

Prepared for: Pace Developments

THORNY BRAE PLACE, MISSISSAUGA, ON

SCOPED ENVIRONMENTAL IMPACT STUDY

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Thorny Brae Place, Mississauga, ON

Scoped Environmental Impact Study

Prepared for:

Pace Developments

Prepared by:

MMM Group, a WSP Company

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1.0 INTRODUCTION

1.1 Study Overview and Context

MMM Group, a WSP company, 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 1745-1775 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"). As the SWM outlet is located on the subject property, many details of the EIS are based on shared data and analysis (e.g. vegetation and wildlife resources); however, two separate reports have been prepared to address the two proposed developments. This report addresses item 2: the SWM outlet that will accept flows from the subject property and neighbouring properties to the south.

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). 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; October 2014) and the City of Mississauga Official Plan, MOP (July 2016) 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: 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 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)
- 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)
- 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.

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 (2016). 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 (October 2014 Office Consolidation)
    - City of Mississauga Official Plan (July 2016 Office Consolidation)
- CVC Regulation 160/06 (2013)

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 (October 2014 Office Consolidation)
- City of Mississauga Official Plan (July 2016 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)
    - 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.
- 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

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 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 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

4.0 EXISTING CONDITIONS CHARACTERIZATION

An overview of the subject property and existing natural heritage features is 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 un-named 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 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 subject property is open / non-treed up to the top of valley slope. The un-named 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 un-named 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 un-named tributary is faintly evident.
- 1995: Eglinton Avenue has been widened. The subject property is generally unchanged. The un-named 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 un-named 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 zoned in the MOP (2016) 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 portion of adjacent tableland).

The following designated natural features, shown on 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 (2014)
    - *Core Areas of the Greenlands System* – Credit River Valley, including the west valley slope on the subject property
- City of Mississauga Official Plan (2016)
    - 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 was 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)

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) and ELC Ecosystem Catalogue: 2008 Version (Lee 2008), where applicable

- 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.

4.3.2 Botanical Inventory and Floristic Analysis

In total, 105 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 (54%) are native and 48 (46%) are non-native.

One species, (Butternut, *Juglans cinerea*), is listed as S3? (rare to uncommon within the province), and two species (Black Walnut [*Juglans nigra*[1]] and Hudson's Eyebright [*Euphrasia hudsoniana*]) are listed as "S4" and "S4?", respectively, which indicates that these species are 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 of 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 (see 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.
- Virginia Stickseed (*Hackelia virginiana*): Units 1, 3, 4, 6a and 6b - occurring sparsely throughout 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)

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 on Figure 3:

- Dry-Moist Old Field Meadow (CUM1-1)
- Sumac Cultural Thicket Type (CUT1-1)
- 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. 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 Sumac Cultural Thicket Type (CUT1-1) – Unit 2

The first of two CUT1-1 units occurs in the northern corner of the subject property on a gentle slope adjacent to the steep valley slope. This unit is dominated by Staghorn Sumac (*Rhus typhina*), and occasional Tree-of-heaven (*Ailanthus altissima*) in the sub-canopy and understory layers with occasional Manitoba Maple (Acer negundo) in the canopy. 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 Type (FOD7-1) – Unit 4

The Elm Lowland Forest is on sloping tableland adjacent to valleylands associated with the un-named 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 Type (FOD7) – Unit 5a

The Lowland Forest is a fairly disturbed community located directly adjacent to the Credit River. 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 wind throw.

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

This Ash Lowland Forest is located on the northeastern most side of the subject property along 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. Nearest Unit 6b, there is a concentration of Black Walnut trees. The stand is young with few trees greater than 50 cm DBH, and most 10 - 24 cm DBH. The small strip of forest between the neighboring parking lot to the south and Unit 6b is highly disturbed by cultural influences, including very high concentration of invasive species and garbage.

4.3.3.7 Sumac Cultural Thicket Type (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 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 Ecosite (CUW1) – Unit 6b

The Mineral Cultural Woodland is located directly south of Thorny Brae Place, extending southwest toward the un-named tributary ravine. 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, wind throw and evidence of Emerald Ash Borer.

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: 0.395 ha 1b: 1.107 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	CUT1-1	0.092 ha	Canopy	Occasional young Manitoba Maple and Tree-of-heaven throughout 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	0.13 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	

Unit	ELC Vegetation Type	Area	Vegetation Layer	Component Species	Plant Species of Conservation Concern
5a	FOD7	0.183 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	
			Ground Layer	Equally abundant Garlic Mustard, Virginia Strawberry (*Fragaria virginiana*) and White Avens	
5b	FOD7-2	0.359 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	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	0.203 ha	Sub-canopy	Frequent 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	0.259 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	

4.4 Wildlife Resources

4.4.1 Breeding Birds and Other Wildlife

4.4.1.1 Approach

Breeding bird / wildlife surveys were conducted on 2 dates: June 23, 2016 and July 4, 2016. 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.

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 time of report preparation)
- The Species At Risk Act for federally listed species (current at time of report preparation)
- The Species At Risk in Ontario list (O.Reg 230/08) for provincial status designations (current list at 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

During the breeding bird surveys, particular attention was paid to assessing habitat for potential SAR use or potential 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

[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

the property due to the lack of suitable breeding / overwintering habitat (i.e., ponds or wetlands).

