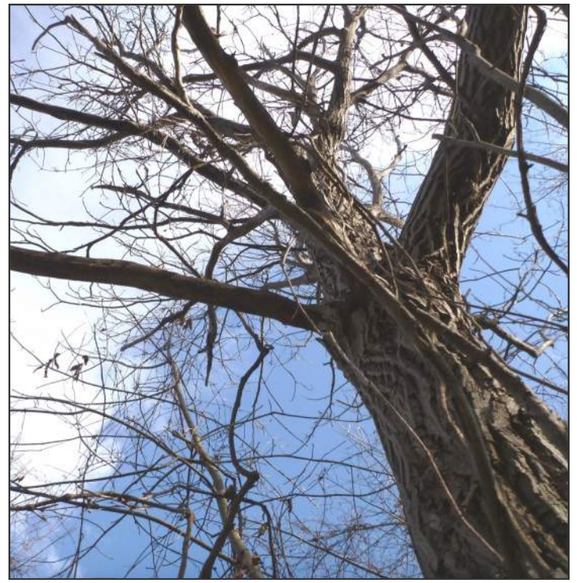


Photo 12: Upper portion of the Butternut tree. Oct 29, 2015

Photo 13: Mid-portion of the Butternut tree trunk (southeastern face). Oct 29, 2015

Photo 14: Root-flare of the Butternut tree. Oct 29, 2015

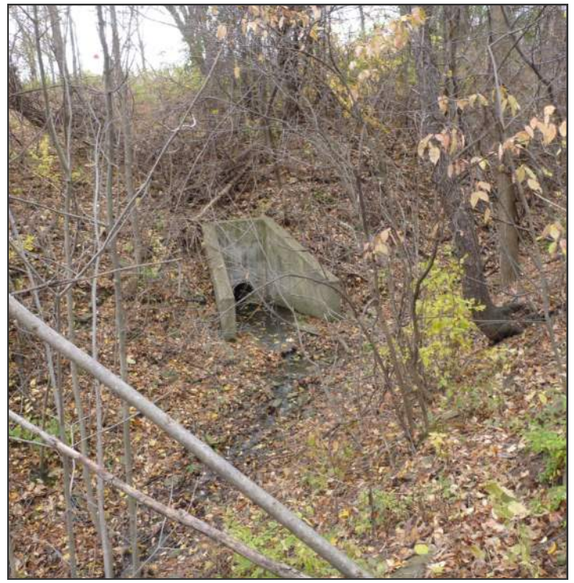


Photo 15: Habitat surrounding the Butternut tree including the Stormwater Management Outlet. Oct 29, 2015

Photo 16: Habitat surrounding the Butternut tree looking towards the outlet to the Credit River. Oct 29, 2015

WSP | MMM GROUP

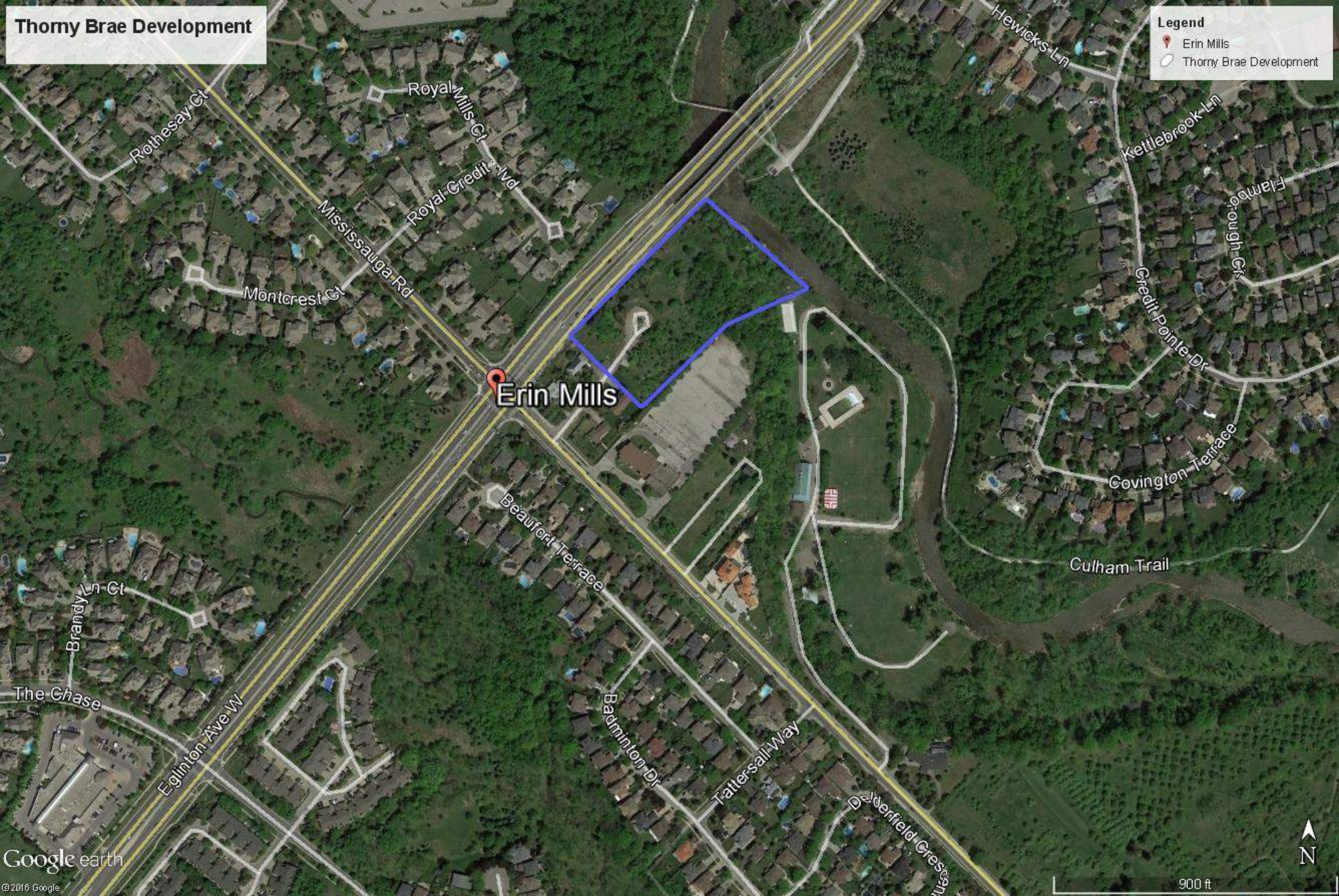
1745 to 1775 Thorny Brae Place Butternut Health Assessment

REPRESENTATIVE SITE PHOTOGRAPHS

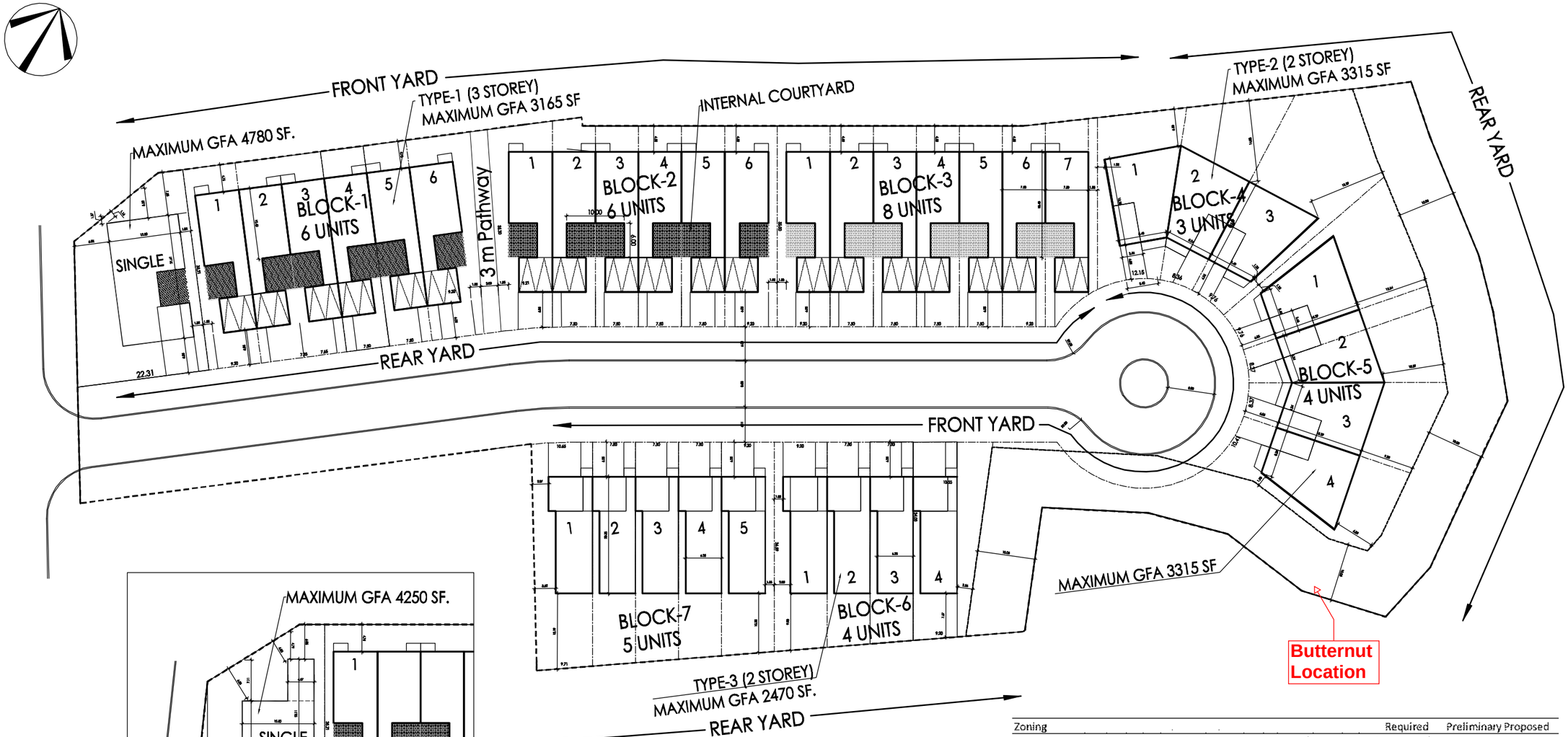
Date: Sept 2016

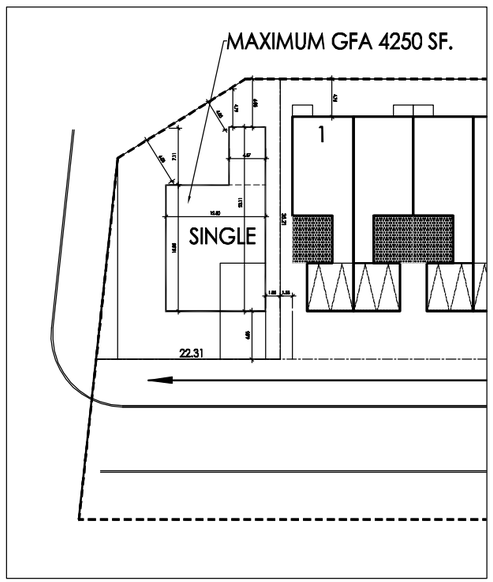
Project No: 3316536

BHA Report: 602 - 002


Thorny Brae Development
Legend
Erin Mills
Thorny Brae Development
Rothesay Ct
Royal Mills Ct
Royal Credit Ivd
Mississauga Rd
Montcrest Ct
Hewicks Ln
Kettlebrook Ln
Credit Pointe Dr
Covington Terrace
Culham Trail
Erin Mills
Beaufort Terrace
Brandy Ln Ct
The Chase
Eglinton Ave W
Badminton Dr
Tattersall Way
Google earth
©2016 Google
N
900 ft


EGLINTON AVENUE WEST
EGLINTON AVENUE WEST
(BY TOWN OF MISSISSAUGA BY-LAW No. 9377, INST. No. 189656VS)
(FORMERLY BASE LINE ROAD, ROAD ALLOWANCE BETWEEN OLD AND NEW SURVEYS, MUNICIPAL SURVEY No. 844)
PIN 13195-0077
LOT 1
PIN 13383-0022
LOT 2
PIN 13383-0023
EX.BRICK BUILDING
THORNY-BRAE PLACE
(DEDICATED BY REGISTERED PLAN 498)
THORNY-BRAE PLACE
(ESTABLISHED BY BY-LAW No. 6247, INST. No. 28131VS)
PIN 13383 0021
EX.150mmDI.WM
EX.50mmCU.WM
EX.50mmPE.WM
FH
W/KEY
LOT 5
PIN 13383-0566
EX.BRICK BUILDING
LOT 4
PIN 13383 - 0019
PART 1
PART 2
EX.BRICK BUILDING
CHURCH
CHURCH OF CROATIAN
MARTYRS #4605
MISSISSAUGA ROAD
LOT
RANGE
PIN 13383 0018
TOP OF BANK AS DEFINED BY THE CREDIT VALLEY CONSERVATION AUTHORITY
AS SHOWN ON A SKETCH BY YOUNG AND YOUNG SURVEYING INC.
6.0m STORM DRAINAGE EASEMENT
Butternut
Location





SINGLE LOT
- REAR AMENITY OPTION

Zoning	Required	Preliminary Proposed
Single Detached (R4)		
Lot Coverage	40%	40%
Min. Lot Frontage	16.5 m	21.31 m
Min. Lot Area	500 sq. m.	612.7 sq. m.
Min. Front Yard	6.0 m	6.0m
Ext. Side Yard	4.5 m	6.0 m
Rear Yard	7.5 m	5.22 m(Ave.)
Height	10.7 m	10.7 m
Street Towns (RM5)		
Min. Lot Frontage	6.8 m	7.5 m
Min. Lot Area	200 sq. m.	255 sq. m.
Min. Front Yard	4.5m	6.0m
Ext. Side Yard	4.5 m	N/A
Int. Side Yard		
Attached Side	0	0 m
Unattached Side	1.5 m	1.2 m
Attached Garage - Unattached Side	1.2 m	1.2 m
Rear Yard	7.5 m	4.5 m
Height	10.7 m	11 m
Maximum GFA - Residential	0.75 times of the lot area	1.1 times of the lot area

client
PACE DEVELOPMENTS

project
THORNY BRAE

title
Conceptual Site Plan

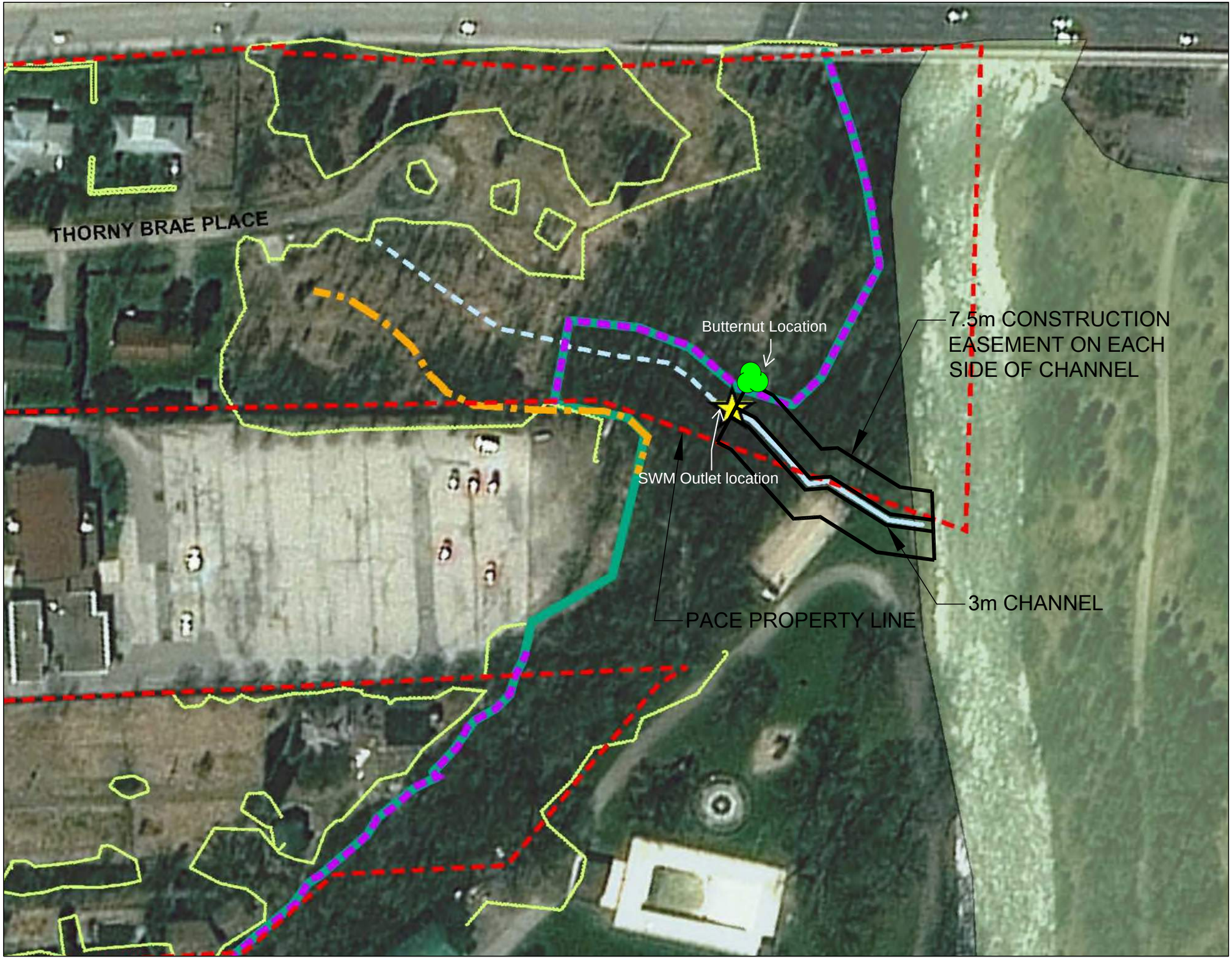
project #
16041

scale
1:750

RN design
Imagine • Inspire • Create

OPTION 3

EXISTING ALIGNMENT



water's edge
ENVIRONMENTAL SOLUTIONS TEAM LTD.

From: Kowalyk, Bohdan (MNRF)<bohdan.kowalyk@ontario.ca>
Sent: Wednesday, September 21, 2016 9:49 AM
To: McPhee, Jennifer
Subject: RE: Thorny Brae Place BHA, Mississauga

Sorry, yesterday I was responding from a remote connection and did not notice the attachment.

I have now noticed that you have assessed the tree to be in category 1. I can accept that. However, I have noted that this is a borderline case. Although no compensation for harm will be required, the recommendation is that the tree be protected. Please ensure that any nails in the tree are carefully removed.

I have seen the tree within the 30 day review period, so that should not be an issue. If there are any

questions, let me know.

Regards,

Bohdan Kowalyk, R.P.F.
Technical Specialist
Aurora District
Ontario Ministry of Natural Resources and
Forestry 50 Bloomington Road, Aurora, Ontario
L4G 0L8
Phone: 905-713-7387; Email: Bohdan.Kowalyk@Ontario.ca

-----Original Message-----
From: McPhee, Jennifer [McPheeJ@mmm.ca]
Sent: Tuesday, September 20, 2016 3:49 PM
To: Kowalyk, Bohdan (MNRF)
Subject: RE: Thorny Brae Place BHA, Mississauga

Hello Bohdan,

The client for Thorny Brae Place was wondering if the 30 day review period started from the day the BHA report was initially submitted or if it began on September 8th, when the report was re- submitted.

Cheers,
Jenn [cid:image002.png@01D21356.9CD20350]

_____
Jennifer McPhee, M.Sc Ecologist – Botanist

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www.mmmgrouplimited.com<http://www.mmmgrouplimited.com/> |
www.wspgroup.ca<http://www.wspgroup.ca/>

From: Kowalyk, Bohdan (MNRF) <bohdan.kowalyk@ontario.ca>
Sent: Tuesday, September 06, 2016 5:08 PM
To: McPhee, Jennifer
Cc: Gross, Jeff
Subject: RE: Thorny Brae Place BHA report, Mississauga

Hello Jennifer,

The Butternut and the proposed development are in what appears to be a significant woodland. I should review on-site. Let me know how this should be arranged. I am currently available September 7 (afternoon), 13, 15, 16…

Regards,

Bohdan Kowalyk, R.P.F.
Technical Specialist
Aurora District
Ontario Ministry of Natural Resources and Forestry
50 Bloomington Road, Aurora, Ontario L4G 0L8
Phone: 905-713-7387; Email: Bohdan.Kowalyk@Ontario.ca

From: McPhee, Jennifer [mailto:McPheeJ@mmm.ca]
Sent: September-06-16 4:36 PM
To: Kowalyk, Bohdan (MNRF)
Cc: Gross, Jeff
Subject: Thorny Brae Place BHA report

Hello Bohdan,

Attached is a copy of the Butternut Health Assessment report that was prepared for 1745 to 1775 Thorny Brae Place. I have sent two hard copies to your office. Please let me know if you have any questions or comments about the report.

Cheers,
Jenn

Jennifer McPhee, M.Sc
Ecologist – Botanist

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DOUGAN ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
77 Wyndham Street South • Guelph, ON N1E 5P9 • T 519.822.1609 • F 519.822.5265 • www.dougan.ca

February 18th, 2009

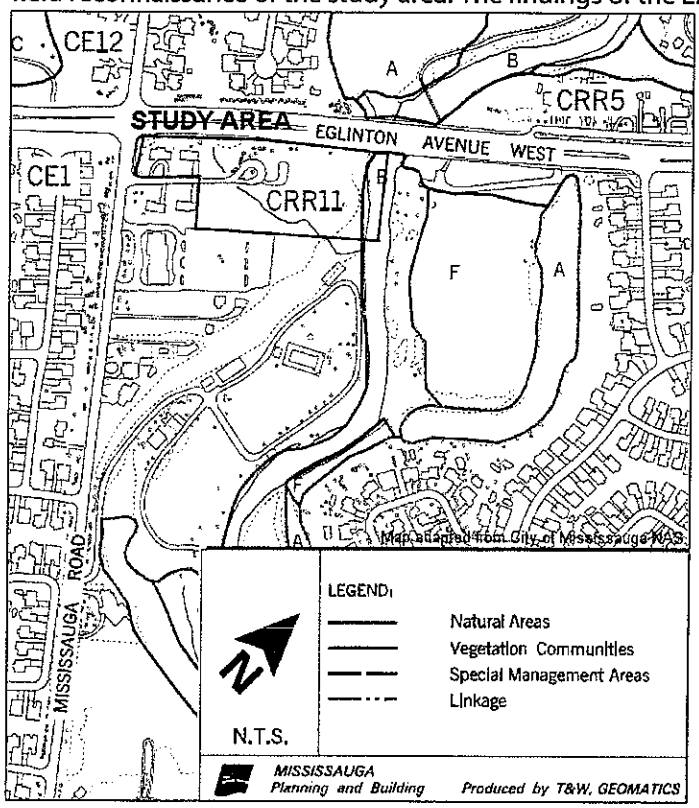
Paul Federico & Patrick Iaboni
Berkley Developments
20 Rivermede Rd. Suite 204
Concord, ON

Re: Scoped Environmental Impact Study for Thorny Brae Place
Part of Lot 3 & 4, Range 5 (N. of Dundas Street), Mississauga, Ontario.

Dear Sir,

As per your request, we have completed a Scoped Environmental Impact Study (EIS) for the subject property at 1745-1775 Thorny-Brae Place, Mississauga, Ontario. This EIS represents an update to an earlier EIS submitted by our firm in 2005. The EIS addresses the new development form for the site as well as comments raised by CVC staff (letter from M. Crechiolo to City dated June 9, 2008). The purpose of the EIS remains as follows: a) to characterize existing ecological conditions, b) to identify environmental constraints, c) to evaluate potential impact of the proposed high density residential development and d) to identify measures for avoiding and/or mitigating the effects of the potential impacts.

The EIS was prepared using available background information and primary data collected through field reconnaissance of the study area. The findings of the EIS are outlined in this letter report.



The subject property is bound on the north by Eglinton Avenue, the Credit River valley to the east and Mississauga Road to the west (see Figure 1). The site is approximately 2.2 ha in size; 1.6 ha consists of tableland and the remainder is valley.

A review of available background information revealed that the eastern portion of the subject property contains lands associated with Credit River valley. These valley lands are identified aspart of an Environmentally Sensitive Area (ESA) and referred to as City of Mississauga Natural Area (CRR11). According to the City of Mississauga Natural Areas Survey's (NAS) mapping (see Figure 1), the ESA designation applies to the valleyland portions of the subject property. The limits of the ESA

were identified in the field with CVC staff on November 12th, 2008. The ESA boundary was subsequently surveyed and incorporated into the current site plan.

The 2006 City of Mississauga Natural Areas Survey (NAS) summary sheet for this natural area (CRR11) was reviewed for the purpose of identifying significant natural heritage resources that may be present in the study area. A query of the NHIC database was also completed and identified one known element occurrence for a special concern species occurring within a square kilometer of the site. The sensitive species was recorded in 2002 from a site situated on the east side of the Credit River. No other background information was available for the site or immediate environs.

Characterization of natural heritage resources on the subject property was completed using information obtained through field surveys and site visits carried out between 2005 and 2008 (see Table 1). Vegetation communities present on the subject lands were mapped and classified to ecosite level according to Ecological Land Classification for Southern Ontario (Lee *et. al.* 1998). Vascular plants observed during the field surveys were recorded in a checklist and their status identified based on Vascular Plant Flora of the Greater Toronto Area (Varga *et al.* 2005). Incidental wildlife and breeding bird surveys were completed by traversing the site and searching under cover objects.

Table 1. Summary of site visits.

Date	**Purpose of Site Visit**
April 4, 2005	Site Reconnaissance
May 16, 2005	Vegetation Survey
March 29, 2006	Butternut Survey
May 28, 2007	General Site Visit
June 18, 2007	Wildlife Survey
October 10, 2008	Butternut Assessment
November 12, 2008	Site Visit with CVC to flag ESA limit

FINDINGS

Vegetation Communities

Vegetation resources on the subject property consist primarily of semi-natural communities. The tableland is relatively open and there is evidence of recent filling and dumping. The site also contains the remnants of a former residential dwelling and associated landscaping elements (i.e. ornamental plantings). As a consequence, the tableland potion of the subject lands is dominated by early successional species and ornamental trees and shrubs. The open areas have been classified as cultural meadow and groupings of trees and shrubs have been classified as cultural woodland and cultural thicket. The eastern third of the subject lands is associated with the steep slopes of the Credit River valley that support deciduous forest. At the southern portion of the site, there is a small draw feature and associated ephemeral watercourse that drains into the main Credit River valley near the south eastern corner of the site. This draw feature is comprised of lowland deciduous forest dominated by green ash, American elm and Manitoba maple.

A total of 7 individual vegetation polygons have been mapped for the site (see Figure 2). A summary of key biophysical attributes associated with these communities is provided in Table 2

Table 2: Summary of Vegetation Communities on the subject property.

Unit Number	1	2	3	4(2)	5	6	7
Vegetation Type	Cultural Woodland	Cultural Thicket	Cultural Meadow / Thicket Complex	Cultural Woodland / Thicket Complex	Cultural Thicket	Deciduous Forest	Parkland
Overstorey Composition	Blue Spruce Cedar Red Pine White Elm	Hawthorn Grey Dogwood	Large-tooted Aspen Eastern Cottonwood Lombardy Poplar	White Elm Black Walnut	White Elm Red Pine Crack Willow Butternut	Green Ash Black Cherry White Elm American Basswood Bitternut Hickory Butternut	
Understorey Composition			Staghorn Sumac Common Apple Black Raspberry Common Grape	Hawthorn sp. Tartarian Honeysuckle Black Raspberry	White Elm Tree of Heaven Staghorn Sumac Black Raspberry Tartarian Honeysuckle Black Walnut Gray Dogwood	Hawthorn sp. Manitoba Maple Green Ash Tartarian Honeysuckle Gray Dogwood Black Walnut Golden-bells	
Groundcover Composition	Smooth Brome Quack Grass	Smooth Brome Teasel Common Grape Canada Thistle	Smooth Brome Common Teasel Queen Anne's Lace Quack Grass St. John's-wort Kentucky Bluegrass Burdock	Smooth Brome Canada Goldenrod	Smooth Brome Canada Goldenrod Common Teasel Garlic Mustard	Woodland Strawberry Yellow Avens Dame's Rocket Garlic Mustard Common Grape	Mown grass
Diameter Range	1-2	1	1	1	1	1-2	1
Structural Diversity	1	1	1	1	1	2	1
Canopy Closure	1-2	1	1	1-2	1	2	1
Relative Age	1	1	1	1	1	1	1
Soil Texture	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam
Drainage Class	1	2	1	1	1	1-2	1
Slope Class	1	1	1	1-2	1-2	3	1
Topographic Class	1	1	1	1	1	1	1
Botanical Quality	1	1	1	1	1-2	2	1

Diameter Range (1=<15 cm d.b.h.; 2=15-30 cm d.b.h.; 3=>30cm d.b.h.) | **Structural Diversity** (1=low; 2=moderate; 3=high) | **Canopy Closure** (1=<25%; 2= 25-60%; 3=>60%) **Relative Age** (1=early; 2=mid 3=late; 4 =old growth) | **Soil Texture** (sand/silt/clay/org) | **Drainage** (1=rapid; 2= well; 3=imperfect; 4=poor) | **Slope** (1=0-9%; 2=9-30%; 3=>30%) **Topographic Class** (1=even; 2=uneven; 3= complex) | **Botanical Quality** (1 = disturbed, exotics; 2 = low diversity; 3 = high diversity (sig spp. Present). **Abbreviations:** ( ) represent localized condition; D=Dominant (60-100%); A=Abundant (25-60%); F=Frequent (10-25%); O=Occasional (0-10%);

Plant Species

A total of 49 vascular plant species have been documented from the site. Approximately 67% of the species observed are considered native to Ontario, while the remaining 33% are considered introduced, and include highly invasive species such as garlic mustard, dame's rocket and Manitoba maple. A complete list is provided in Appendix 1. The diversity and quality of species and habitats improves notably as one approaches the valley wall of the Credit River beyond the existing headwall, where the presence of mature red oak, white elm, bitternut hickory, black cherry and native woodland understorey and groundcover species (trout lily, bloodroot, zigzag goldenrod) becomes evident.

Of the native species present on the site, only Butternut (*Juglans cinerea*) is considered significant. This species is endangered in Canada and Ontario due to its susceptibility to a pathogen that has resulted in widespread declines to native populations. Two individuals of this species have been identified on the subject property. The locations of Butternut are depicted on Figure 2. Of the two trees in the setback zone, one individual is dead and no longer standing and the other is poor health with severe crown dieback.

A health assessment of the single live butternut specimen was performed on October 10th, 2008 according to MNR protocols. The specimen did not meet the required criteria to be subject to regulation under the Ontario Endangered Species Act (2008). A copy of the Butternut health assessment is included in Appendix 3. The 2005 EIS erroneously reported a number of possible additional specimens on the site; however a more thorough review revealed that they corresponded with young Black Walnut saplings, a related species without status.

Wildlife

Wildlife species were surveyed during the breeding season by Karl Konze on June 18th, 2007 between 6:00 and 7:15 a.m. Conditions were sunny, warm (16 – 21 °C) and relatively humid, with almost no wind. All habitats of the study area were visited, except for the most severe of slopes adjacent to the Credit River, slowly walking from one area to the next. Regular stops were made to listen and observe wildlife species. Observations from adjacent habitats just beyond the study area boundary were also included incidentally.

One other incidental wildlife observation was made by Ken Ursic on May 16th, 2005. A single Eastern Red-backed Salamander was observed near the storm sewer outfall headwall at the bottom of the tributary draw.

A total 27 species of wildlife were documented from the subject lands and immediate vicinity in 2007. This included 2 species of butterfly, 2 species of herpetofauna (amphibian and reptiles), 21 species of birds and 2 species of mammal (Appendix 2). None of the 27 species are 'Species at Risk' in Ontario (OMNR, 2006) or Canada (COSEWIC, 2007). That is, none of them are designated "Special Concern", "Threatened", or "Endangered."

At the regional scale, two species are considered significant, Northern Flicker (*Colaptes auratus*) and Baltimore Oriole (*Icterus galbula*) (OPIF, 2006). A single Northern Flicker was observed atop a tall conifer near the centre of the site. It called several times and was likely eyeing the area below to forage in. No suitably large snags were observed on the property to suggest nesting was occurring. A Baltimore Oriole was heard sing near to along the slope adjacent to Credit River, just south of the

property boundary. No other breeding status information was gathered on the individual at the time but suitable habitat was present on both the subject lands and adjacent property.

At the local scale, two species are considered to be of conservation concern in the Credit Watershed (CVC, 1997). They were Cliff Swallow (*Petrochelidon pyrrhonota*) and Gray Catbird (*Dumetella carolinensis*). A pair of Cliff Swallows was observed nesting under the west bound lanes of the bridge over the Credit River. None of the birds were observed flying over the site to forage although this could be a possibility. Rather, these birds were likely associating with the river. A single Gray Catbird was heard singing from a group of shrubs directly west of the Thorny Brae Place turning circle.

No area-sensitive breeding bird species was also noted during the field survey. Area sensitive species require large areas of suitable habitat in order to sustain their populations (OMNR, 2000).

Ecological Functions

The subject property supports a variety of basic ecological functions and services including provision of habitat for generalist species, erosion control, water storage and flow attenuation. In addition to providing habitat for generalist wildlife species and one endangered tree species, the site offers supportive functions to the ESA that include buffering of the interface between the urban and open space environments and foraging opportunities for species that reside or migrate through the ESA. The subject property is surrounded on three sides by urban land uses. The semi-natural features do provide for separation between the two land uses. In terms of wildlife corridors, the site does not provide linkage opportunities to other natural areas. The ravine currently offers generalist species such as raccoon, deer and coyote an access point into the Credit River valley; however this function is limited to the site scale. The wooded and thicket habitats in the ravine likely support a small population of tree nesting birds. There are no vernal pools or habitat for sensitive amphibian species associated with the study area; however the rocky ledges along the valley slope do support habitat for Red-backed Salamander. One individual of this species was observed downstream of the outfall.

Description of the Proposed Development

The proposed development consists of three apartment buildings (see Figure 3). Apartment buildings A1 (8 storeys), A2 (8 storeys) & B (4 storeys) have a combined footprint of 1.22 ha. Each apartment building will have 2 levels of underground parking and will be to be constructed entirely on the tableland portion of the property outside the ESA. Access to the buildings will be from Eglinton Ave and Thorny-Brae Place.

A 5.0 metre ecological buffer has been specified adjacent to the ESA for the purposes of protecting adjacent trees and general ecological functions in the ESA. In addition, there is a 10.0 m geotechnical setback from the long-term stable top of slope that has the effect of increasing the ESA buffer dimension further. It is proposed that the ESA buffer and geotechnical setback be retained in a natural state. The development will occur outside the ESA and associated buffer zones which will be retained as Open Space.

Stormwater management for the site will be provided through a series of storage tanks to be constructed within the underground parking areas. Stormwater runoff will be controlled in a manner that is consistent with CVC and City SWM criteria (refer to Functional Servicing Report by Skira & Associates, 2009). Stormwater discharge will be controlled on site and conveyed to the draw feature via a grassed swale and sewer pipe. The sewer pipe will outlet through a headwall structure to be constructed in the middle of the draw feature. This represents to only component of the proposal that will occur within the ESA.

Impact Assessment

The proposed high-rise residential development will occur on lands that are situated outside the limits of the Credit River Valley ESA. The only component of the proposed development that will occur within the ESA is the stormwater drainage outlet, which is confined to a small area within the draw feature. The limit of development is coincident with the greater of the ESA buffer or 10.0 m geotechnical setback (Figure 3). The specified buffers and setbacks are considered more than adequate to protect ESA features and functions. Indirect impacts to trees and vegetation resources can be mitigated by establishing fencing at the limit of development and through diligent site supervision during construction. Sediment and erosion controls should be installed prior to construction and maintained and monitored for the duration of construction.