4.4.1.2 Results - Avifauna

In total, 23 'breeding' bird species were observed within the subject property (see 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)
- None is designated as a Species at Risk in Ontario (by COSSARO5)
- One species is considered Area Sensitive by MNRF (2015):
    - Coopers Hawk (*Accipiter cooperii*)
- One SCC in the Credit Valley Watershed (i.e., Tiers 1-3 in CVC 2010)
    - One *species of interest* (i.e., Tier 2 per CVC 2010) was recorded: Cooper's Hawk

[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]	COSEWIC[3]	MNR[4]	SARA Status[5]	CVC (2010)[6]	MNR Area Sensitive[7]	Site Visit Details					
									23-Jun-16		4-Jul-16		Overall	
									Number	Highest BE	Number	Highest BE	Highest Abundance	Highest breed Status
American Goldfinch	Spinus tristis	G5	S5B				4		6	S/H	13	S/H	13	POSS
American Robin	Turdus migratorius	G5	S5B				4		3	FY	2	S/H	3	CONF
Baltimore Oriole	Icterus galbula	G5	S4B				3		1	S/H	1	S/H	1	POSS
Black-capped Chickadee	Poecile atricapillus	G5	S5				4		4	S/H	10	H	10	POSS
Blue Jay	Cyanocitta cristata	G5	S5						2	H			2	POSS
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
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	POSS
Downy Woodpecker	Picoides pubescens	G5	S5				4				2	H	2	POSS
Eastern Phoebe	Sayornis phoebe	G5	S5B				3		2	FY	1	S/H	2	CONF
European Starling	Sturnus vulgaris	G5	SNA				5		2	S/H	4	S/H	4	POSS
Gray Catbird	Dumetella carolinensis	G5	S4B				3		3	CF	2	S/H	3	CONF
House Sparrow	Passer domesticus	G5	SNA				5				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	2	POSS
Northern Cardinal	Cardinalis cardinalis	G5	S5				2		2	S/H	4	S/H	4	POSS
Red-eyed Vireo	Vireo olivaceus	G5	S5B				4				2	S/H	2	POSS
Red-winged Blackbird	Agelaius phoeniceus	G5	S4				4		2	S/H	2	S/H	2	POSS
Song Sparrow	Melospiza melodia	G5	S5B				4		4	S/H	1	S/H	4	POSS
Tree Swallow	Tachycineta bicolor	G5	S4B				3		5	FY	4	H	5	CONF
Warbling Vireo	Vireo gilvus	G5	S5B				4		1	S/H			1	POSS
Yellow Warbler	Setophaga petechia	G5	S5B				4		1	FY	3	S/H	3	CONF
Total No. of Species	**23**								**18**		**19**			

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*).

MMM 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 – searches were completed during 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.

4.4.2 SAR Bat Habitat

4.4.2.1 Approach

Four endangered bat species, all subject to provisions of the ESA, are known from Hamilton (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 surveys:

- 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)

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 survey area (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 required or 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.

Table 3. Assessment of bat 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 not warranted.

Key results of the SWH evaluation are as follows:

- 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. No impacts to overall function based on the very minor disturbance for works associated with the SWM outlet.
    - **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.
    - **Raptor Nesting Habitat** (wetlands, ponds and rivers): potential Osprey nesting habitat (candidate SWH) is associated with the Credit River treed areas. Nesting and SWH on the subject property has not been confirmed and all valley forest will be retained with the proposed plan, save for limited tree removals, predominantly in the upper portion of the tributary ravine.
    - **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 and the more mature, less disturbed forest areas 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.

- One potentially *Confirmed SWH* type:
    - **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. 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 BMPs during construction.

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 of the f, 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.
- 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.
- 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 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. Therefore, we concluded, per the HDF Guidelines, that this feature does not provide an important hydrological function. Moreover, 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.

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 the subject property and/or impacted by proposed works. 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.

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

Neither species was recorded 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. 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.

4.7 Geotechnical

Information presented in this section is based on the Soils Investigation (Soil Eng. Oct. 2016; Addendum Dec. 22 2016). 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 5.6m 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.

4.8 Fluvial Geomorphology

4.8.1 Approach

Water's Edge completed a fluvial assessment of the drainage feature on the property, as input to the assessment of potential erosion impacts resulting from increased SWM discharge at the existing outlet. This included background information and site assessments to characterize the drainage feature existing conditions and make recommendations for mitigation and enhancements.

4.8.2 Results and Analysis

The Water's Edge report (February 27, 2017) characterized this as a 75 m long high slope, single thread channel, with 4 reaches: 1 upstream of the SWM outlet; and 3 downstream of the outlet (Reaches 1-3). The report noted that the drainage feature has cut through the overburden into the underlying shale just downstream of the outlet and that this would continue, if untreated. It also noted erosion at the steep slope of the lower reach near the Credit River. To address these issues, a number of measures have been recommended, as discussed below.

4.8.3 Recommended Works

To mitigate potential impacts to the drainage feature and Credit River due to increased SWM flows, measures for stabilization, rehabilitation and erosion mitigation have been identified.