There is a possibility that the ESA features and functions could be impacted during construction. Site preparation activities such as clearing, grubbing, grading and excavation could potentially result in encroachment onto the ESA and its associated buffers and setbacks. Such impacts can be avoided by installing appropriate construction fencing and signage at the limit of development. There is a possibility that sediment laden runoff from the site may enter the draw and Credit River and have an indirect impact. Such impacts can be avoided by implementing appropriate BMP's such as settling ponds, silt fencing, straw bales and rock check dams.

There is a small portion of the draw feature within the ESA that will be affected by the construction of a headwall for the storm drainage outlet. It will be necessary to remove several trees to facilitate the construction of the sewer pipe and headwall structure. It should be noted that most of the vegetation within the upper and mid portions of the draw feature consists of non-native invasive species. As such, the anticipated impacts to the ESA are considered negligible and temporary in duration. The impacts to vegetation can be mitigated by rehabilitating the area with native species that are compatible with the ESA. A rehabilitation plan for this area will be submitted to the City and CVC at the detailed design stage.

Under post development conditions, runoff from the adjacent lands will flow freely to the draw as it does at present. Future runoff from the site will be collected on the roofs and in storage tanks to be located in the underground parking area. This runoff, captured from the buildings, terraces and landscaped areas of the site will be used for site irrigation. Excess runoff from storm events will be controlled in accordance with CVC and City SWM criteria and conveyed via pipe to an outfall structure located in the draw. It is anticipated that there will be a net increase in post-development runoff volumes from the site somewhere in the order of 4% under a 10 year event. To ensure there is no net increase in erosion within the draw, it is recommended that the outfall bottom be lined with rip rap or similar. For more details regarding the proposed stormwater management plan for the site, please refer to the Functional Servicing Report prepared by Skira & Associates (2009).

The proposed development will include underground parking facilities at each building. The CVC has expressed a concern that the underground parking structures may interfere with groundwater movement toward the valley and potentially impact on baseflow contributions to the Credit River. The geotechnical investigation prepared by McClymont and Rak Engineers Inc. (2009) indicated that groundwater flow is at considerable depth and toward the valley. The two level underground parking facilities under each high rise will not interfere with potential groundwater flow contributions to the ESA as groundwater levels are at elevations below that of the building foundations (*pers comm*: Lad Rak (McClymony & Rak) 2009).

There are a number of post construction activities that could indirectly impact the ESA. These include impacts associated with the increased proximity of human habitation to the ESA. It is anticipated that the adjacent ESA may experience increased trail use by pedestrians, cyclists and pets. Given the narrowness of the ESA in this location and the lack of a formal trail, efforts should be made to guide potential recreational users to designated trails and discourage utilization of the existing informal trail adjacent to the site. Such impacts can be mitigated by installing fencing and signage. Other indirect impacts from the proposed development that may affect the ESA include artificial lighting, noise and runoff. These can be mitigated by installing light shields on any external light fixtures to prevent light from infiltrating the ESA.

Direct impacts to the non-ESA portions of the site will include partial removal of semi-natural vegetation features and habitat for generalist wildlife species (Figure 4). The affected features provide limited supportive functions to the ESA and their removal can be mitigated by intensively landscaping the site using native trees and shrubs and through naturalization of underutilized portions of the site. The utilization of native species in site landscaping can function as an important native seed source that can enhance the adjacent ESA. Additional enhancement can be achieved by restoring portions of the ESA and buffer zones. A vegetation management strategy should be developed for the area identified on Figure 5 with the objective of controlling invasive species and enhancing biodiversity through supplemental plantings of native species that are complimentary to the ESA.

Recommendations

The impact assessment section above includes a number of recommendations for mitigating potential impacts associated with the proposed development. A summary of these recommendations has been provided below for convenience. It is intended that these recommendations be incorporated as conditions of site plan approval to ensure their implementation. Key recommendations are as follows:

1. Establish the limit of development at the greater of the ESA buffer or 10.0 m geotechnical setback as depicted on Figure 3 of the EIS.
2. The landscaping plan for the site should fully utilize native species compatible with the adjacent ESA. It should include details for the formal landscaped areas, areas to be naturalized, outdoor lighting fixtures with appropriate shielding to light prevent spillage into the ESA, permanent fencing and associated signage informing residents to respect the ESA.
3. Vegetation clearing on the site should be carried out between August and April so as to avoid impacting potential nesting birds on the site.
4. Prior to construction, erect plywood hoarding at the limit of development and install signage to inform contractors to stay out of the natural area.
5. Prior to construction, prepare and implement a sediment and erosion control plan to ensure protection of the ESA.
6. Prior to construction, erect temporary fencing around the perimeter of the area to be affected by the construction of the storm sewer and headwall.
7. Prior to construction, submit a rehabilitation plan, to the satisfaction of the CVC and City, for the area to be affected by the construction of the storm sewer and outlet headwall within the ESA.
8. Prior to construction, submit a vegetation management strategy and plan, to the satisfaction of the CVC and City, for the management of invasive species and restoration and enhancement areas depicted on Figure 5 of the EIS.
9. During active construction, full time site supervision must be provided to monitor and report on the condition of the environmental protection measures (fencing, s&e controls).

10. During construction of the storm sewer infrastructure within the draw portion of the ESA, full time site supervision by an environmental inspector must be provided to monitor and report on the condition of the environmental protection measures (fencing, s&e controls).
11. Following construction, the applicant shall implement a rehabilitation plan for the area to be affected by the construction of the storm sewer and outlet headwall within the ESA, to the satisfaction of the CVC and City.
12. The applicant shall monitor the rehabilitation area for a period of 2 years to ensure the area has been restored to the satisfaction of the CVC and City.
13. Following construction, the applicant shall implement the initial 2 year phase of the vegetation management strategy for the restoration and enhancement areas depicted on Figure 5 of the EIS to the satisfaction of the CVC and City.

Conclusions

This scoped EIS is based on a review of available background information, technical studies and primary data collected through field inventories of natural heritage resources. These data were used to identify environmental opportunities and constraints on the subject lands, establish ecologically appropriate boundaries and buffers to the ESA, and assess potential direct and indirect impacts of the proposed development on the ESA.

The proposed development will occur on lands that are situated primarily outside the Credit River Environmentally Sensitive Area and do not support any significant natural heritage resources. The development limits have been established in consultation with CVC staff at the greater of the ESA buffer or 10.0 m geotechnical setback (ref. Figure 3). It is our opinion that these setback distances are more than adequate to protect the ESA's natural heritage features and ecological functions. There is a small portion of the draw feature contained within the ESA will be temporarily impacted by the installation of a storm sewer and outlet structure. These impacts will consist of localized vegetation removal and can be mitigated though rehabilitation. It is not anticipated that this impact will adversely affect the ESA or its functions.

Indirect impacts associated with the proposed development may potentially include encroachment related impacts stemming from increased proximity of structures and human activities to the ESA, and drainage related impacts to receiving watercourses. The EIS includes a series of recommendations for mitigating potential impacts that could adversely affect the ESA feature and its functions. Implementation of these recommendations will ensure that the ESA is not adversely affected. The EIS also identifies additional restoration and enhancement opportunities within the buffer zones that we believe can provide ecological benefits to the ESA.

The proposed development will have a direct impact on natural heritage resources associated with the non-ESA portions of the site. The affected tableland area is comprised of semi-natural vegetation cover that provides some basic ecological functions. The loss of these resources can be mitigated in part through the use of intensive landscaping and naturalization of underutilized portions of the site.

In conclusion, it is our opinion that the proposed development will not have a significant negative impact on the natural heritage features and functions of the ESA provided the recommendations outlined in this report are incorporated as conditions of site plan approval.

Should you have any questions or concerns, please do not hesitate to contact me.

Sincerely,

Ken Ursic, M.Sc.
Sr. Ecologist & Manager

Appendix 1. List of vascular plants observed on the subject property.

SCIENTIFIC NAME	COMMON NAME	COSEWIC	MNR SAR	GTA	Native Status
Acer negundo	Manitoba Maple				N
Acer platanoides	Norway Maple				I
Ailanthus altissima	Tree-of-heaven				I
Alliaria petiolata	Garlic Mustard				I
Anemone virginiana var. alba					N
Arctium minus ssp. minus	Lesser Burdock				I
Bromus inermis ssp. inermis	Smooth Brome				I
Carduus nutans ssp. leiophyllus	Musk Thistle				I
Carya cordiformis	Bitternut Hickory				N
Circaea lutetiana ssp. canadensis	Enchanter's Nightshade				N
Cornus alternifolia	Alternate-leaf Dogwood				N
Cornus foemina ssp. racemosa	Gray Dogwood				N
Crataegus sp	Hawthorn Species				?
Daucus carota	Queen Anne's Lace				I
Dipsacus fullonum ssp. sylvestris	Common Teasel				I
Elymus repens	Quack Grass				I
Erythronium americanum ssp. americanum	Yellow Trout-lily				N
Fragaria virginiana ssp. virginiana	Virginia Strawberry				N
Fraxinus pennsylvanica	Green Ash				N
Geranium maculatum	Wild Geranium			U	N
Geum aleppicum	Yellow Avens				N
Hesperis matronalis	Dame's Rocket				I
Hypericum canadense	Canadian St. John's-wort			R	N
Juglans cinerea	Butternut	END	END		N
Juglans nigra	Black Walnut				N
Lonicera tatarica	Tartarian Honeysuckle				I
Malus pumila	Common Apple				I
Parthenocissus inserta	Thicket Creeper				N
Picea pungens	Colorado Spruce				I
Pinus resinosa	Red Pine			R	N
Poa pratensis ssp. pratensis	Kentucky Bluegrass				N
Populus deltoides ssp. deltoides	Eastern Cottonwood				N
Populus grandidentata	Large-tooth Aspen				N
Populus sp	Poplar Species				N
Prunus avium	Sweet Cherry				I
Prunus serotina	Wild Black Cherry				N
Rhus radicans ssp. negundo	Poison Ivy				N
Rhus typhina	Staghorn Sumac				N
Rubus occidentalis	Black Raspberry				N
Salix fragilis	Crack Willow				I
Sanguinaria canadensis	Bloodroot				N
Solidago canadensis	Canada Goldenrod				N
Solidago flexicaulis	Broad-leaved Goldenrod				N
Taraxacum officinale	Common Dandelion				I
Thuja occidentalis	Northern White Cedar				N
Tilia americana	American Basswood				N
Ulmus rubra	Slippery Elm				N
Vitis riparia	Riverbank Grape				N

Appendix 2. Wildlife species observed on the subject property - June 18, 2007.

	Common Name	Scientific Name	Conservation Status						Area Sensitivity[6]	Numbers & breeding status observed[7]
			National	Provincial		Regional		Local		
			COSEWIC[1]	MNR[2]	SRanks[3]	BCR 13[4]	Former MNR 'Central Region'	Credit Watershed[5]		
	BUTTERFLIES									
1	European Skipper	*Thymelicus lineola*	---	---	SE	n/a	n/a	---	---	6
2	Cabbage White	*Pieris rapae*	---	---	SE	n/a	n/a	---	---	1
	AMPHIBIANS & REPTILES									
1	Eastern Red-backed Salamander*	*Plethodon cinereus*	---	---	S5	n/a	Abundant & Widespread	---	---	1
2	DeKay's Brownsnake	*Storeria dekayi*	NAR	NAR	S5	n/a	Common & Widespread	---	---	1 dead on road
	BIRDS									
1	Mallard	*Anas platyrhynchos*	---	---	S5B	---	n/a	---	---	1
2	Spotted Sandpiper	*Actitis macularius*	---	---	S5B	---	n/a	---	---	1H
3	Rock Pigeon	*Patagioena livia*	---	---	SE	---	n/a	---	---	4H (under bridge)
4	Mourning Dove	*Zenaida macroura*	---	---	S5B	---	n/a	---	---	1S, 1H
5	Northern Flicker	*Colaptes auratus*	---	---	S5B	PLS	n/a	---	---	1S
6	Warbling Vireo	*Vireo gilvus*	---	---	S5B	---	n/a	---	---	1S
7	American Crow	*Corvus brachyrhynchos*	---	---	S5B	---	n/a	---	---	1S
8	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	---	---	S5B	---	n/a	---	---	2
9	Cliff Swallow	*Petrochelidon pyrrhonota*	---	---	S5B	---	n/a	CC	---	2 (under bridge)
10	Black-capped Chickadee	*Poecile atricapilla*	---	---	S5	---	n/a	---	---	1S, 1CF
11	American Robin	*Turdus migratorius*	---	---	S5B	---	n/a	---	---	1S
12	Gray Catbird	*Dumetella carolinensis*	---	---	S5B	---	n/a	CC	---	1S
13	European Starling	*Sturnus vulgaris*	---	---	SE	---	n/a	---	---	1CF, 4H
14	Yellow Warbler	*Dendroica petechia*	---	---	S5B	---	n/a	---	---	1P, 1A
15	Song Sparrow	*Melospiza melodia*	---	---	S5B	---	n/a	---	---	1CF, 2S
16	Northern Cardinal	*Cardinalis cardinalis*	---	---	S5	---	n/a	---	---	1S, 1H
17	Brown-headed Cowbird	*Molothrus ater*	---	---	S5B	---	n/a	---	---	1S, 2FY, 1FY
18	Baltimore Oriole	*Icterus galbula*	---	---	S5B	PLS	n/a	---	---	1S
19	House Finch	*Carpodacus mexicanus*	---	---	SE	---	n/a	---	---	1X
20	American Goldfinch	*Carduelis tristis*	---	---	S5B	---	n/a	---	---	3s
21	House Sparrow	*Passer domesticus*	---	---	SE	---	n/a	---	---	1H
	MAMMALS									
1	Eastern Chipmunk	*Tamias striatus*	---	---	S5	---	n/a	---	---	2
2	White-tailed Deer	*Odocoileus virginianus*	---	---	S5	---	n/a	---	---	1heard, bed

*observed May 2005

0cm 3cm 15cm

APPENDIX 3

Butternut Data Collection Form 1

(PLEASE USE BLOCK LETTERS)

Date (dd/mm/yyyy) 11 - 10 - 2008

Contact Information

Surveyor Contact

First: VLADIMIR Last: KRICSFALUSY

Email: VLAD@DOUGAN

Telephone (519) 822-1609 Telephone Other ( ) - X

Property Owner (check if same as surveyor) ☐

First: Last:

Email:

Telephone ( ) - Telephone Other ( ) - X

Property Owner's Mailing address

Address: Postal Code: Prov.:

City:

Tree Location (if different from mailing address)

Address/ (911#): 1745-1775 THORNY BRAE PLACE

Township: Lot: Con:

City: MISSISSAUGA

Directions

☑ Yes ☐ No Can Share Location Information with other Butternut Recovery Organizations?

☑ Yes ☐ No Site visits OK? (prior arrangments will always be made for a site vist)

> (Greater than)
< (Less than)

Butternut Trees Tally by Diameter Class

(Do a dot tally in blank space; write total# in box for each)

Tree Condition	< 3 cm	3-15 cm	16-30cm	>30 cm
Vigorous: > 50% Live Crown Minor or no cankers				
Poor Vigor: <50% Live Crown or >50% Live Crown + heavily cankered stem				1
Dead Notes				

Historically, do some trees produce seeds? ☐ Y ☐ N ☐ Unkown

Butternut Origin ☑ Natural ☐ Planted ☐ Unknown

Estimated area containing butternut for properties > 1 acre (0.4 hectares): 10 ☑ Acres ☐ Hectares

Overall Property Description (area(s) containing Butternut)

☐ Rolling Upland ☐ Bottomland
☐ Valley Slope ☐ Variable
☑ Tableland ☐ Unknown

Vegetation Community/ies

☐ Open ☐ Fencerow
☐ Shrubland ☐ Roadside
☐ DeciduousForest ☐ Quary
☐ ConiferForest ☑ UrbanYard
☐ MixedForest ☐ UrbanPark

Other

Page Link

Surveyor ID

(Contact Information follows all applicable privacy policies and guidelines)

Please return forms to:
Forest Gene Conservation Association
Suite 233, 266 Charlotte St.
Peterborough, ON, K9J 2V4
www.fgca.net

38426

Butternut Data Collection FORM-2 (PLEASE USE BLOCK LETTERS) *Fill when Form1 indicates canker is well established*

Site Code(A,B,...Z, AA...):

Please enter matching page link code at bottom left of form 1 and 2

Date (dd/mm/yyyy): 11 - 10 - 2008

Surveyor Contact First: VLADIMIR Last: KRICSFALUSY

Telephone (519) 822-1609

Butternut Site Features

Soil Texture ☐ Clay ☐ Clay Loam ☐ Loam ☐ Loamy Sand ☐ Sand ☐ Variable ☐ Unknown

Soil Depth ☐ > 1metre ☐ 30 - 99cm ☐ < 30cm ☐ Variable ☐ Unknown

Soil Drainage ☐ Well Drained ☐ Moderately Drained ☐ Poorly Drained ☐ Unknown

Tree ID Numbering: 1,2,3,...Starting from 1 for each site

Tree 1

Tree #: 1 | Zone: 1 | Easting: 796931 | Northing: 4356942

Crown Class: 2 | Crown Vigour: 3

☐ Twig Dieback ☑ Branch Dieback ☐ Defoliation ☐ Discolouration

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☑ None

DBH(cm): >30 | #Stems: 1 | Main Stem Length(m) Below crown: 4

Assess below live crown: #Epic-Live: 0 | #Epic-Dead: 0 | Bark Type: S | # Callused Wounds: 1

	#Open	#Sooty
Root	2	
=<2m	1	
>2m	3	1

Metres from badly cankered tree (dead): ☑ < 40 ☐ > 40 ☐ None Found

Competing Species: FRAAMER

Tree 2

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Crown Vigour:

☐ Twig Dieback ☐ Branch Dieback ☐ Defoliation ☐ Discolouration

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

DBH(cm): | #Stems: | Main Stem Length(m) Below crown:

Assess below live crown: #Epic-Live: | #Epic-Dead: | Bark Type: | # Callused Wounds:

	#Open	#Sooty
Root		
=<2m		
>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

Tree 3

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Crown Vigour:

☐ Twig Dieback ☐ Branch Dieback ☐ Defoliation ☐ Discolouration

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

DBH(cm): | #Stems: | Main Stem Length(m) Below crown:

Assess below live crown: #Epic-Live: | #Epic-Dead: | Bark Type: | # Callused Wounds:

	#Open	#Sooty
Root		
=<2m		
>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

Tree 4

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Crown Vigour:

☐ Twig Dieback ☐ Branch Dieback ☐ Defoliation ☐ Discolouration

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

DBH(cm): | #Stems: | Main Stem Length(m) Below crown:

Assess below live crown: #Epic-Live: | #Epic-Dead: | Bark Type: | # Callused Wounds:

	#Open	#Sooty
Root		
=<2m		
>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

Tree 5

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Crown Vigour:

☐ Twig Dieback ☐ Branch Dieback ☐ Defoliation ☐ Discolouration

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

DBH(cm): | #Stems: | Main Stem Length(m) Below crown:

Assess below live crown: #Epic-Live: | #Epic-Dead: | Bark Type: | # Callused Wounds:

	#Open	#Sooty
Root		
=<2m		
>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

Page Link: | Surveyor ID:

(Contact information follows all applicable privacy policies and guidelines)

Please return forms to:
Forest Gene Conservation Association
Suite 233, 266 Charlotte St.
Peterborough, ON, K9J 2V4
www.fgca.net

38426

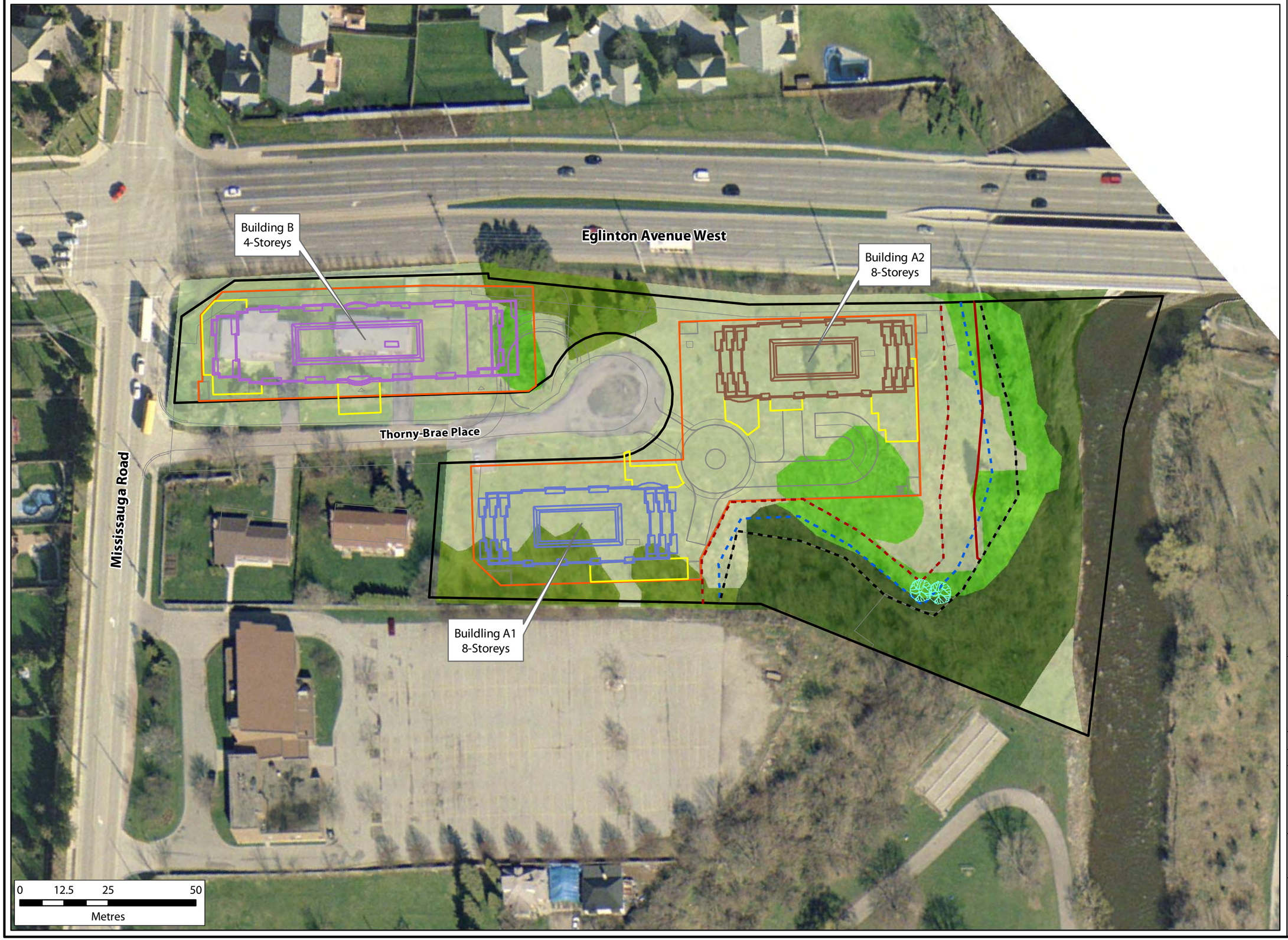
BUTTERNUT FOREST HEALTH SURVEY - Initial plot establishment

Plot Number: 1 **Location:** Mississauga
Date: 11/10/2008 **Evaluator:** Vladimir Kricsfalusy
ELC Site: CUW (cultural woodland)

Tree No.	Vigour [1]	dbh cm	% Live Crown	Canker Symptoms (y/n) - Stem (S)[2] - Branch (B)	Canker % of Stem circum.	Callused cankers? (y/n)	Archive * (y/n)	Other Pest/ Level[3]				UTM Coordinates NAD 83			√ Bark Phenotype (See Ostry photos)		Remarks
								P1	L1	P2	L2	Zone	Easting	Northing	Dark	Light	
e.g.	3	30	75	y-S, y-B	<20	y	y								√		Within 40m of dead Bn
1	3	30	50	y-S, y-B	10 <	y										√	#127

* - deemed archive potential due to evidence of callused cankers or no cankers though other butternut are dying within 40 m.
[1] Use the Crown Damage Assessment (NAMP) codes for these columns
[2] Evidence of sunken canker areas on branches – use of binoculars
[3] Use revised Forest Health Pest/Damage Codes

Sept 2005, Ed Czerwinski, Forest Health Specialist South Central Ontario
Ontario Ministry of Natural Resources, Peterborough ed.czerwinski@mnr.gov.on.ca



Legend

- Butternut
- Study Area Boundary

Top of Bank and Setbacks

- 5 & 10m Setback to Long Term Stable Top of Bank
- Long Term Stable Top of Bank
- ESA Limit
- Original Approved Top of Bank

Buildings

- Building A1
- Building A2
- Building B
- Amenity
- Underground Parking

Vegetation Community

- Anthropogenic
- Cultural Meadow
- Cultural Thicket
- Cultural Woodland
- Deciduous Forest

PROPOSED DEVELOPMENT AND ENVIRONMENTAL CONSTRAINTS

DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
77 Wyndham Street South • Guelph ON N1E 5R3
T 519.822.1609 • F 519.822.5389 • www.dougan.ca

PROJECT: DA05-10B

CLIENT: Beverly Developments

DATE: FEBRUARY 2009

SCALE: 1:1,000

DRAWN BY: LW

CHECKED BY: KU

UTM Zone 17 NAD83

MAP NUMBER:

4

APPENDIX L

DATA SHEETS

WSP | MMM GROUP

BREEDING BIRD SURVEY DATASHEET

Project Name: Credit River SWM outfall **Project Number:** 331S019

Date: June 23, 2016 Observers: S Gibbs & J McPhee Photo #s: —

Wildlife Survey Unit #: Whole site Station #: — Plate #: — ELC Unit: —

Road Chainage Start: — Road Chainage End: — Direction from Road: —

UTM Zone: — UTM Easting: — UTM Northing: — Accuracy(m): — Datum: —

SURVEY DETAILS

Start Time:	End Time:	Total Survey Time:	Start Temp (C):	End Temp (C):	Start Wind Code:	End Wind Code:	Start Sky Code:	End Sky Code:
8:25 am	10:00 am	95 min	16	20	1	1	0	0

Beaufort Wind Scale

0 = calm, smoke rises vertically (0-2km/hr), 1 = Light air movement, smoke drifts (3-5), 2 = Slight breeze, wind felt on face; leaves rustle (6-11), 3= Gentle breeze, leaves & twigs in constant motion (12-19), 4= Moderate breeze, small branches moving, raises dust & loose paper (20-30), 5= Fresh breeze, small trees begin to sway (31-39), 6= Strong breeze, large branches in motion (40-50)

Beaufort Sky Codes

0 = clear (no cloud cover), 1 = partly cloudy (scattered or broken) or variable, 2 = cloudy or overcast, 3 = sandstorm, duststorm or blowing snow, 4 = fog, smoke, thick dust, or haze, 5 = drizzle or light rain, 6 = rain, 7 = snow or snow/rain mix, 8 = showers, 9 = thunderstorms

SP. CODE	#	EV	COMMENTS
BCCH	3	S	
AMRO	3	FY	
SOSP	2	S	
GRCA	2	CF	
YEWA	1	FY	
CEDW	1	S	
AMGO	1	S	
EAST	1	S	
RWBL	1	S	
EAPH	1	FY	
TRES	1	FY	
COGR	1	—	
HOWR	1	S	
BAOR	1	S	
NOCA	1	S	
WAVI	1	S	
CHSP	1	S	
BLJA	2	FY	

SP. CODE	#	EV	COMMENTS

Breeding Bird Evidence Level:

Possible --- H = Species observed in its breeding season in suitable nesting habitat S = Singing male/breeding calls in suitable nesting habitat in breeding season

Probable --- T=Territory, A=Anxiety Behaviour, D=Display, P=Pair, N=Nest building, V=Visiting nest

Confirmed--- AE= Adult nest entry/exit, CF=Carrying Food, DD= Distraction, FS=Food/Faecal Sack, FY=Fledged young, NE=Nest with Eggs, NU=Used Nest, NY=Nest with Young

Observed-- X= Species observed in its breeding season (no breeding evidence)

WSP | MMM GROUP

GENERAL WILDLIFE SURVEY DATASHEET

Project Name: Credit River SWH Outfall Project Number: 3315019

Date: June 23, 2016 Observers: SG, HDS Photo #s: —

Wildlife Survey Unit #: Whole site Station #: — Plate #: — ELC Unit: —

Road Chainage Start: — Road Chainage End: — Direction from Road: —

UTM Zone: — UTM Easting: — UTM Northing: — Accuracy (m): — Datum: —

SURVEY DETAILS

Start Time:	End Time:	Total Survey Time:	Start Temp (C):	End Temp (C):	Start Wind Code:	End Wind Code:	Start Sky Code:	End Sky Code:
8:25am	10:00 am	16 min	16	20	1	1	0	0

Beaufort Wind Scale

0 = calm, smoke rises vertically (0-2km/hr), 1 = Light air movement, smoke drifts (3-5), 2 = Slight breeze, wind felt on face; leaves rustle (6-11),
3= Gentle breeze, leaves & twigs in constant motion (12-19), 4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30),
5= Fresh breeze, small trees begin to sway (31-39), 6 = Strong breeze, large branches in motion (40-50)

Beaufort Sky Codes

0 = clear (no cloud cover), 1 = partly cloudy (scattered or broken) or variable, 2 = cloudy or overcast, 3 = sandstorm, duststorm or blowing snow,
4 = fog, smoke, thick dust, or haze, 5 = drizzle or light rain, 6 = rain, 7 = snow or snow/rain mix, 8 = showers, 9 = thunderstorms

SWH / NOTABLE FEATURES

TY	EASTING	NORTHING	PHOTO #s	COMMENTS

FEATURE TYPES:
AB=Amphibian Breeding Habitat, H=Hibernacula, ML=Mineral Lick, MFA=Mast Foraging Area, RN=Raptor Nest, SN=Snag, SP=Seepage, VP=Vernal Pools, WT=Well-used Wildlife Trail
DW=Deer Winter Habitat Potential (i.e. hemlock, white cedar, pines, white spruce, >60% canopy cover), MW=Moose Winter Habitat Potential (i.e. hemlock, balsam fir, white spruce, >60% canopy cover),

WILDLIFE OBSERVATIONS

TY	SP. CODE	#	EV	SAR / NOTABLE OBSERVATIONS EASTING	SAR / NOTABLE OBSERVATIONS NORTHING	COMMENTS
I	Black saddle bags					
M	Eastern cottontail					
I	Wood satyr					
I	Cabbage white					
I	Jewelwings					
P	Butternut					
I	Pearl crescent					
M	black squirrel					

TY	SP. CODE	#	EV	SAR / NOTABLE OBSERVATIONS EASTING	SAR / NOTABLE OBSERVATIONS NORTHING	COMMENTS

FAUNAL TYPES:
A=Amphibian, B= Bird, F=Fish, I= Insect, M=Mammal, S=Snake, T=Turtle,

Breeding Bird Evidence Level:
Possible --- H = Species observed in its breeding season in suitable nesting habitat S = Singing male/breeding calls in suitable nesting habitat in breeding season
Probable --- T=Territory, A=Anxiety Behaviour, D=Display, P=Pair, N=Nest building, V=Visiting nest
Confirmed--- AE= Adult nest entry/exit, CF=Carrying Food, DD= Distraction, FS=Food/Faecal Sack, FY=Fledged young, NE=Nest with Eggs, NU=Used Nest, NY=Nest with Young
Observed-- X= Species observed in its breeding season (no breeding evidence)

Other Wildlife Evidence:
BE=Bedding Area, CA=Carcass, DP=Distinctive Parts, FE=Feeding Evidence, HO-House/Den, OB=Observed, RK=Roadkill, SC=Scat, TK=Tracks, VO=Vocalization

Additional Comments:

Snag count ☒ : 0

WSP | MMM GROUP

BREEDING BIRD SURVEY DATASHEET

Project Name: Thornhill Brae **Project Number:** 331S014

Date: July 4, 2016 Observers: SGibbs Photo #s: —

Wildlife Survey Unit #: Entire Site Station #: — Plate #: — ELC Unit: —

Road Chainage Start: — Road Chainage End: — Direction from Road: —

UTM Zone: — UTM Easting: — UTM Northing: — Accuracy(m): — Datum: —

SURVEY DETAILS

Start Time:	End Time:	Total Survey Time:	Start Temp (C):	End Temp (C):	Start Wind Code:	End Wind Code:	Start Sky Code:	End Sky Code:
7:12	8:48	96 min	18	25	0	1	0	0

Beaufort Wind Scale

0 = calm, smoke rises vertically (0-2km/hr), **1** = Light air movement, smoke drifts (3-5), **2** = Slight breeze, wind felt on face; leaves rustle (6-11), **3**= Gentle breeze, leaves & twigs in constant motion (12-19) , **4**= Moderate breeze, small branches moving, raises dust & loose paper (20-30), **5**= Fresh breeze, small trees begin to sway (31-39), **6**= Strong breeze, large branches in motion (40-50)

Beaufort Sky Codes

0 = clear (no cloud cover), **1** = partly cloudy (scattered or broken) or variable, **2** = cloudy or overcast, **3** = sandstorm, duststorm or blowing snow, **4** = fog, smoke, thick dust, or haze, **5** = drizzle or light rain, **6** = rain, **7** = snow or snow/rain mix, **8** = showers, **9** = thunderstorms

SP. CODE	#	EV	COMMENTS
EUST	5	S	
AMGO	5	S	
CEDW	1	H	
GRCA	2	S	
RWBL	5	S	
BCCH	4	H	
COHA	1	H	
SOSP	1	S	
YEWA	5	S	
BAOR	1	S	
BAPH	1	S	
AMRO	2	S	
PONO	3	H	
NOCA	5	S	
IHBU	2	S	
REVI	2	S	
TRES	5	H	
HOSP	2	S	
COGR	2	P	

SP. CODE	#	EV	COMMENTS

Breeding Bird Evidence Level:

Possible --- **H** = Species observed in its breeding season in suitable nesting habitat **S** = Singing male/breeding calls in suitable nesting habitat in breeding season

Probable --- **T**=Territory, **A**=Anxiety Behaviour, **D**=Display, **P**=Pair, **N**=Nest building, **V**=Visiting nest

Confirmed--- **AE**= Adult nest entry/exit, **CF**=Carrying Food, **DD**= Distraction, **FS**=Food/Faecal Sack, **FY**=Fledged young, **NE**=Nest with Eggs, **NU**=Used Nest, **NY**=Nest with Young

Observed-- **X**= Species observed in its breeding season (no breeding evidence)

WSP | MMM GROUP

BREEDING BIRD SURVEY DATASHEET

Project Name: Thorny Brae **Project Number:** 16M-01600-01

Date: July 6, 2018 Observers: SG Photo #s: _____

Wildlife Survey Unit #: _____ Station #: _____ Plate #: _____ ELC Unit: _____

Road Chainage Start: _____ Road Chainage End: _____ Direction from Road: _____

UTM Zone: _____ UTM Easting: _____ UTM Northing: _____ Accuracy(m): _____ Datum: _____

SURVEY DETAILS

Start Time:	End Time:	Total Survey Time:	Start Temp (C):	End Temp (C):	Start Wind Code:	End Wind Code:	Start Sky Code:	End Sky Code:
7:00	12:00	300 min	17	25	2	3	1	1

Beaufort Wind Scale

0 = calm, smoke rises vertically (0-2km/hr), 1 = Light air movement, smoke drifts (3-5), 2 = Slight breeze, wind felt on face; leaves rustle (6-11), 3= Gentle breeze, leaves & twigs in constant motion (12-19) , 4= Moderate breeze, small branches moving, raises dust & loose paper (20-30), 5= Fresh breeze, small trees begin to sway (31-39), 6= Strong breeze, large branches in motion (40-50)