Several design options were evaluated, in consideration of existing conditions, CVC input and property ownership. Those options that would require extensive valley slope / floodplain excavation were screened out. The preferred option, is generally as discussed at the site meeting with CVC on December 4, 2015; this proposes no change to the existing outlet location, with stabilization of the upper reach of the drainage feature and enlargement / naturalization of the lower portion in the floodplain. Specifically, the following tasks are proposed (as shown on Water's Edge Drawings PP1 and DET 1; February 2017):

- Reach 1.
    - Objective: erosion protection
    - Design: placement of armour stone blocks and riprap / gravel on top of native substrate and shale bedrock
    - Restoration: native woodland or upland meadow seed mix on 150mm of topsoil (+ nurse crop of 50% oats and 50% buckwheat) in areas disturbed for access or works
- Reach 2.
    - Objective: erosion protection and habitat enhancement
    - Design: establishment of a larger bankfull drainage feature with a pool riffle sequence
    - Restoration: native woodland or upland meadow seed mix on 150mm of topsoil (+ nurse crop of 50% oats and 50% buckwheat) in areas disturbed for access or works
- Reach 3.
    - Objective: stabilization and habitat enhancement
    - Design: establishment of a step pool feature to stabilize the short steep bank at the Credit River
    - Restoration: native woodland or upland meadow seed mix on 150mm of topsoil (+ nurse crop of 50% oats and 50% buckwheat) in areas disturbed for access or works; native shrub plantings adjacent to step pool sequence

5.0 DESCRIPTION OF THE PROPOSED ACTIVITIES

As input to the proposed 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 2016) and design are included in Section 5.3; the reader is referred to the various technical reports for additional details.

The proposed stormwater management plan and design (SWM and fluvial) forms the basis for the impact review and evaluation that is documented in Section 7.0.

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)/

      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 12.5m west of the previous TOB along the Credit River drainage feature.

      The LTSSL (per Soil Engineers Ltd. 2016) is the recommended 'valley' limit as input to natural heritage designations discussed herein.

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)
    - It follows the LTSSL on Soil Engineers Ltd. 2016 Dwg. No. 1

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* (ESA); limits of the ESA 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

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), as noted above
- *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
    - This seems to encompass some of the regenerating cultural woodland

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 + 10m
2. City Significant Natural Area + 10m
3. Top of Bank / Natural Hazard + 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; this is at the LTSSL + 10m. Note that this encompasses ~ 1833m^2 of the regenerating vegetation adjacent to the top of bank.

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 improvements to an existing SWM outfall and related infrastructure, including the works described below. Works are shown on engineering drawings (Cole Engineering March 1, 2017) and fluvial design / channel restoration drawings (Water's Edge 2017), with relevant drawings included in Appendix H.

Access and Construction

- The proposed 750 mm diameter storm will be constructed in a 6 m wide permanent storm drainage easement from Thorny-Brae Place to the existing headwall.
- Prior to any construction, sedimentation control measures are to be installed and existing trees are to be removed inside the designated limit of construction, and debris disposed of off-site.
- The sewer and manholes will be constructed in a confined space with a vertical trench with temporary steel trench boxes (per recommendations of the geotechnical consultant) and temporary side slopes extending at 1:1 to existing ground, all within the limits of the working easement as shown on the engineering drawings and Figure 7. Due to the topography, it is anticipated that a temporary access road will be constructed within the working easement to facilitate access for construction of the storm sewer for excavation, removal, backfill and materials handling. Sewer construction and backfill shall be in accordance to the City of Mississauga design criteria and standards and all trenching carried out in accordance with Ontario Regulation 213/91.
- Refer to the "Storm Sewer Outfall Opinion Letter" prepared by Soil Engineers Ltd, Ref No. 1608-S094, dated March 1, 2017 commenting on the feasibility of the above referred vertical trench construction and open cut excavation slope stability.
- The storm sewer will be connected to a reconstructed wingwall of the existing headwall and backfilled to the proposed gradient with all disturbed areas to be restored to original condition or better as specified by the landscape architect.
- Access for the portion of the drainage feature below the SWM outlet is from the floodplain on adjacent lands owned by the church (see Water's Edge Drawing. DET1). Access for

the headwall works and portion of the drainage feature above the outlet will occur via the easement.

Mitigation and Enhancement

- Fluvial geomorphological works to mitigate erosion potential downstream of the outlet, as detailed in Section 4.8.3. This includes measures for erosion protection and aquatic habitat enhancement (riffle / pool and step pools; riparian plantings).
- Ecological restoration and tree compensation plantings along the drainage feature and valley top of bank setback / buffer
- The Tree Inventory & Preservation Plan and letter (BTI March 8 2017) demonstrate that there will be no negative impacts to the *Urban Forest* resulting from proposed development / site alteration. An arborist report and tree inventory that demonstrates tree preservation and protection both pre and post construction, and where preservation of some trees is not feasible, identifies opportunities for replacement, will be prepared to the satisfaction of the City in compliance with the City's tree permit by-law.
    - The Restoration Landscape Plan (Drawing B1, Appendix K) identifies plantings to compensate for the removal of 27 trees (i.e., 17 trees @ 3:1 and 10 Ash trees @ 1:1) for a total of 61 trees (i.e., 43 trees and 270 shrubs) – in the temporary easement
    - The Restoration Landscape Plan identifies seeding of the remainder of the temporary and permanent easement with *CVC-7 Upland Native Meadow Mix*
    - Drawing PP1 and Drawing DET1 (Appendix H; Water's Edge: Feb. 2017) identify: *CVC-7 Upland Native Meadow Mix* on 150mm of topsoil (+ nurse crop of 50% oats and 50% buckwheat) in areas disturbed for access or works; native shrub plantings adjacent to step pool sequence

Development of the portion of the tablelands on the subject property is proposed, and has been considered in the recommended SWM strategy discussed herein. A separate EIS will be submitted in support of that future Draft Plan application.