Beaufort Sky Codes

0 = clear (no cloud cover), 1 = partly cloudy (scattered or broken) or variable, 2 = cloudy or overcast, 3 = sandstorm, duststorm or blowing snow, 4 = fog, smoke, thick dust, or haze, 5 = drizzle or light rain, 6 = rain, 7 = snow or snow/rain mix, 8 = showers, 9 = thunderstorms

SP. CODE	#	EV	COMMENTS
NOCA	2	S	
AMRO	2	S	
INBU	1	S	
EUST	1	T/A	
SOSP	2	S	
YWAR	2	S	
REVI	2	S	
NOFL	1	H	
COGR	2	H	
TRES	1		
RWBL	1		
HRWS	2		
THUU	1		thuu being mobbed by EAKI
EAKI	2	P	
BCCH	2	S	
AMGO	1	S	
WBNU	2	S	
GRCA	2	S	
COHA	1	H	-seen being mobbed off property by EUST -No nests seen. Obs in residential portion

SP. CODE	#	EV	COMMENTS

Breeding Bird Evidence Level:

Possible --- H = Species observed in its breeding season in suitable nesting habitat S = Singing male/breeding calls in suitable nesting habitat in breeding season

Probable --- T=Territory, A=Anxiety Behaviour, D=Display, P=Pair, N=Nest building, V=Visiting nest

Confirmed--- AE= Adult nest entry/exit, CF=Carrying Food, DD= Distraction, FS=Food/Faecal Sack, FY=Fledged young, NE=Nest with Eggs, NU=Used Nest, NY=Nest with Young

Observed-- X= Species observed in its breeding season (no breeding evidence)

Incidental Wildlife Observations:

MONA

Additional Comments:

ELC Summary Sheet Project Name: Cred. + River SWM Project No: 3315019 Page 1 of 2 **MMM GROUP**

UNIT #: 1 - 4 Observers: JM Date: Oct 29, 2015 Weather / Limitations: Dull 5°C

SYSTEM:	COMMUNITY CLASS:	Photo #:	COMMUNITY SERIES:	ECOSITE:	VEGETATION TYPE:
(Terrestrial) Wetland Aquatic	Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Crevice-Cave, Sand Barren, Prairie-Savannah-Woodland, (Forest), (Cultural), Swamp, Fen, Bog, Marsh, Open Water, Shallow Water	48-50, 51-64, 65-82, 83-89	CUM; CUT; FOD	CUM1; CUT1; FOD5, 6	CUM1-1, CUT1-1, FOD6-4, 6-1, 5

STAND DESCRIPTION:	SOIL ANALYSIS:
COMMUNITY AGE: 1=Pioneer 2=Young (3=Mid-Aged) 4=Mature 5=Old Growth	DRAINAGE: 1= very well 2=well (3=moderate) 4=imperfect 5=poor 6=very poor
STANDING SNAGS: R=Rare (O=Occasional) A=Abundant D=Dominant	SOIL MOISTURE: 1=wet 2= wet-mesic (3=mesic 4=dry-mesic) 5=dry
DEADFALL LOGS: R=Rare (O=Occasional) A=Abundant D=Dominant	TEXTURE: silt sand clay (loam)
HEALTH: 1 = low (2 = medium) 3 = high	DEPTH TO MOTTLES / GLEY: M - cm / G - cm
SENSITIVITY: 1 = low (2 = medium) 3 = high	DEPTH TO GROUNDWATER: at surface less than 1m (more than 1 m)
BOTANICAL QUALITY: 1 = low (2 = medium) 3 = high	DEPTH TO BEDROCK: at surface less than 1m (more than 1 m)

TOPOGRAPHY	SLOPE
lacustrine, riverine, tableland, rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar	none gentle moderate (steep) (simple or (complex))

Height Code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7= < 0.2m *Cover Codes*: 0 = none, 1 = 0%- 10%, 2 = 10%- 25%, 3 = 25%-60%, 4= >60%

	VEGETATION LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GROUND LAYER			

Abundance Code: S-Scarce, O=Occasional, F = Frequent, A=Abundant, D=Dominant;

SIZE CLASS ANALYSIS (abundance code):	< 10 cm DBH: A	10 - 24 cm DBH: A	25 to 50 cm DBH: F	> 50 cm DBH: S

SPECIES Unit 1 CUM1-1 p48-50	S	1	2	3	4
Brom iner		—	—	—	D
Pop trem		—	O	O	—
Dias full		—	—	O	O
Ulm amer		—	D	—	
Rhus typh (edge)		—	A	A	A
Ancr rhim		—	—	O	O
Sali alt		—	—	A	A
Cirs arv		—	—	O	O
Lot corn		—	—	—	S
Vicc crac		—	—	—	O
Juss car		—	—	—	A
Vitis rip		—	—	—	O
Lonic sp.		—	—	—	R
Arct lapp		—	—	O	O
Hackelia virg.		—	—	—	S
Rubu ll		—	—	—	O
Sym lat		—	—	—	O
Geum sp. (alle)		—	—	—	O
Verb urti		—	—	S	O
Tara offi		—	—	—	O
Erig stri		—	—	—	O
Unit 2					
Rhus typh 51-57		—	O	A	A
Symp card 058-60		—	—	—	A
Sym lanc		—	—	—	A
Rub alle occ.		—	—	A	A
Ailn altiss patch		—	A	A	A
Ulmu amer p58		—	A	D	A
Jugl nigr		—	O	O	O

SPECIES Unit 3 p64	S	1	2	3	4
Rubus all		—	—	D	D
+ CUM sp.					
Unit 4					
Sali frag patches		—	—	—	F
Frax penn top of slope/Town		A/D	A/D	—	—
Pru ser		—	F	—	—
Crate sp.		—	O	O	O
Geum alle Yellow		—	—	—	D
Carya card ?		—	O	—	—
Symp late.		—	—	—	F
Dr ulat.		—	—	O	O
Vib lant			A	A	A
Jugl cin 127 (12m from tilt		—	—	—	S
17T 0605533 4824888 (2m)					
p68-76					
Ribes drainage ditch		—	—	—	S
Alli pet		—	—	—	O
Pru virg		—	—	—	O
Acer sac across stream		—	—	—	O
Querc mac Nodestrips fewlobes		O	O	O	—

ELC Summary Sheet Project Name: Credit Project No: 3315019 Page 2 of 2 **MMM GROUP**

UNIT #: 5 Observers: JM Date: Oct 29 2015 Weather / Limitations: Dull 15°C

SPECIES Units p83-89	S	LAYER / ABUNDANCE 1	2	3	4
acer sas? lg tar spots & Dlat		D	D	D	O
Tili amer		—	—	O	O
Doli pub Cultivated?		—	—	—	A
Galium alle		—	—	—	A
Sym. lat		—	—	—	F
UDM– Sol. cana ridge		—	—	—	D
Jugl nig		—	O	—	—
All. pet		—	—	—	D
acer neg		—	—	—	A
Carya cord			O	O	O
Prun ser		—	O	O	O
Frax amer		A	A	—	
Acer froe		—	O		—
Syringa		—	—	—	O
<750m Querc rubr		—	S	—	—
Pinus sylv edge		—	S	—	—
Agrimonia		—	—	—	O

SPECIES	S	LAYER / ABUNDANCE 1	2	3	4

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, recreational use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

Bird nest p62 unit 2 p86 - nest

Bl. Squirrels

COMMENTS / ADDITIONAL NOTES:

ELC Summary Sheet Project Name: Thorny Brae Project No: ______ Page___of___ WSP | MMM GROUP

UNIT #: 1 a/b Observers: Jn Date: May 20/16 Weather / Limitations: ______

SYSTEM:	COMMUNITY CLASS:	COM. SERIES:	ECOSITE:	VEG. TYPE:
Terrestrial Aquatic Wetland	Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Crevice-Cave, Sand Barren, Prairie-Savannah-Woodland, Forest, **Cultural**, Swamp, Fen, Bog, Marsh, Open Water, Shallow Water	CUM	CUM1	CUM1-1

STAND DESCRIPTION:	SOIL ANALYSIS:	
COMMUNITY AGE: 1=Pioneer **2=Young** 3=Mid-Aged 4=Mature 5=Old Growth	DRAINAGE: 1=very well **2=well** 3=moderate 4=imperfect 5=poor 6=very poor	Community Inclusion:
STANDING SNAGS: R=Rare **O=Occasional** A=Abundant D=Dominant	SOIL MOISTURE: 1=wet 2=wet-mesic 3=mesic 4=dry-mesic 5=dry	
DEADFALL LOGS: R=Rare **O=Occasional** A=Abundant D=Dominant	TEXTURE: silt sand clay loam	
BOTANICAL QUALITY: 1=low 2=medium 3=high	DEPTH TO MOTTLES / GLEY: M= cm / G= cm	Complex/Mosaic:
SLOPE: none **gentle** moderate steep (simple or complex)	DEPTH TO GROUNDWATER / BEDROCK: G= cm / B= cm	

TOPOGRAPHY: lacustrine, riverine, tableland, rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar

Height code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.5m *Cover codes*: 0=none, 1=0%- 10%, 2=10%- 25%, 3=25%-60%, 4=>60%

	VEGETATION LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	Canopy	3	1	Frax Penn
2	Sub-Canopy	4	2	Crat
3	Understorey	5	3	"
4	Ground Layer	6/7	4	Sol alti > Brom

SIZE CLASS ANALYSIS (abundance code): R-Rare, O=Occasional, F=Frequent, A=Abundant, D=Dominant	< 10 cm DBH: O	10 - 24 cm DBH:	25 to 50 cm DBH:	> 50 cm DBH:

SPECIES	1	2	3	4	SPECIES	1	2	3	4
Popu trem / delt		O	R	R	Sol alti			A	A
Ulmu rubr		O			Brominer				A
Frax penn		R			Dips fas.			O	O
					Arct minu			O	O
					Cirs arve			O	O
					Lotu corn				O
					Urti dioc				O
					Tuss fara				A
					Viti ripa				O
					Arct lappa			R	R
					Hack virg				R
					Symp late				O
					Geum alle				O
					Verb urti			R	O
					Tara offi				O
					Erig stri				O
					Conv arve				R
					Sola dulc				R
					Poa prat				A
					Phel prat				A
					Elym rept				R
Pyru comm			R		Symph cord				R
Viti ripa			O	O	Verb hast				R
Crata punct				O					
Rubu occi				O					
Lon sp.				R					
Rhus typh (edge)		O	O	O					

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

Hwy

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

COMMENTS / ADDITIONAL NOTES:

ELC Summary Sheet Project Name: Thorny Brae Project No: ________ Page___of___ WSP | MMM GROUP

UNIT #: 2 Observers: JM Date: May 20, '16 Weather / Limitations: Sunny

SYSTEM:	COMMUNITY CLASS:	COM. SERIES:	ECOSITE:	VEG. TYPE:
(Terrestrial) Aquatic Wetland	Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Crevice-Cave, Sand Barren, Prairie-Savannah-Woodland, Forest, (Cultural), Swamp, Fen, Bog, Marsh, Open Water, Shallow Water	CUT	CUT1	CUT1-1

STAND DESCRIPTION:	*SOIL ANALYSIS:*	Community Inclusion:
COMMUNITY AGE: 1=Pioneer (2=Young) 3=Mid-Aged 4=Mature 5=Old Growth	DRAINAGE: 1=very well 2=well 3=moderate 4=imperfect 5=poor 6=very poor	
STANDING SNAGS: (R=Rare) O=Occasional A=Abundant D=Dominant	SOIL MOISTURE: 1=wet 2=wet-mesic 3=mesic 4=dry-mesic 5=dry	
DEADFALL LOGS: (R=Rare) O=Occasional A=Abundant D=Dominant	TEXTURE: silt sand clay loam	
BOTANICAL QUALITY: (1=low) 2=medium 3=high	DEPTH TO MOTTLES / GLEY: M= cm / G= cm	Complex/Mosaic:
SLOPE: none (gentle) moderate steep (simple or complex)	DEPTH TO GROUNDWATER / BEDROCK: G= cm / B= cm	

TOPOGRAPHY: lacustrine, riverine, tableland, rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar

Height code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.5m *Cover codes:* 0=none, 1=0%- 10%, 2=10%- 25%, 3=25%-60%, 4=>60%

	VEGETATION LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	Canopy	3	1	Acer negu
2	Sub-Canopy	4	2	Rhus typh > Frax penn
3	Understorey	5	3	" "
4	Ground Layer	6/7	4	Alli pet = Heme ful ≥ Arct lapp

SIZE CLASS ANALYSIS (abundance code): R-Rare, O=Occasional, F=Frequent, A=Abundant, D=Dominant	< 10 cm DBH: D	10 - 24 cm DBH: R/O	25 to 50 cm DBH: —	> 50 cm DBH: —

SPECIES	1	2	3	4	SPECIES	1	2	3	4
Ulm amer	R	R	O	O	Carex sp.				R
Frax penn		O		R	Heme flav				O
Acer negu	O	O	O	O	Arct lapp				F
Jugl nigr		O	O	O	Poly pub				O
					Symp sp.				F
					Vicc crac				R
					Gali sp (Cleavers-apar)				R
					Dips fus				R
					Symp off. Comphry				R
					Alli pet				F
					Dact glom				O
					Symp cord				R
					Symp lance				O
Loni morro			R	R					
Alia alt. Tof Hea			O	O					
Rubu occ.			A	A					
Loni tart			F						
Rham cath			R						
Parth inse			F	F					
Rhus typh	D	D	D	D					

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

exotic species: many; dumping: garbage; noise: Hwy

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

COMMENTS / ADDITIONAL NOTES:

- Dense sumac
- Scots Pine to rear

ELC Summary Sheet Project Name: Thorncrest Project No: _____ Page ___ of ___ WSP | MMM GROUP

UNIT #: 3 Observers: JM Date: May 20, 16 Weather / Limitations: _____

SYSTEM: Terrestrial Aquatic Wetland	COMMUNITY CLASS: Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Crevice-Cave, Sand Barren, Prairie-Savannah-Woodland, Forest, Cultural, Swamp, Fen, Bog, Marsh, Open Water, Shallow Water	COM. SERIES: CUT	ECOSITE: CUT1	VEG. TYPE: CUT1-5

STAND DESCRIPTION:	*SOIL ANALYSIS:*	Community Inclusion:
COMMUNITY AGE: 1=Pioneer 2=Young 3=Mid-Aged 4=Mature 5=Old Growth	DRAINAGE: 1=very well 2=well 3=moderate 4=imperfect 5=poor 6=very poor	
STANDING SNAGS: R=Rare O=Occasional A=Abundant D=Dominant	SOIL MOISTURE: 1=wet 2=wet-mesic 3=mesic 4=dry-mesic 5=dry	
DEADFALL LOGS: R=Rare O=Occasional A=Abundant D=Dominant	TEXTURE: silt sand clay loam	
BOTANICAL QUALITY: 1=low 2=medium 3=high	DEPTH TO MOTTLES / GLEY: M= cm / G= cm	Complex/Mosaic:
SLOPE: none gentle moderate steep (simple or complex)	DEPTH TO GROUNDWATER / BEDROCK: G= cm / B= cm	

TOPOGRAPHY: lacustrine, riverine, tableland, rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar

Height code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.5m ***Cover codes:*** 0=none, 1=0%- 10%, 2=10%- 25%, 3=25%-60%, 4=>60%

VEGETATION LAYER		HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	Canopy			
2	Sub-Canopy			
3	Understorey	5	3	Ruba occi,
4	Ground Layer	6/7	4	CUM sp.

SIZE CLASS ANALYSIS (abundance code): R-Rare, O=Occasional, F=Frequent, A=Abundant, D=Dominant	< 10 cm DBH: —	10 - 24 cm DBH: —	25 to 50 cm DBH: —	> 50 cm DBH: —

SPECIES	LAYER / ABUNDANCE 1	2	3	4
Jugl nigr	R	R		
Pice pun	R			
Ruby occi			D	D
Rhus typh			O/R	
Loni sp.			R	
Ruby idea				DO

SPECIES	LAYER / ABUNDANCE 1	2	3	4
Brom inerm				O/F
Achi mill				O
Arct minu				O
Arct lapp				O
Asci Syri				O
Circ arve				O
Cora varí				O
Deus cana				R
Dipp fas				R
Elym repe				O
Erig str.				R
Geum sp. cana?				R
Hack vira				R
Hype per. f				R
Lota corn				R
Medi lupu				R
Phle prat				O
Poa prat				O
Solidyls				R
Sal alb.				F

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

COMMENTS / ADDITIONAL NOTES:

ELC Summary Sheet Project Name: Thorny Brae Project No: ______ Page __ of __ **WSP | MMM GROUP**

UNIT #: 4 Observers: JM Date: May 20/16 Weather / Limitations: Sunny

SYSTEM:	COMMUNITY CLASS:	COM. SERIES:	ECOSITE:	VEG. TYPE:
(Terrestrial) Aquatic Wetland	Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Crevice-Cave, Sand Barren, Prairie-Savannah-(Woodland), (Forest), Cultural, Swamp, Fen, Bog, Marsh, Open Water, Shallow Water	FOD	FOD7	FOD7-1 ?

STAND DESCRIPTION:	SOIL ANALYSIS:	Community Inclusion:
COMMUNITY AGE: 1=Pioneer (2=Young) 3=Mid-Aged 4=Mature 5=Old Growth	DRAINAGE: 1=very well 2=well 3=moderate 4=imperfect 5=poor 6=very poor	Cultural?
STANDING SNAGS: (R=Rare) O=Occasional A=Abundant D=Dominant	SOIL MOISTURE: 1=wet 2=wet-mesic 3=mesic 4=dry-mesic 5=dry	
DEADFALL LOGS: (R=Rare) O=Occasional A=Abundant D=Dominant	TEXTURE: silt sand clay loam	
BOTANICAL QUALITY: 1=low (2=medium) 3=high	DEPTH TO MOTTLES / GLEY: M= cm / G= cm	Complex/Mosaic:
SLOPE: none (gentle) moderate steep (simple or complex)	DEPTH TO GROUNDWATER / BEDROCK: G= cm / B= cm	

TOPOGRAPHY: lacustrine, riverine, tableland, rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar

Height code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.5m *Cover codes:* 0=none, 1=0%- 10%, 2=10%- 25%, 3=25%-60%, 4=>60%

VEGETATION LAYER		HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	Canopy	3	3/4	Ulmu amer
2	Sub-Canopy	4	2	"
3	Understorey	5	3	Rubuocci
4	Ground Layer	6/7	4	Alli pet ≥ Geumcano

SIZE CLASS ANALYSIS (abundance code): R-Rare, O=Occasional, F=Frequent, A=Abundant, D=Dominant	< 10 cm DBH: O	10 - 24 cm DBH: A	25 to 50 cm DBH: R	> 50 cm DBH: —

SPECIES	1	2	3	4	SPECIES	1	2	3	4
Ulmu amer		D	D	D	Samp card				O
Frax penn			F	F	Glec hede				O
Jugl reg		R			Frag virg				F
Prun sero		O			Tara offi				R
					Geum ~~sp~~ cana				A/D
					Alli pet.				O/F
					~~Poa~~ Polypubs				R
					Cumsp.				
					Eye-bright (Vero serp)				R
					Leon card				
Grater									
Part inser			O						
Rhus typh		()	O						
Loni tart			O						
Rham cath			F/O	F					
Rubu occi			O	A					

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

COMMENTS / ADDITIONAL NOTES:

- Boordline b/w woodland & forest ≈ very cultural
- DownieUP
- Moisture closer to fresh than moist

ELC Summary Sheet Project Name: Thorny Brae Project No: _____ Page ___ of ___ WSP | MMM GROUP

UNIT #: Sa-Slope Observers: JM Date: May 20, '16 Weather / Limitations: Sunny

SYSTEM:	COMMUNITY CLASS:	COM. SERIES:	ECOSITE:	VEG. TYPE:
(Terrestrial) Aquatic Wetland	Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Crevice-Cave, Sand Barren, Prairie-Savannah-Woodland, (Forest), Cultural, Swamp, Fen, Bog, Marsh, Open Water, Shallow Water	FOD	FOD7	FOD7

STAND DESCRIPTION:	SOIL ANALYSIS:	Community Inclusion:
COMMUNITY AGE: 1=Pioneer (2=Young) 3=Mid-Aged 4=Mature 5=Old Growth	DRAINAGE: 1=(very well) 2=well 3=moderate 4=imperfect 5=poor 6=very poor	
STANDING SNAGS: (R=Rare) O=Occasional A=Abundant D=Dominant	SOIL MOISTURE: 1=wet 2=wet-mesic 3=mesic (4=dry-mesic) 5=dry	
DEADFALL LOGS: R=Rare O=Occasional (A=Abundant) D=Dominant	TEXTURE: silt sand clay (loam)	
BOTANICAL QUALITY: 1=low (2=medium) 3=high	DEPTH TO MOTTLES / GLEY: M=999cm / G=999 cm	Complex/Mosaic:
SLOPE: none gentle moderate (steep) (simple or complex)	DEPTH TO GROUNDWATER / BEDROCK: G=/ cm / B=>1m cm	

TOPOGRAPHY: lacustrine, riverine, tableland, rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar

Height code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.5m ***Cover codes:*** 0=none, 1=0%- 10%, 2=10%- 25%, 3=25%-60%, 4=>60%

VEGETATION LAYER		HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	Canopy	2	4	Frax spp. ~~Acer sac~~ = Prun sero < Jugl nig = Acer ne,
2	Sub-Canopy	3	2	Crat. sp. = Frax penn = Acer ne
3	Understorey	4/5	3	" = Lon. tart ; Rham cart* = Rhus typh
4	Ground Layer	6/7	3	All. pet. ; App C. cann = Fras virs = Geum can

SIZE CLASS ANALYSIS (abundance code): R-Rare, O=Occasional, F=Frequent, A=Abundant, D=Dominant

< 10 cm DBH: A | 10 - 24 cm DBH: D | 25 to 50 cm DBH: F | > 50 cm DBH: R

SPECIES	LAYER / ABUNDANCE 1	2	3	4
Prun sero	O			
Frax penn	F			
Frax amer	F			
Acer nego (near river)	O			
Tili amer				F
Acer plat (slope)	F/A			
Jugl nigr	F			
Ulmu amer	O			
Sali sp (alba?)	R			
Amel lave	R			
Thuj occi (local)				
Rubu occ. (slope)				A
Rhus typh (slope)			O	
Rham cath			A	A
Prun virg			A	F
Crate sp			A	A
Pant inse				F
Lon. tart				R
Rosa mult				R
Viti ripa			O	F

SPECIES	LAYER / ABUNDANCE 1	2	3	4
Sali flex				D
Sali alti				O
Song cana				O
Frag amer				A
R. be rubr				O
Frag vesc				A
Geum sp(p.)				A
Tara off.				R
All. pet.				A
Arct. minu (slope)				R
Tri rod				O
Gera macu				P
Impa capa				R
Hydr virg				R
Bonb vulg				R
Poa sp.				O
Care sp.				D
Phal arun				R
~~Ex~~ Symp late				O

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

Deer tracks on slope

COMMENTS / ADDITIONAL NOTES:

- Thick Sumac
- Strawb & Ch. Cherry dom on slope
- Crata Dom in some areas
- B/w Ash & walnut as Dom
- Carex sp.?? lvs like pedunc

ELC Summary Sheet Project Name: Thorny Blae Project No: ______ Page__of__ WSP | MMM GROUP

UNIT #: Sb-tablelands Observers: JM Date: May 20.16 Weather / Limitations: ______

SYSTEM:	COMMUNITY CLASS:	COM. SERIES:	ECOSITE:	VEG. TYPE:
~~Terrestrial~~ Aquatic Wetland	Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Crevice-Cave, Sand Barren, Prairie-Savannah-Woodland, Forest, Cultural, Swamp, Fen, Bog, Marsh, Open Water, Shallow Water	FOD	FOD7	FOD7-2?

STAND DESCRIPTION:	*SOIL ANALYSIS:*	
COMMUNITY AGE: 1=Pioneer 2=Young (3=Mid-Aged) 4=Mature 5=Old Growth	DRAINAGE: 1=very well 2=well (3=moderate) 4=imperfect 5=poor 6=very poor	Community Inclusion:
STANDING SNAGS: R=Rare (O=Occasional) A=Abundant D=Dominant	SOIL MOISTURE: 1=wet 2=wet-mesic (3=mesic) 4=dry-mesic 5=dry	
DEADFALL LOGS: R=Rare (O=Occasional) A=Abundant D=Dominant	TEXTURE: silt sand clay (loam)	
BOTANICAL QUALITY: 1=low (2=medium) 3=high	DEPTH TO MOTTLES / GLEY: M= cm / G= cm	Complex/Mosaic:
SLOPE: none gentle (moderate) (steep) (simple or complex)	DEPTH TO GROUNDWATER / BEDROCK: G= cm / B= cm	

TOPOGRAPHY: lacustrine, riverine, tableland, rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar

Height code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.5m *Cover codes:* 0=none, 1=0%- 10%, 2=10%- 25%, 3=25%-60%, 4=>60%

VEGETATION LAYER		HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	Canopy			
2	Sub-Canopy			
3	Understorey			
4	Ground Layer			

SIZE CLASS ANALYSIS (abundance code): R-Rare, O=Occasional, F=Frequent, A=Abundant, D=Dominant	< 10 cm DBH: A	10 - 24 cm DBH: A	25 to 50 cm DBH: F	> 50 cm DBH: R

SPECIES	LAYER / ABUNDANCE 1	2	3	4
Acer sacc	O	O	O	O
Acer plat	O		O	O
Tili amer			O	O
Acer negu				A
Cary cord		O	O	O
Prun sero		O	O	O
Frax amer	A	A		
~~Frax penn~~	~~O~~	~~O~~		
Acer ×free		O		
Quer rubr		R		
Pinu sylv (edge)		R		
Frax penn (dying)	O	O		
Jugl nigr		O	O	
Prun avium		R		
Jugl cine		R		
Viti ripa				O
Syri vulg			O	O

SPECIES	LAYER / ABUNDANCE 1	2	3	4
Poly pube				A
Geum alle				O
Symp late				F
Soli cana				R
Alli peti				F
Agri gryp				O
Soli flex				A
Frag spp				O
Geum alle				O/A
Tara off.				R
Eryt amer				O
Toxi rad.				O

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

COMMENTS / ADDITIONAL NOTES:

ELC Summary Sheet Project Name: Th Brae Project No: 3315019 Page 8 of 8 MMM GROUP

UNIT #: 6 Observers: JM Date: June 23 2016 Weather / Limitations: Sunny

SYSTEM:	COMMUNITY CLASS:	COMMUNITY SERIES:	ECOSITE:	VEGETATION TYPE:
Terrestrial (circled), Wetland, Aquatic	Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Crevice-Cave, Sand Barren, Prairie-Savannah-Woodland, Forest, Cultural, Swamp, Fen, Bog, Marsh, Open Water, Shallow Water	A CUT B CUW	A = CUT1 CUW-B	A = CUT1-1 B CUW1 WODM4

STAND DESCRIPTION: | **SOIL ANALYSIS:**

COMMUNITY AGE: 1=Pioneer **2=Young** (circled) 3=Mid-Aged 4=Mature 5=Old Growth	DRAINAGE: 1= very well **2=well** (circled) 3=moderate 4=imperfect 5=poor 6=very poor
STANDING SNAGS: **R=Rare** (circled) O=Occasional A=Abundant D=Dominant	SOIL MOISTURE: 1=wet 2= wet-mesic 3=mesic **4=dry-mesic** (circled) 5=dry
DEADFALL LOGS: **R=Rare** (circled) O=Occasional A=Abundant D=Dominant	TEXTURE: silt sand clay loam
HEALTH: **1 = low** (circled) 2 = medium 3 = high	DEPTH TO MOTTLES / GLEY: M- cm / G- cm
SENSITIVITY: **1 = low** (circled) 2 = medium 3 = high	DEPTH TO GROUNDWATER: at surface less than 1m **more than 1m** (circled)
BOTANICAL QUALITY: **1 = low** (circled) 2 = medium 3 = high	DEPTH TO BEDROCK: at surface less than 1m **more than 1 m** (circled)

TOPOGRAPHY
lacustrine, riverine, tableland, rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar

SLOPE
none **gentle** (circled) **moderate** (circled) steep (simple or complex)

Height Code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7= < 0.2m *Cover Codes:* 0 = none, 1 = 0%- 10%, 2 = 10%- 25%, 3 = 25%-60%, 4= >60%

VEGETATION LAYER		HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	CANOPY	3	2	Jugl nigr
2	SUB-CANOPY	4	2	Jug nigr
3	UNDERSTOREY	5	3	Cratae
4	GROUND LAYER	6/7	4	Cum sp

Abundance Code: S-Scarce, O=Occasional, F = Frequent, A=Abundant, D=Dominant.

SIZE CLASS ANALYSIS (abundance code):	< 10 cm DBH: A	10 - 24 cm DBH: D	25 to 50 cm DBH: S	> 50 cm DBH: —

SPECIES	1	2	3	4		SPECIES	1	2	3	4
Cratae sp - F (3)										
Jugl nigr	D	A/D	F	F	6B	Geum urba				S
Quer alba - planted		S	S			Geum alle				O
Tili amer		F	O			Stell medi				F
Popu sp? delt? (P. canadensis from airport)		S				Cirs arve				F
Frax penn		O	F			+ Cum sp. from unit 1				
Pinu sylv - hedgerow?		O								
Ligu vulg			S							
Acer negu		F			6A	Cum sp from unit 1				
Acer plat		F				Rub stri			O	
Jug nigr		S				Vinca mino				D
Rhus typh			D	A		Seccor Crownvetch				D
Lonic morr			F							
Thuj occi		S								

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, recreational use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

1EAB

Pice pun 3 O
Cratae sp. 3 A
Pop trem 3 O

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

COMMENTS / ADDITIONAL NOTES:

Very disturbed

UNIT NO:

Date: July 6, 2018
Observers: SG

Project name & number: Thorny Brae
Weather/limitations: none

WSP | MMM GROUP

HEDGEROW – FIELD DATA SHEET

**Abundance Code: S-Scarce, O=Occasional, F = Frequent, A=Abundant, D=Dominant*

SPECIES	LAYER / ABUNDANCE 1	2	3	4	SPECIES	LAYER / ABUNDANCE 1	2	3	4
tilicard	F								

HEIGHT / AGE (1=Pioneer, 2=Young, 3=Mid-Aged, 4=Mature, 5=Old Growth)	*TREE HEALTH / CONDITION* (Excellent, Good, Fair, Poor, Very Poor, Dead)	*TREE STRUCTURE* (multi-stemmed, leaning, broken, deadfall, standing snags)
		pruned

HEDGEROW SIZE (circle):	Narrow width – single row of trees	Moderate width		Broad width
SIZE CLASS ANALYSIS*:	< 10 cm DBH: –	10 - 24 cm DBH: D	25 to 50 cm DBH: –	> 50 cm DBH: –

**Abundance Code: S-Scarce, O=Occasional, F = Frequent, A=Abundant, D=Dominant*

COMMUNITY DIVERSITY	Relatively homogeneous	Moderate diversity	High diversity
COMMUNITY STRUCTURE	Short-lived pioneer/few or no trees/old field	Variable age with mature tree component	Predominantly mature with regen layer and native woodland ground flora
CONTINUITY	Discontinuous/fragmented/gaps	Moderate – a few gaps	Continuous – no gaps (or minor gaps)
LINKAGE	No function	Moderate function	Strong linkage between natural heritage features
DISTURBANCE	Highly disturbed (tree cutting, grazing, debris dump, invasive species, trails, fill, ornamentals, fragmentation, plantation)	Moderate	Low disturbance, intact native system

COMMENTS *(including wildlife observations - vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding, etc.)*

Hedgerow horticultural plantings only. Mid sized trees with mown grass below. No ecological function

ELC Summary Sheet Project Name: Thorny Brae Project No: 164-01600-01 Page 1 of 1

UNIT #: _____ Observers: SG Date: July 6, 2018 Weather / Limitations: none

SYSTEM:	COMMUNITY CLASS:	SERIES:	ECOSITE:	VEG. TYPE:
Terrestrial Aquatic (Wetland)	Beach-Bar, Sand Dune, Bluff, Cliff, Talus, Alvar, Rock Barren, Cave, Sand Barren, Prairie-Savannah-Woodland, Forest, Cultural, Swamp, Fen, Bog, (Marsh) Open Water, Shallow Water			

STAND DESCRIPTION:	SOIL ANALYSIS:	Community Inclusion:
COMMUNITY AGE: 1=Pioneer (2=Young) 3=Mid-Aged 4=Mature 5=Old Growth	DRAINAGE: 1=very well 2=well 3=moderate 4=imperfect (5=poor) 6=very poor	
STANDING SNAGS: (R=Rare) O=Occasional A=Abundant D=Dominant	SOIL MOISTURE: 1=wet (2=wet-mesic) 3=mesic 4=dry-mesic 5=dry	—
DEADFALL LOGS: (R=Rare) O=Occasional A=Abundant D=Dominant	TEXTURE: silt sand clay loam	
BOTANICAL QUALITY: (1=low) 2=medium 3=high	PARENT MATERIAL: (mineral) organic	Complex/Mosaic:
SLOPE: (none) gentle moderate steep (simple or complex)	SUBTRATE DEPTH: (> 15cm) < 15cm	—

TOPOGRAPHY: lacustrine, riverine, (tableland), rolling upland, cliff, talus slope, crevice/cave, alvar, rockland, valley slope, terrace, bottomland, sand dune, bluff, beach/bar

Height code: 1=>25m, 2=10m-25m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.5m ***Cover codes:*** 0=none, 1=0%- 10%, 2=10%- 25%, 3=25%-60%, 4=>60%

	VEGETATION LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1	Canopy			
2	Sub-Canopy			
3	Understorey	5	1	Vitirip >> rosamul
4	Ground Layer	67	4	Lythsal > symplan > poapal > inuhel

SIZE CLASS ANALYSIS (abundance code): R-Rare, O=Occasional, F=Frequent, A=Abundant, D=Dominant

< 10 cm DBH:	10 - 24 cm DBH:	25 to 50 cm DBH:	> 50 cm DBH:

SPECIES	LAYER / ABUNDANCE 1	2	3	4
Rosamul			R	
Vitirip			F	

SPECIES	LAYER / ABUNDANCE 1	2	3	4
Lythsal				D
inuhel				F
Symplan				A
artmin				O
taraoff				R
taraccar				R
Galmol				O
Poapal				F
Dipstul				O
Phalarun				O
cirsarv - outskirts				R

EVIDENCE OF DISTURBANCE:
logging, sugar bush, gaps, livestock, (exotic species), plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice

Ldominated by non-natives

WILDLIFE HABITAT OBSERVATIONS:
vernal pools, hibernacula, snags, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding

_____

COMMENTS / ADDITIONAL NOTES:
Very small patch - no technically large enough for ELC

APPENDIX M

ENHANCEMENT PLAN

MEMO

SUBJECT: **Revised Thorny Brae Woodland Enhancement Strategy**

DATE: **March 28, 2019**

1.0 INTRODUCTION

This memo outlines an enhancement strategy to compensate for the removal of woodland vegetation at 1745, 1765 and 1775 Thorny Brae Place in Mississauga, Ontario (the "subject property"). The woodland limit was defined during a site walk with City and Credit Valley Conservation (CVC) staff on July 17, 2018, and subsequently surveyed as shown on attached Figure 1.

This updated strategy builds on a previous draft submitted in November 2018 and has been revised based on comments from CVC and City staff on December 3, 2018.

The primary objective of this strategy is to enhance the existing but degraded woodland vegetation community on the property, relative to the current condition (i.e., presence of non-native / invasive species, limited woodland plant species composition, high edge ratio, and limited woodland understory and ground layer), including retention of the higher quality areas of the woodland. This will result in a healthy, functional deciduous forest community that supports natural succession and has better long-term ecological viability. The species composition of the target forest is somewhat challenging to predict based on factors such as climate change, insect outbreaks, and disturbance; however, the goal of the woodland creation is to achieve a deciduous forest similar to what currently exists on tablelands along the top of the valleylands (i.e. Dry – Fresh Deciduous Forest: FOD4 or Dry – Fresh Sugar Maple Deciduous Forest: FOD5). While the 'new' forest is still in a transitional regeneration period, the native species that are planted / seeded will support wildlife that use a variety of habitats, including meadows and thickets that will exist in the interim.