6.0 POLICY REVIEW AND 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

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

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 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.

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 (i.e., almost entirely active croplands) and there is no suitable nesting habitat for several species in areas of proposed development (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 outside of the *Significant Natural Area* (CRR11), with the exception of a very small area of the drainage feature at the Credit River bank, part of the proposed improvements / ecological enhancements to the lower reach of the drainage feature of the SWM outlet. The footprint of these proposed works is minimal.
    - Minimizing encroachment into higher quality, more sensitive habitats.
        - No removal or disturbance of higher quality natural vegetation communities associated with the valley is proposed (except as described above). Vegetation to be removed for installation of the SWM sewer from the Thorny Brae Place cul-de-sac to the existing SWM outlet headwall is comprised of immature / successional culturally influenced communities (CUM1-1, CUW1 and FOD7-2) which have established on a former farmstead and upper portion of the un-named tributary ravine. 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.

One species afforded protection under the ESA was identified within the subject property: Butternut (Endangered). 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. 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.

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 present on / immediately adjacent to the subject property.

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

Significant Valleylands

The Credit River valley is designated as a significant valley (per Schedule A of the 2014 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. Candidate SWH was identified in five categories: Snake hibernacula; bat maternal roosts and hibernacula; Turtle nesting habitat, Raptor nesting habitat (rivers), Raptor nesting habitat (woodlands), and Wildlife movement corridors. One confirmed SWH type is present: Species listed as rare in Ontario (Butternut).

Conclusion: All candidate and confirmed SWH areas are within the natural hazard lands associated with the Credit River valley which will be retained (save for minor removals in the upper portion of the ravine). This disturbance represents a negligible portion of the habitat in the broader valley and there is no anticipated impact to SWH associated with the Credit River valley from the SWM outlet works.

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 66.2.1.

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

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. No development is currently proposed; future development is contemplated, with potential impacts to ecological features and functions to be addressed in a future EIS report.

Conclusion: n/a

6.3 Regional / Municipal

6.3.1 Region of Peel Official Plan (ROP) (2014)

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 September 2014 (some of which are currently under appeal). 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).

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. 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 likely 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*
    - The existing *ESA* 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 SNA/ESA.

- 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.
- *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. See Figure 6.

Policy Compliance

Per Policy 2.3.2.6 of the ROP, *development*[6] and *site alteration*[7] within *Core Areas* is prohibited, with some exceptions.

- The recommended *Core Area* will be retained in full with development setbacks of 10 m.
- *Minor development*[8] / *site alteration*[9] for *essential*[10] *infrastructure* is proposed for the modification to the existing SWM outlet.

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. None is mapped in the ROP and they are intended to be identified through

6 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.

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

8 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.

9 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.

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

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 and none was confirmed through field surveys / analyses for the current study.
    - Based on the detailed evaluation in Appendix E and summary of results in Section 4.4.3, one *Confirmed SWH* type is present:
        - **Species listed as Rare in Ontario**: 1 Butternut tree is present in ELC Unit 5b (ravine). As noted in Section 4.4.3, however, it is uncertain whether this would quality given the declining health and BHA classification.
        - Notwithstanding the above, the Butternut and surrounding forest habitat is included within the recommend Core Area
- *Fish habitat*[11]
    - The drainage feature on the subject property acts as contributing habitat to downstream reaches (Credit River) but does not support direct fish use.
- Regionally significant Life Science *Areas of Natural and Scientific Interest*
    - None is present
- Provincially significant Earth Science *Areas of Natural and Scientific Interest*
    - 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*

[11] 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

- 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*.
- *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*
  - None is present

Recommendation: No NACs are recommended. 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.

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. 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
  - None is present. 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*[12]
    - 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: No NACs are recommended.

6.3.2 City of Mississauga Official Plan (July 2016 Office Consolidation)

The City of Mississauga Official Plan was adopted by Regional Council in July 1996 and approved in October 1996 with an updated consolidation in 2016. 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*

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

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

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.

Significant Natural Areas

- 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.
- 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

Natural Green Spaces

- 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. See discussion in Section 6.3.1 and Appendix I. Woodland within the valley (including the ravine; Veg. Units 5a and 5b) is considered significant as part of the valleyland *Core Area*).
        ii. Other woodland on the property (i.e., Veg. Units 4 and 6b; total area 0.39 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 within 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. Vegetation outside of the recommended valleyland Core Area is common, culturally derived communities that are widespread and abundant.