This strategy is consistent with buffer enhancement recommendations included in the Thorny Brae Place, Mississauga, ON. Residential Re-development Scoped Environmental Impact Study (WSP; December 2017), but builds on and refines that work through additional field surveys and refined / updated vegetation community mapping (as shown on the attached Figure 1).

This is a conceptual strategy provided for discussion, with the final strategy to include planting plans and additional details.

2.0 WOODLAND ENHANCEMENT STRATEGY

The proposed woodland enhancement strategy includes the following elements:

1. Retention of existing higher quality woodland associated with the FOD7-1 vegetation community (as well as CUS communities) north of the approved stormwater management (SWM) outfall easement. Retaining standing snags, if not hazards.

2. Removal of woodland south of the SWM outlet easement. This is primarily CUW1, with a small amount of FOD7-2 (extension of Vegetation Unit 5c).

3. Creation of new woodland habitat north of the SWM easement (currently cultural meadow / thicket), contiguous with retained woodland – via native species plantings and retention of non-invasive tree species.

4. Invasive species control within retained woodland areas and proposed restoration areas. There are several high-density concentrations of five priority taxa identified through scoped field surveys undertaken by WSP in 2018:

    i. **Tree-of-heaven** (*Ailanthus altissima*), a highly invasive tree species native to China, and introduced to North America as an ornamental tree. There is a large, dense patch of Tree-of-heaven in the north-east corner of the property. Tree-of-heaven is a high priority for removal, as it is a fast-growing weedy tree that reproduces from either suckers or seeds*. It is capable of displacing native trees by poisoning root systems and producing sap that can cause skin rash or heart inflammation† and has roots that damage sewer lines. An ~550 m^2 area of dense Tree-of -heaven removal is recommended.

    ii. **Common Buckthorn** (*Rhamnus cathartica*), a highly invasive shrub species native to Europe and identified as a noxious weed in Ontario's Weed Control Act. This shrub was widely planted as a hedgerow or windbreak species throughout Ontario in the early 1900s‡. It readily out-competes native species and degrades wildlife habitat. In total, approximately 755m^2 of moderately dense Buckthorn patches along the informal trail and concentrated near the SWM outlet is recommended for removal.

    iii. **Invasive Honeysuckles** (*Lonicera* spp.) and **European Privet** (*Ligustrum vulgare*), species which form dense shrub thickets that out-compete native woodland understory species. Two dense patches are recommended for removal: 1) an ~ 270m^2 area near the end of the fencing along the southern property boundary; and 2) an ~111 m^2 area between the existing foot trail and the Credit River near the Top of Slope line.

    iv. **Norway Maple** (*Acer platanoides*). Norway Maple, an invasive species, is a large shade tree similar in appearance to our native Sugar Maple (*Acer saccharum*). On the subject property,

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* A. A. Reznicek, E. G. Voss, & B. S. Walters. February 2011. University of Michigan. Web. October 18, 2018. https://michiganflora.net/species.aspx?id=2686.

† Bisognano, J.D., K.S. McGrody, and A.M. Spence. 2005. Myocarditis from the chinese sumac tree. Annals of Internal Medicine 143 (2): 159-160.

‡ Anderson, Hayley. 2012. Invasive Common (European) Buckthorn (*Rhamnus cathartica*): Best Management Practices in Ontario. Ontario Invasive Plant Council, Peterborough, ON.

there are planted and naturalized Norway Maple trees on the tablelands, as well as along the valley slope.

5. Woodland enhancement plantings with native species.

6. Seed collection of the regionally rare species Virginia Stickseed (*Hackelia virginiana*) and dispersal through enhancement areas, in Vegetation Units 1a 2, 3, and 6a.

7. Salvage of logs, rootwads and brush from areas of tree removal.

8. Installation of additional wildlife habitat elements and retention of existing habitat (utilizing materials salvaged from the site).

9. Closure of the informal pedestrian trail.

10. Garbage removal.

2.1 Woodland Retention & Enhancement

The woodland habitats north of the SWM outlet easement (i.e., Unit 2: CUS1, Unit 3: CUT1-5, Unit 4: FOD7-1, Unit 5a: FOD7, Unit 5b: FOD7-2), although very degraded, will be retained, and enhanced through the measures discussed below. In addition, a 10 m edge impact zone (~283 m^2) has been delineated at the west limit of Unit 5c adjacent to the proposed development. This area has also been considered as part of the woodland enhancement area discussed herein, given the potential for indirect impacts.

Under current conditions, the woodland has a relatively open canopy with sections of dense *Cultural Meadow* ground layer or sparse woodland vegetation. Native woodland understory and subcanopy layers are not well developed. In areas where there are some shrubs, the composition is made up of primarily invasive species, such as Common Buckthorn, Honeysuckles, and Common Privet.

The recommended approach / sequence is as follows (with works completed by hand or small equipment, minimizing heavy equipment use), coordinated with the same activities in the 'woodland creation' area:

1. Remove garbage within the subject property
2. Remove invasive trees and shrubs, in focal areas shown in Figure 2 and described above. Retain logs, rootwads and brush for wildlife micro-habitat creation, while disposing of any seeds remaining on the plants. Invasive species control should be applied in one session, immediately prior to recommended native species planting.
    - Recommended control methodology for Tree-of-heaven, Privet, Honeysuckles and Common Buckthorn is: 1) cutting the stems 1 – 2 inches above ground level; and 2) applying an herbicide by spraying or painting each stump immediately. The combination of cutting and herbicide is recommended because cut stems without herbicide will re-sprout quite

vigorously in the spring. Herbicide can be used between mid-May and mid-October. If herbicide alone is used without cutting (foliar spray) then August to mid-October is the recommended timing window, as they are beginning to translocate nutrients back down to the root system. A Forestry Class land exterminator licence would be required to use commercial herbicides in a forest. No *Letter of Opinion* (from MNRF) is required for herbicide use on the site because it falls under the forestry exception. Intensive invasive species control should occur prior to or during construction, if feasible, with supplemental herbicide application the following year to get any plants missed or re-sprouting.

- Recommended control methodology for Norway Maple is girdling five trees to the east of the informal trail. While complete eradication is not recommended on / adjacent to the valley slope (since trees provide shade, shelter, and soil / slope stability), girdling several trees would allow native trees and shrubs to establish and mature. Girdled trees would slowly kill the tree while leaving a standing snag for wildlife habitat. Since the trees would likely fall towards the river due to the steep slope and are not near the proposed development area, they should not be a hazard to the public. Girdling should occur before or during construction, if possible.

3. Install vegetation protection fencing and erosion and sediment control (ESC) fencing at the recommended woodland limit (i.e., west of the surveyed forest limit)

4. Install wildlife habitat elements: one (1) snake hibernaculum; two (2) bat boxes; at least five (5) logs; brush piles (number based on the amount of material generated from cuttings); and three (3) rock piles. Materials generated from site activities will be used, where possible. Details and specifications to be confirmed at detailed design.

   Note that other elements of wildlife habitat enhancement will be achieved by implementing the overall woodland enhancement (i.e., larger, greater continuity with valley woodland, improved structure and transition to native species dominant forest), including improved raptor nesting habitat; and enhanced movement corridor (better buffering and greater continuity with valley habitats.

5. Plant suitable native trees within gaps, at an appropriate spacing. Suggested species include American Basswood (*Tilia americana*), Red Oak (*Quercus rubra*), Black Cherry (*Prunus serotina*), Eastern White Cedar (*Thuja occidentalis*) and Sugar Maple. Tree guards should be included in the planting detail to reduce animal browse on young trees

6. Plant native shrubs to establish natural forest stratification – in canopy gaps, gaps resulting from removal of invasive species, and areas where there is little understory or subcanopy structure. A mix of species, including fruit-bearing shrubs, is recommended to encourage use by wildlife. Measures to prevent deer herbivory should be used, as appropriate (e.g., Tree guards, deer repellent, etc.)

7. Seed the ground with a woodland understory species mix including herbaceous and woody species. Shade tolerant, native seed mixes similar to the "Semi-Shade Forest Edge Seed Mix: from St. William's Nursery and Ecology Center or the "Shady Woodland Seed Mix" from Prairie Moon Nursery could be used. Seeding should occur in any areas that have been disturbed through planting, as well as any areas with bare soil in the woodland that is to be retained. Application rate should be 250 g / 90 m^2 or 22 – 25 kg / ha for larger areas, based on the *Credit Valley Conservation Seed Mixes* (CVC, 2014) guidance document.

8. Close and block (with brush / plantings) the informal pedestrian trail along the Credit River to improve vegetation recovery and reduce the spread of invasive species. Soil erosion is an issue along the slope, and use of the trail by people and dogs may exacerbate the problem. The trail can be closed by adding woody debris, planting trees, or planting thorny shrubs to make the trail less appealing.

9. Install permanent fencing and natural heritage feature signage along the proposed development boundary.

10. Implement monitoring and maintenance as detailed in the final enhancement plan and components (e.g., detailed planting plans).

2.2 Woodland Removal

The proposed woodland vegetation removal, approximately 2,071 m^2 in total, is south of the SWM easement and primarily restricted to Unit 6b (CUW1; 80% or 1,577 m^2), a small section of hedgerow along the southern property boundary (11% or 240 m^2) and a very small area of the westerly extension of Unit 5c (FOD7-2; 9% or 254 m^2). An additional 10 m into the of forest edge, along the boundary of the removals (near vegetation Unit 5c), is considered to be the woodland edge impact zone (213 m^2). It is anticipated that this area will incur indirect degradation of the woodland community due to construction (e.g. increased abundances of invasive species, potential sun scald on tree bark, reduced shade to shade tolerant plant species, etc.). For a map of woodland removal areas, as well as the edge impact zone, see Figure 2.

Trees to be removed from within the development envelope include primarily Green Ash (*Fraxinus pensylvanica*), Black Walnut (*Juglans nigra*), and Littleleaf Linden (*Tilia cordata*) with occasional Manitoba Maple (*Acer negundo*), Elm species (*Ulmus spp.*), Norway Maple, Scots Pine (*Pinus sylvestris*) and Blue Spruce (*Picea pungens*), as well as sparse White Mulberry (*Morus alba*), and poplars (*Populus* spp.). More specifically, 22 trees over 10 cm DBH within the portion of woodland within the development envelope will be removed due to construction. Recommendations for tree planting to compensate for the removal of these trees will be determined as part of a future submission, to the satisfaction of City and CVC. Logs, rootwads and brush will be retained on site, where possible, for wildlife micro-habitat creation.

The rationale is as follows:

- This is primarily a young, sparsely treed (less than 60% canopy cover) Cultural Woodland community with a canopy consisting of planted non-native trees, Black Walnut, Trembling Aspen, Manitoba Maple, and dead or dying ash trees. The understory is primarily a mix of non-native and Hawthorn shrubs, while the ground layer is composed of species more commonly associated with Cultural Meadows, due to the openness of the canopy. No regionally or provincially rare species were noted in the area of removals; however, sparse Virginia Stickseed was observed and is listed as regionally uncommon.
- In addition, there is a small projection (~254 m^2) of immature / mid-aged FOD7-2 forest above the Long-term Stable Top of Slope (LTSSL) line which is proposed for removal. This is a narrow protection of the larger FOD7-2 community which extends easterly. This forest edge has a high degree of anthropogenic disturbance (garbage, invasive species) and is transitional between the CUW1 community to the east and the FOD7-2 community to the east. The canopy includes Green Ash and Black Walnut, while the understory and ground layer includes invasive shrubs and species more indicative of shade conditions, such as Calico Aster (*Symphyotrichum lateriflorum*), Garlic Mustard (*Alliaria petiolata*), and Yellow Avens (*Geum aleppicum*). No species of conservation concern are present and this portion of the woodland has no other notable, significant or sensitive attributes.
- These woodland communities are a narrow extension of the contiguous valleyland forest to the east but have no connectivity with natural areas to the west (and no potential for establishing connectivity). With the narrow width and high edge ratio, there is greater potential for edge / anthropogenic effects (which would exacerbate the prevalent edge effects already present e.g., invasive species, Ash dieback, potential for wind / sun damage).
- These habitats can be effectively replicated in the proposed restoration area north of the SWM easement.
- The proposed habitat creation area north of the SWM easement will result in no net reduction in woodland size (i.e., compensated at a minimum 1:1 area ratio).
- With other recommended woodland enhancement measures, there will be a net enhancement to the woodland on site

2.3 Woodland Habitat Creation

An area of at least 2353 m^2 north of the SWM easement and along the floodplain is recommended for the creation of additional woodland habitat. This is contiguous with the retained FOD7-1 forest and CUT / CUS communities. Moreover, this will result in a woodland configuration with a much smaller edge ratio, thereby reducing potential for edge effects and resulting in greater long-term forest health and viability.

The recommended approach / sequence for this area is similar to the retained woodland but includes a much higher density of plantings given the overall limited tree cover. It is as follows (with works completed by hand or small equipment, minimizing heavy equipment use):

1. Remove garbage from habitat creation area
2. Identify, mark and remove invasive trees and shrubs. Retain non-invasive trees and shrubs and standing dead trees that are not hazards (e.g., planted conifers, Black Walnut, Hawthorns). Invasive trees, such as Siberian Elm or Norway Maple, should not be retained. Retain logs, rootwads and brush from cut stems for wildlife micro-habitat creation.
3. Install vegetation protection fencing and erosion and sediment control (ESC) fencing at the recommended woodland limit
4. As mentioned in Section 2.1, the following wildlife habitat elements will be installed: one (1) snake hibernaculum; two (2) bat boxes; at least five (5) logs; brush piles (number based on the amount of material generated from cuttings); and three (3) rock piles. Details and specifications to be confirmed at detailed design. With a final plan at detailed design, each wildlife habitat element will be assigned a unique identifier for monitoring / inspection.
5. Plant suitable native trees at an appropriate spacing within gaps, with a maximum density of 1000 trees per hectare. Suggested species include American Basswood, Red Oak, White Oak, Black Cherry, Eastern White Cedar, Eastern Hemlock, and Sugar Maple.
6. Plant native shrubs to establish natural forest stratification. A mix of species including fruit-bearing shrubs is recommended to encourage use by wildlife. Thorny / very dense shrubs to be considered along the development limit interface.
7. Seed the ground with a woodland understory species mix including herbaceous and woody species. Since the majority of the area to be enhanced is dominated by turf-forming grasses and non-native species, some vegetation removals will be required to allow the seed mix to contact the soil and to remove excessing species competition.
8. Implement monitoring and maintenance as detailed in the final compensation / enhancement plan and components (e.g., detailed planting plans)
9. The edge area of retained / enhanced habitat adjacent to the development will include dense edge plantings to mitigate potential development and occupancy related impacts but improving buffering to sensitive habitats. These could include thorny species to further discourage uncontrolled access.

3.0 MONITORING

Biological monitoring is recommended within the retained and enhanced natural features on the subject property to assess the effectiveness of the recommended mitigation measures and proposed woodland enhancements. Monitoring will include the following elements and methodologies:

1. Assessment of general woodland health – qualitative assessment through the entire area
2. Initial inspection of installed plantings, seeding areas, and wildlife habitat elements to verify appropriate installation (numbers, species, locations) in accordance with final / approved detailed plans.
3. Post-construction inspection of installed plantings, seeding areas and wildlife habitat elements to verify appropriate installation (numbers, species, locations) in accordance with final approved detailed plans.
    - Plantings: all plantings will be surveyed for condition / health and survivorship, with deficiencies identified on final plans.

      Four vegetation plots are recommended. See Figure 4 and Attachment 1 for locations and details.
    - Wildlife habitat elements: each feature will be surveyed for evidence of wildlife use (tracks, shedding, basking observations, scat etc.) and condition / suitability for wildlife use. Supplementary evidence of wildlife use will be noted throughout the area, as observed.
4. Inventory of invasive species – locations and abundance, inventoried within the vegetation plots, with supplementary observations throughout.
5. Breeding bird use: 2 early morning surveys between late May and early July recording species, abundance and level of breeding activity
6. General assessment of succession / development of the target vegetation community – based on ELC habitat type (i.e., increasing dominance by target canopy species) within plots and throughout the area.

The recommended monitoring timing / schedule is as follows:

1. Pre-construction: if possible (pending timing of approval and construction), one monitoring visit will be conducted between June-September, with collection of baseline data for each of the six monitoring components. If not possible, existing data from the EIS work and/or initial post-installation inspections will be used as baseline data.
2. Immediately following installation, an initial inspection of installed plantings, seeding areas, invasive species control measures and wildlife habitat elements will be completed to ensure appropriate / complete installation. Deficiencies will be identified and remedial measures implemented, where

appropriate. Note that the pre-construction and initial inspections could be combined, depending on the timing of construction and approvals.

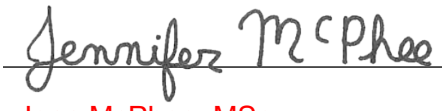
3. Post-construction, monitoring will occur for a period of 5 years at an interval of once every two years (i.e., year one, year three, and year five). This will entail one monitoring visit conducted in early-mid September.

Where applicable, measures will be recommended to address concerns. These could include, for example, repairs to fencing / signage; replacement plantings; or remedial measures for wildlife habitat elements.

4.0 CONCLUSION

With proper implementation of the approach described above, including post-construction / installation monitoring, the proposed Woodland Enhancement Strategy will result in a net ecological benefit to the natural heritage system.