Special Management Areas

- None is present

Residential Woodlands

- None is present

Linkages

- None is present

Recommendation: no change to the *Significant Natural Area*, as mapped on Schedule 3

Policy Compliance:

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

- the *Natural Heritage System* (i.e., the *Significant Natural Area*) will be retained in full with setbacks and buffer management identified in the current study.
- 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
- 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 8, 2017). 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 demonstrates that there will be no negative impacts to the *Urban Forest* resulting from proposed development / site alteration. An arborist report and tree inventory that demonstrates tree preservation and protection both pre and post construction, and where preservation of some trees is not feasible, identifies opportunities for replacement, will be prepared to the satisfaction of the City in compliance with the City's tree permit by-law.
    - The Restoration Landscape Plan (Drawing B1, Appendix K) identifies plantings to compensate for the removal of 27 trees (i.e., 17 trees @ 3:1 and 10 Ash trees @ 1:1) for a total of 61 trees (i.e., 43 trees and 270 shrubs) – in the temporary easement
    - The Restoration Landscape Plan identifies seeding of the remainder of the temporary and permanent easement with *CVC-7 Upland Native Meadow Mix*
    - Drawings PP1 and DET1 (Appendix H; Water's Edge: Feb. 2017) identify: *CVC-7 Upland Native Meadow Mix* on 150mm of topsoil (+ nurse crop of 50% oats and 50% buckwheat) in areas disturbed for access or works; native shrub plantings adjacent to step pool sequence

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).

      The Long-Term Stable Slope Line (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, except for minor works associated with the upgraded SWM outlet and drainage feature enhancements
- Slope stability study. Works within the LTSSL are restricted to those described herein, with minimized footprint, mitigation measures and post-construction enhancements. Future development contemplated on tablelands will respect the LTSSL.
- Works are proposed to enhance fluvial geomorphology / function and mitigate erosion

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* will be retained; individual tree removals will be minimized, with additional opportunities for tree retention continually assessed during construction
- 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 (e.g., Low Impact Development [LID] measures such as lot-level infiltration galleries and permeable unit pavers)

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 and review of / input to the draft TOR by CVC staff.
- Per Section 4.1, a permit will be required for the current application since drainage feature alterations and 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 yr 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 yr flood.
    - Erosion – Potential impacts (erosion) to the drainage channel caused by the movement of stormwater through the channel have been mitigated through design (Waters Edge, 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

This section reviews potential direct and indirect impacts or condition changes to fluvial function and natural environmental features on or adjacent to the proposed works.

7.1.1 Fluvial Geomorphology and Erosion

The un-named watercourse was assessed from a fluvial geomorphologic perspective upstream and downstream of the existing SWM outlet.

Under current conditions, erosion is occurring and the drainage feature continues to degrade over time.

With the proposed additional flows, there is potential for additional erosion downstream of the outlet. The proposed stabilization and drainage feature design measures identified in Water's Edge (2017) will mitigate these erosion issues.

7.1.2 Natural Heritage

Direct impacts are limited to vegetation / slope grading in the footprint of proposed works, including access areas. No direct impacts to habitat for species of conservation concern will occur.

There is potential for indirect impacts during construction including: increased noise / vibration; sedimentation and erosion in the downstream receiving drainage feature and Credit River (which, in turn, may impact vegetation in the vicinity).

Once works are complete, with implementation of recommended restoration / enhancement measures, potential long-term (indirect) impacts are restricted to changes in the receiving drainage feature resulting from erosion in downstream areas. As noted, however, recommended drainage feature works will mitigate potential erosion resulting from increased SWM discharge.

Three primary factors natural environment factors (aquatic habitat, vegetation and wildlife / habitat) were reviewed, as presented in Table 6. In Table 6, 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 / restoration / enhancement measures are provided on drawings included in Appendix H, Appendix J and Appendix K.

7.2 Overview of Mitigation and Enhancement Measures

Specific mitigation measures are identified for each evaluation factor in Table 5. A number of mitigation measures are common to all / most evaluation factors, including:

- Drainage feature stabilization measures to reduce impacts of erosion
- Restoration / enhancement measures (see Drawings PP1 and DET1):

  - Native species seeding in disturbed areas and riparian shrub plantings in the new step pool drainage feature reach in the floodplain.
  - Tree compensation plantings as shown on the Restoration Landscape Plan (A. Budrevics & Associates March 2017)

- Erosion & Sediment Control (ESC) Plan, including fencing installed prior to and throughout construction and other measures such as a fibre log perimeter sediment control and coir matting and seeding on exposed soils.
- Vegetation protection fencing, coincident with the ESC fencing.
- Monitoring cross sections may be established to assess erosion.
- Spills management / best management practices during construction (e.g., guidelines for heavy equipment use to reduce potential for damage to natural areas [mechanical damage to trees, soils compaction etc.]). Follow Clean Equipment Protocol for Industry (Ontario Invasive Plant Council 2013).

Table 5. SWM Outlet – Impact Assessment

Feature Significance and Sensitivity	Natural Environment Impacts	Mitigation Measures	Residual Effects
Aquatic Resources			
<u>Subject Property</u> • Un-named ephemeral tributary 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**. ○ There will be no removal of or direct impacts to fish or habitat for direct fish use. ○ Potential impacts to the drainage feature and receiving watercourse (Credit River) resulting from increased erosion / sedimentation (due to increased SWM discharge) • **During-construction.** There will be temporary impacts to the drainage feature during construction – grading, substrate removal equipment access and potential for spills.	• **Long-term Impacts** mitigated by: ○ 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) ○ Implementing LIDs on future developed areas of the tablelands on the subject property – reducing surface runoff and promoting 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 from entering the Credit River. • **During-construction (short-term).** Mitigated by ○ Respecting a coldwater and warmwater timing windows for protection of spawning salmonids in the Credit River ○ Implementing an ESC plan, with ESC fencing to be installed prior to any site grading ○ Utilizing a designated stockpile area ○ Utilizing a designated dewatering area, as required ○ Implementing a Spills Management Plan and BMPs during construction	• There will be no direct impacts to fish or habitat for direct fish use. • No adverse short-term effects to groundwater, aquatic habitat and fisheries from construction activities are anticipated with implementation of recommended during-construction measures. • Residual long-term effects to aquatic habitat and fisheries are anticipated to be minor, 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

Feature Significance and Sensitivity	Natural Environment Impacts	Mitigation Measures	Residual Effects
Vegetation			
• **Vegetation**. The subject property is composed of a mosaic of culturally derived / 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 study area: Butternut. One tree is present in the vicinity of the SWM outlet. • 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; City of Mississauga Natural Hazard / Significant Natural Area / Greenlands.	• **Direct Impacts.** Permanent removal of a small amount of successional / tolerant habitat on the tablelands above the LTSSL (~521 m^2). Temporary disturbance to vegetation on the valley slope (with minimal tree loss of 27 trees) for drainage feature works. No impacts to SAR (Butternut). Potential impacts to regionally / locally significant species: Allegheny Serviceberry; Wild Cranes'-bill; and Virginia Stickseed. Note that proposed works will only potentially impact a portion of these species on site. • **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 the site is already in an edge condition with canopy gaps and dry soils, and invasive species are already present within and adjacent to the footprint. ○ **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.	**Direct Impacts** to be mitigated by: ○ 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. ○ Tree removals will be compensated at a 3:1 ratio for healthy trees and 1:1 ratio for dead/hazardous trees and Ash trees (see Dwg B1, Appendix K) ▪ 17 removals – 51 compensation trees ▪ 10 dead/hazardous/Ash – 10 compensation trees ○ Regionally / locally rare species. Minimizing tree removals / impacts and considering seedbank / plant salvage or replacement following drainage feature works. ○ The area of temporary disturbance from excavation for construction will be re-stabilized and vegetated with a native seed mix and plantings compatible with the local floristic composition. **Indirect Impacts** to be mitigated by: ○ Implementing an ESC plan, with ESC fencing to be installed prior to any site grading ○ Utilizing a designated stockpile area ○ Utilizing a designated dewatering area, as required ○ Implementing a Spills Management Plan and BMPs during construction	Residual impacts to vegetation are anticipated to be minor, with proper implementation of recommended mitigation measures. • Direct impacts will be restricted to a small area of common, tolerant vegetation in an area with a long history of anthropogenic land use and relatively disturbed portion of the escarpment forest (i.e., existing edge condition, dumping, presence of invasive species, limited ground flora). • Tree removals will be compensated, as shown on Drawing B (i.e., total of 43 trees and 270 shrubs) • The zone of temporary disturbance will be stabilized and revegetated (seeded/planted and naturalized). • No substantive changes in vegetation health / richness resulting from hydrological changes are anticipated in the escarpment forest. • Residual impacts from construction are anticipated to be negligible, with implementation of recommended vegetation protection fencing, ESC fencing and spills management plan, compensation / restoration plantings and revegetation of temporary disturbance zones.

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 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. In total, three deciduous trees with cavities that may be suitable for SAR bat roosting / maternity colony use were recorded during field surveys in 2015 and 2016; all are within the valley slope / ravine forest areas. • **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. One confirmed SWH type identified during current study: SAR (Butternut) habitat. Five candidate SWH types identified during current study; all are associated with treed/riverine/slope habitats in the Credit River valley. • **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., outside of the valley).	Potential impacts on wildlife habitat are similar to those discussed for vegetation (i.e. removal of a small amount of culturally influenced vegetation and temporary disturbance to habitat within the valleylands). • **Direct impacts**. Removal of ~ 965 m^2 of culturally derived wildlife habitat (CUM, CUW and FOD) within Units 1a, 1b, 4, 5b and 6b. Of this, ~443 m^2 is within the valley as defined by the LTSSL (i.e., in veg. unit 5b) ○ **Movement opportunities**. No impact to wildlife movement opportunities is anticipated. No defined movement trails are present in the study area, and broader movement opportunities along the Credit River valley are maintained. ○ **Habitat for wildlife species of concern** will not be impacted. Potential woodland habitat in the valley (for Cooper's Hawk) will be retained, with limited tree removals. ○ **SAR habitat** will not be impacted. No confirmed SAR wildlife habitat is present and potential SAR habitat (cavity trees for SAR bats) will be retained. ○ **SWH** will not be impacted. Works will result in minimal tree removal and temporary disturbance to the drainage feature, balanced by post-construction restoration / enhancement. Candidate SWH, all associated with the valley, is abundant in the local landscape. • **Indirect Impacts**. There is potential for indirect impacts to wildlife during construction, including noise, vibration and erosion / sedimentation.	Retention and protection of vegetation in the Credit River valley (as defined by the LTSSL) will also protect wildlife habitat. Specific mitigation measures 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	• Residual impacts to wildlife and wildlife habitat resulting from the outfall construction are anticipated to be very minor: • The proposed footprint is very small and there is no direct impact to unique, significant or sensitive wildlife habitats or wildlife movement opportunities. • Measures are proposed to reduce potential for indirect impacts to offsite wildlife habitat (i.e. work zone delineation / tree protection fencing, ESC measures and other BMPs during construction).