Prepared by



March 28, 2019

Jenn McPhee, MSc.,
Ecologist

Date

Reviewed by

March 28, 2019

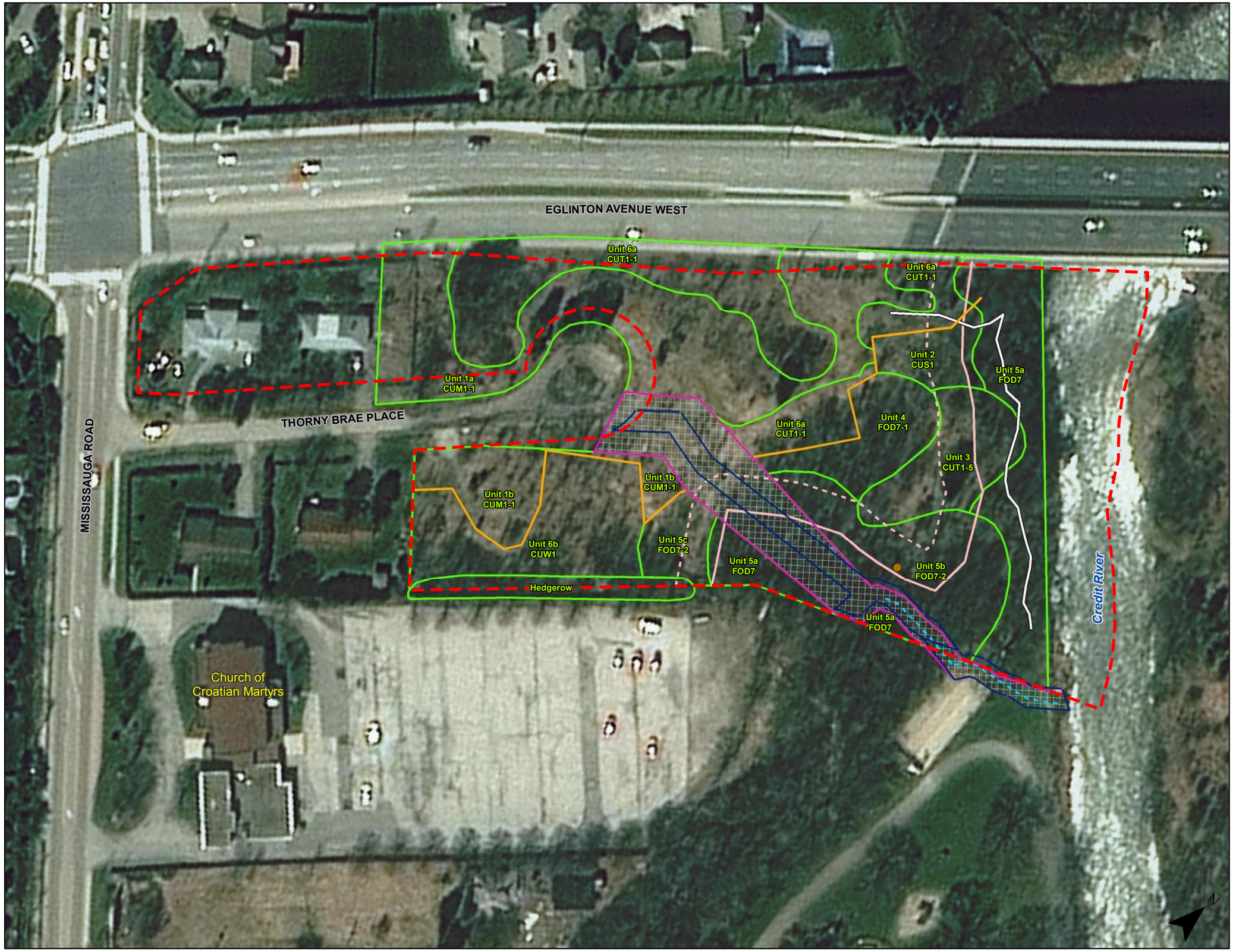
Jeff Gross, MSc.,
Senior Ecologist

Date

FIGURES

1745-1775 Thorny Brae Place, Mississauga
Woodland Enhancement Strategy

FIGURE 1
VEGETATION
AND FLORA



Legend

- Butternut Tree
- Subject Property
- Staked Woodland Boundary
- Informal Trail
- Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. March 2019)
- LTSSL/ Valley / Core Area 10m Setback
- Intermittent Watercourse
- Vegetation Community

SWM Outlet Easement

- Temporary Easement
- Permanent Easement
- Cleared of Vegetation in 2018

Unit 1a: CUM1-1: Dry-Moist Old Field Meadow

Unit 1b: CUM1-1: Dry-Moist Old Field Meadow

Unit 2: CUS1: Mineral Cultural Savanah

Unit 3: CUT1-5: Raspberry Cultural Thicket

Unit 4: FOD7-1: Fresh-Moist Lowland Deciduous Forest

Unit 5a: FOD7: Lowland Deciduous Forest

Unit 5b: FOD7-2: Fresh-Moist Ash Lowland Deciduous Forest

Unit 5c: FOD7-2: Fresh-Moist Ash Lowland Deciduous Forest

Unit 6a: CUT1-1: Sumac Cultural Thicket

Unit 6b: CUW1: Mineral Cultural Woodland

0 25 50
metres
1:1,000

Figure: 1
Project No.: 3316536
Date Created: 27/10/2016
Date Modified: 15/03/2019
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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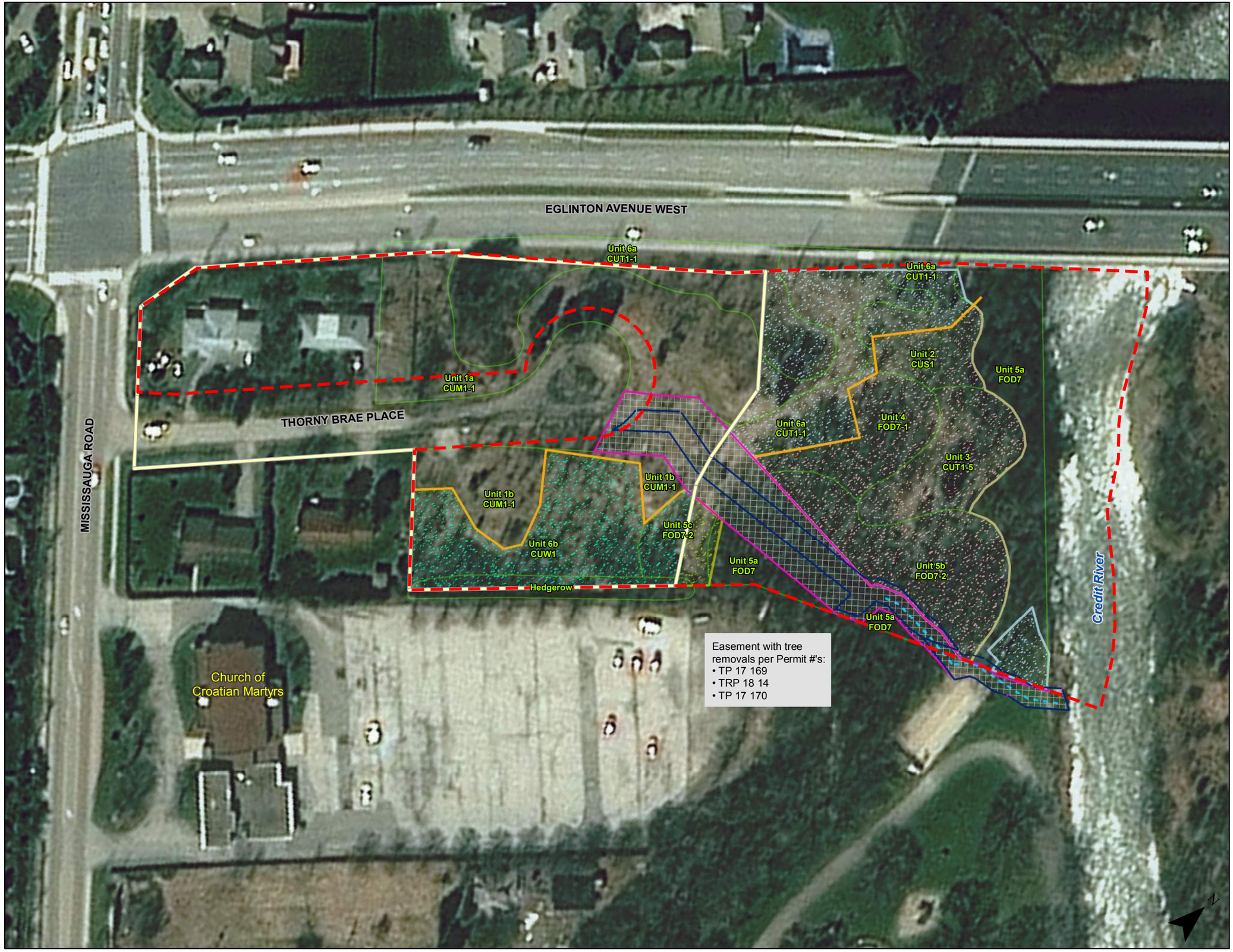

1745-1775 Thorny Brae Place, Mississauga
Woodland Enhancement Strategy

FIGURE 2
WOODLAND ENHANCEMENTS

Legend

- Subject Property
- Recommended Development Boundary
- Staked Woodland Boundary (July 17, 2018)
- Intermittent Watercourse
- Vegetation Community

Woodland Enhancements

- Woodland Creation
- Woodland Enhancement

Woodland Impacts

- Woodland to be Removed
- Edge Impact Zone

SWM Outlet Easement

- Temporary Easement
- Permanent Easement
- Cleared of Vegetation in 2018

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metres
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Figure: 2
Project No.: 3316536
Date Created: 27/10/2016
Date Modified: 15/03/2019
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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1745-1775 Thorny Brae Place,
Mississauga
Woodland Enhancement Strategy

FIGURE 3
INVASIVE SPECIES
REMOVAL AREAS

EGLINTON AVENUE WEST

THORNY BRAE PLACE

MISSISSAUGA ROAD

Church of
Croatian Martyrs

Credit River

Easement with tree removals per Permit #'s:
- TP 17 169
- TRP 18 14
- TP 17 170

N

Legend

- Potential Hibernacula Install Location
- Subject Property
- Recommended Development Boundary
- SWM Outlet Easement
- SWM Outlet Easement (Permanent Easement, Temporary Access/ Work Area Cleared of Vegetation in 2018)
- Staked Woodland Boundary
- Informal Trail
- Intermittent Watercourse

SWM Outlet Easement

- Temporary Easement
- Permanent Easement
- Cleared of Vegetation in 2018

Invasive Species Removal Areas

- Common Buckthorn
- Honeysuckle & Privot
- Norway Maple
- Tree-of-Heaven

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metres
1:1,000

F igure: 3
Project No.: 3316536
Date Created: 27/10/2016
Date Modified: 15/03/2019
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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1745-1775 Thorny Brae Place,
Mississauga
Woodland Enhancement Strategy

FIGURE 4
PROPOSED SITE PLAN

EGLINTON AVENUE WEST

THORNY BRAE PLACE

MISSISSAUGA ROAD

Church of
Croatian Martyrs

Credit River

N

Legend

- Natural Feature Signage
- Subject Property
- Staked Woodland Boundary
- Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. March 2019)
- LTSSL/ Valley / Core Area 10m Setback and Fencing
- Woodland Enhancement Area
- Woodland Creation
- Recommended Development Boundary and Permanent Fencing
- Proposed Site Plan

SWM Outlet Easement

- Temporary Easement
- Permanent Easement
- Cleared of Vegetation in 2018

Woodland Enhancement and Creation Monitoring

- Monitoring Plot Locations

0 25 50
metres
1:1,000

Figure: 7
Project No.: 3316536
Date Created: 27/10/2016
Date Modified: 15/03/2019
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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ATTACHMENTS

ATTACHMENT 1: VEGETATION MONITORING

ATTACHMENT 1: VEGETATION MONITORING

SUBJECT: **Woodland Enhancement Strategy**

DATE: **March 22, 2019**

VEGETATION MONITORING APPROACH AND METHODS

Vegetation monitoring will include three components: Habitat classification, Quantitative Photo Monitoring, and General Habitat Inspection. An annual monitoring report will be completed after each year of monitoring (year one, year three, and year five) with the data collected from each of these three components.

1.1 Habitat Classification

Vegetation communities are to be characterized during each monitoring visit using the Ecological Land Classification for Southern Ontario (ELC) (Lee et al., 1998). The ELC characterization recorded during each monitoring visit is to be compared to the communities described in the Thorny Brae Place Scoped Environmental Impact Study – Revised (WSP, 2019).

1.2 Quantitative Photo Monitoring

A technique described by Van Horn and Van Horn (1996), known as "quantitative photo monitoring" will be utilized to sample the monitoring plots. Five permanent photo monitoring plots will be established; approximate locations are shown in Figure 4.

The terrestrial vegetation assessments will be conducted at five plot locations:

- One plot within the woodland edge impact zone (Figure 2)
- One plot within the woodland creation area (Figure 2)
- Three plots within the woodland enhancement area, specifically in areas with a high density of invasive species (Figure 2, Figure 3)

A transect that consists of two stakes spaced 10 m apart will be established at each location. One stake is the photo reference point, the other is the end point of the 10 m transect. Each plot will consist of the 10 m, as well as the general area 5 m to either side of the transect.

Four 0.5 m square quadrats will be established along the transect line at 1 m, 3 m, 5 m and 8 m. Each quadrat will then be divided into nine equal sub-samples. Each quadrat will be inventoried for plant species (presence / absence, frequency of occurrence) within each of the nine sub-samples. Additional measurements and observations will be made including the dominant vegetation between the photo and reference points; the depth and location of any standing water along the transect between the photo and reference points (start and end plot stakes); and general notes on community health and site disturbance.

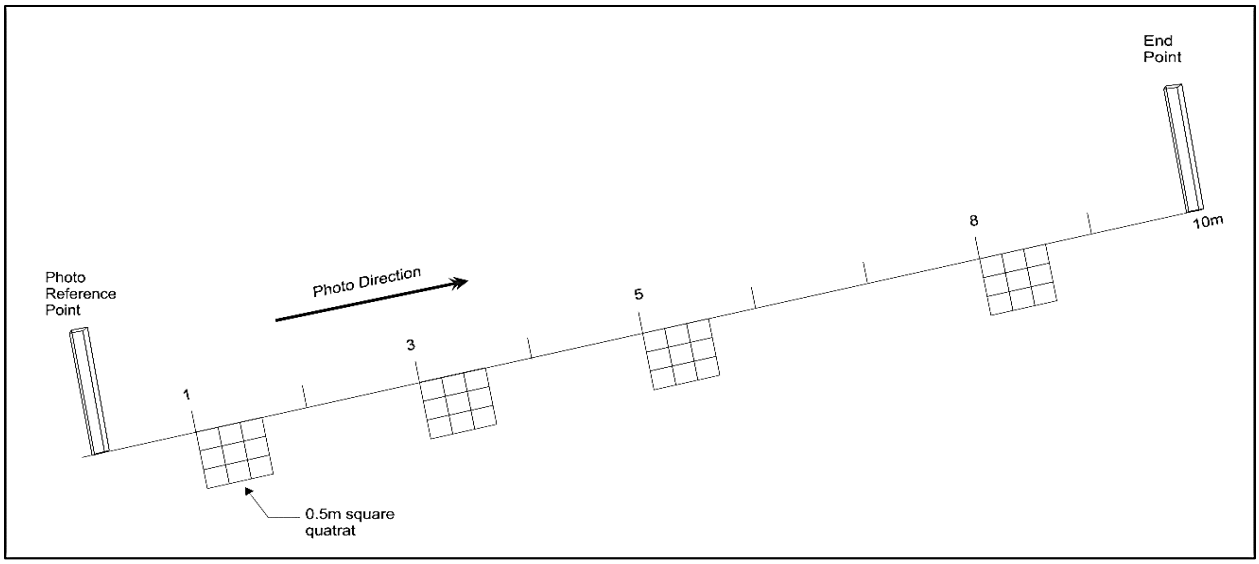

Figure 1. Schematic of Vegetation Monitoring Transect Layout

Inventoried plant species will be characterized by their *Coefficient of Conservatism* (CC) and *Coefficient of Wetness* (CW). The CC is a measure of habitat specificity / tolerance, and ranges in value from 0 (tolerant of a wide range of habitats) to 10 (very habitat specific), as shown in Table 1. The CW is an indicator of wetland or upland affinity, ranging in value from +5 (upland) to –5 (obligate wetland), according to Table 2. Mean CW and CC values are calculated based on sampling data and will be compared over subsequent years. Values for CC and CW from each monitoring plot are calculated based on a weighted mean, which considers both the CC or CW value as well as the species' abundance within the monitoring plot. These data can provide indications of wetland condition changes in association with surface and groundwater levels, and climatic data.

Table 1. Coefficient of Conservatism (CC). Adapted from Oldham et al. 1995.

CC	Rank	Description
0 to 3	Tolerant	Found in a wide variety of plant communities, including disturbed
4 to 6	Moderately Conservative	Typically associated with a specific plant community, but tolerate moderate disturbance.
7 to 8	Conservative	Typically associated with a plant community in an advanced successional stage that has undergone minor disturbance.
9 to 10	Highly Conservative	Typically displaying a high degree of fidelity to a specific plant community or a narrow range of synecological parameters.

Table 2. Coefficient of Wetness (CW). Adapted from Oldham et al. 1995.

CW	Rank	Description
- 5	OBL	**OBLIGATE WETLAND**: Occurs almost always in wetlands under natural conditions (99% probability)
- 4	FACW+	**FACULTATIVE WETLAND**: Usually occurs in wetlands, but occasionally found in non-wetlands (67-99%)
- 3	FACW	
- 2	FACW-	
- 1	FAC +	**FACULTATIVE**: Equally likely to occur in wetlands or non-wetlands (34-66%)
0	FAC	
1	FAC -	
2	FACU+	**FACULTATIVE UPLAND**: Occasionally occurs in wetlands, but usually occurs in non-wetlands (1-33%)
3	FACU	
4	FACU-	
5	UPL	**UPLAND**: Occurs almost never in wetlands under natural conditions (<1%)

1.3 General Habitat Inspection

This involves recording general biophysical conditions of the plot and noting site changes. A general habitat inspection will occur within the entire 10m x 10m plot (approximately 5 m to either side of the established transect, as mentioned above). Details regarding floral composition, invasive species abundances, site disturbance (i.e. trails, rubbish, vandalism, etc.), and incidental wildlife observations will be complied for each year of monitoring.