8.0 RESTORATION & ENHANCEMENT

Ecological restoration and enhancement measures are focused on three areas: 1) the SWM Easement from Thorny Brae Place to the SWM outlet (including temporary / working areas); 2) the lower reaches of the drainage feature downstream of the SWM outlet; and 3) the future buffer lands (to accompany a future site plan application).

8.1 SWM Easement

The Restoration Landscape Plan (Drawing B1, Appendix K) identifies plantings to compensate for the removal of 27 trees (i.e., 17 trees @ 3:1 and 10 Ash trees @ 1:1) for a total of 61 trees (i.e., 43 trees and 270 shrubs) – in the temporary / working easement.

The Restoration Landscape Plan identifies seeding of the remainder of the temporary and permanent easement with *CVC-7 Upland Native Meadow Mix*

- Drawings PP1 and DET1 (Appendix H; Water's Edge: Feb. 2017) identify:

8.2 Lower Reaches of Drainage Feature

To mitigate potential impacts to the drainage feature and Credit River due to increased SWM flows, measures for drainage feature stabilization, rehabilitation and erosion mitigation have been identified. These are discussed in detail in Section 4.8.3, shown on Drawings PP1 and DET 1; (Water's Edge February 2017; Appendix H) and summarized briefly below.

- Reach 1. Restoration via *CVC-7 Upland Native Meadow Mix* on 150mm of topsoil (+ nurse crop of 50% oats and 50% buckwheat) in areas disturbed for access or works
- Reach 2. Establishment of a larger bankfull drainage feature with a pool riffle sequence Restoration via *CVC-7 Upland Native Meadow Mix* on 150mm of topsoil (+ nurse crop of 50% oats and 50% buckwheat) in areas disturbed for access or works
- Reach 3. establishment of a step pool feature to stabilize the short steep bank at the Credit River and restoration via *CVC-7 Upland Native Meadow Mix* on 150mm of topsoil (+ nurse crop of 50% oats and 50% buckwheat) in areas disturbed for access or works; native shrub plantings adjacent to step pool sequence

8.3 Valleyland Buffer

Restoration and enhancement plans for the future valleyland buffer (within the LTSSL + 10m setback) will accompany a future EIS submission for development of the tablelands on the subject property.

9.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the review discussed herein, we support the proposed works associated with proposed SWM strategy involving the existing SWM outfall and un-named channel for the subject property. The proposed works can be undertaken while protecting key 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
- The SWM outfall location (which is fixed at the existing outlet), and design have minimized potential impacts to natural heritage features and functions (all associated with the Credit River valley) to the extent possible. The design has the following key attributes:
    - Utilizing existing infrastructure (SWM outlet) and surface flow path downstream of the outlet, thereby minimizing vegetation loss / disturbance and erosion.
    - Avoiding impacts to sensitive vegetation / wildlife habitats and SAR habitat
    - Minimizing the disturbance footprint, particularly in the lower slope downstream of the SWM outlet.
    - Provision of channel treatments to mitigation potential erosion and downstream sedimentation
    - Enhancing the lower channel to provide improved aquatic habitat and connectivity with the Credit River, via channel design which incorporates riffle/pool and step/pool sequences.

- Restricting in-water works between September 16th and June 14th to respect timing windows for spring and fall spawning salmonids known from the Credit River
- Restoration / enhancement of vegetation along portions of the drainage feature disturbed during proposed construction
- Tree removal compensation plantings and native seeding
- Compliance with all relevant legislation (e.g., ESA, MBCA etc.)

All of which is respectfully submitted by,

MMM Group, a WSP Company



Jeff Gross, M.Sc.
Senior Project Manager / Senior Ecologist
Ecology Department

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1745-1775 Thorny Brae Place,
Mississauga
EIS

FIGURE 1
SITE LOCATION AND
NATURAL HERITAGE
DESIGNATIONS



Legend

- Subject Property
- The Archways Property
- Existing SWM Outfall Location
- Intermittent Watercourse
- Watercourse
- Waterbody
- Railway Track
- Top of Bank (via CVCA, 2004)
- Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. Dec. 2016)

Natural Heritage Features*

- Natural Green Space, Valley Land (Mississauga Official Plan)
- Significant Natural Area, Valley Land (Mississauga Official Plan)
- Public and Private Open Spaces (Mississauga Official Plan)
- Green System (Mississauga Official Plan)
- Greenlands (Mississauga Official Plan)
- Core Areas (Peel Regional Official Plan)
- Natural Hazards (Mississauga Official Plan)

*Limits are approximate.

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metres
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Figure: 1
Project No.: 3316536
Date Created: 9/2/2016
Date Modified: 03/03/2017
Coordinate System: NAD 1983 UTM Zone 17N
Source: City of Mississauga, 2016

WSP | MMM GROUP

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1745-1775 Thorny Brae Place, Mississauga EIS

FIGURE 2
EXISTING SWM OUTFALL AND TOP OF BANK

EGLINTON AVENUE WEST

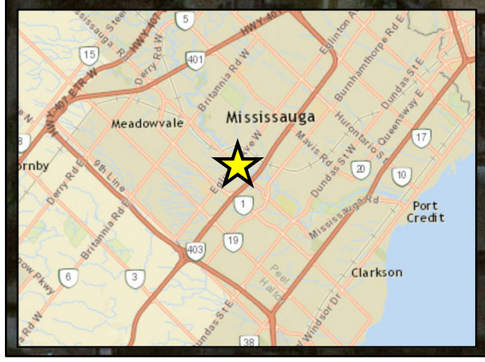
THORNY BRAE PLACE

MISSISSAUGA ROAD

BADMINTON DRIVE

Church of Croatian Martyrs

Credit River



Legend

- Subject Property
- The Archways Property
- Existing SWM Outfall Location
- Intermittent Watercourse
- Top of Bank (via CVCA, 2004)
- Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. Dec. 2016)
- Natural Hazard (Approximate, City of Mississauga Official Plan, 2012)
- Significant Natural Areas (City of Mississauga, 2015)

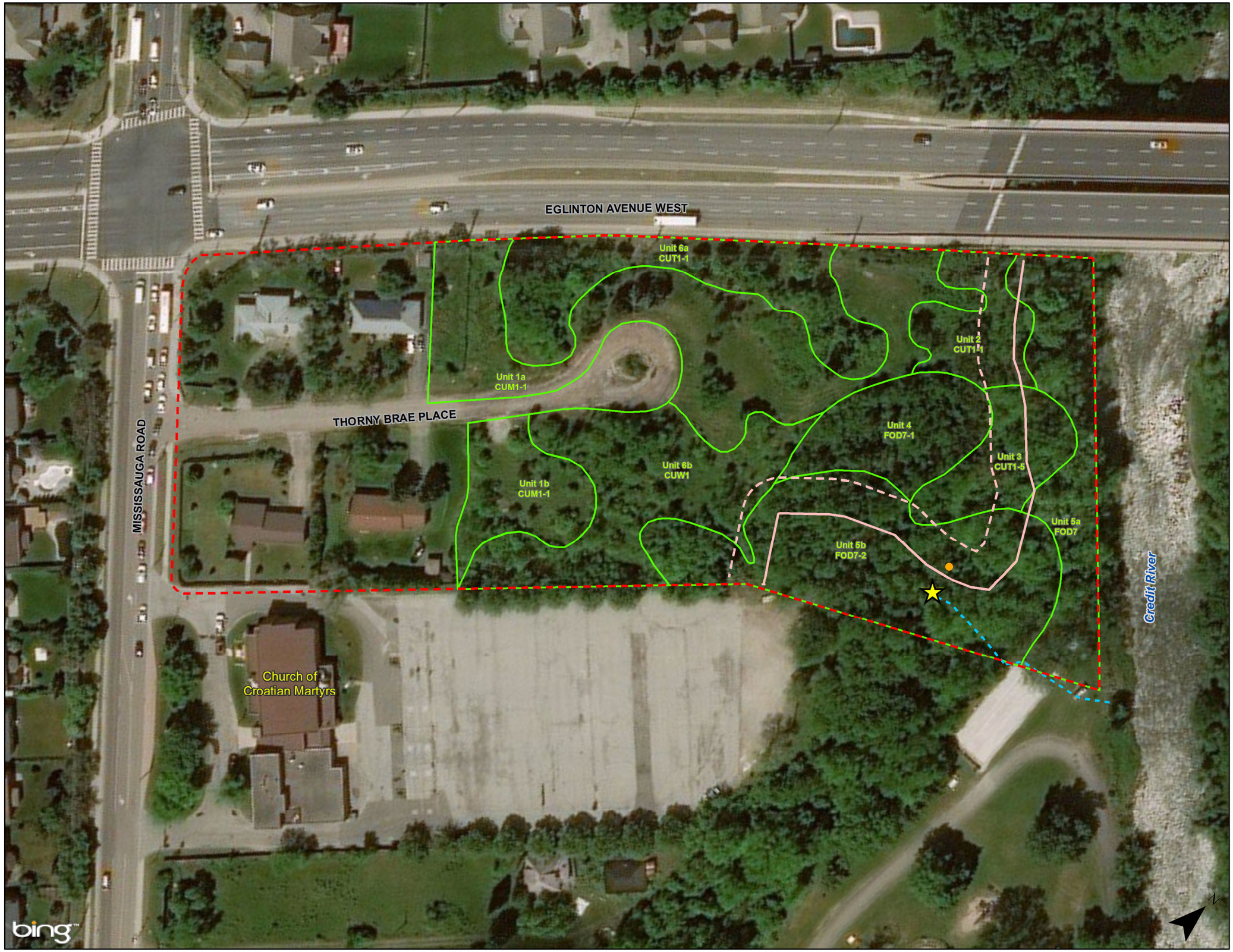
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Project No.: 3316536
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Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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03/03/2017

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1745-1775 Thorny Brae Place,
Mississauga
EIS

FIGURE 3
VEGETATION
AND FLORA

Legend

- Subject Property
- Vegetation Community
- Existing SWM Outfall Location
- Butternut Tree
- Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. Dec. 2016)
- LTSSL/ Valley / Core Area 10m Setback
- Intermittent Watercourse

Unit 1a: CUM1-1: Dry-Moist Old Field Meadow

Unit 1b: CUM1-1: Dry-Moist Old Field Meadow

Unit 2: CUT1-1: Sumac Cultural Thicket

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 6a: CUT1-1: Sumac Cultural Thicket Mineral Cultural Woodland

Unit 6b: CUW1: Mineral Cultural Woodland

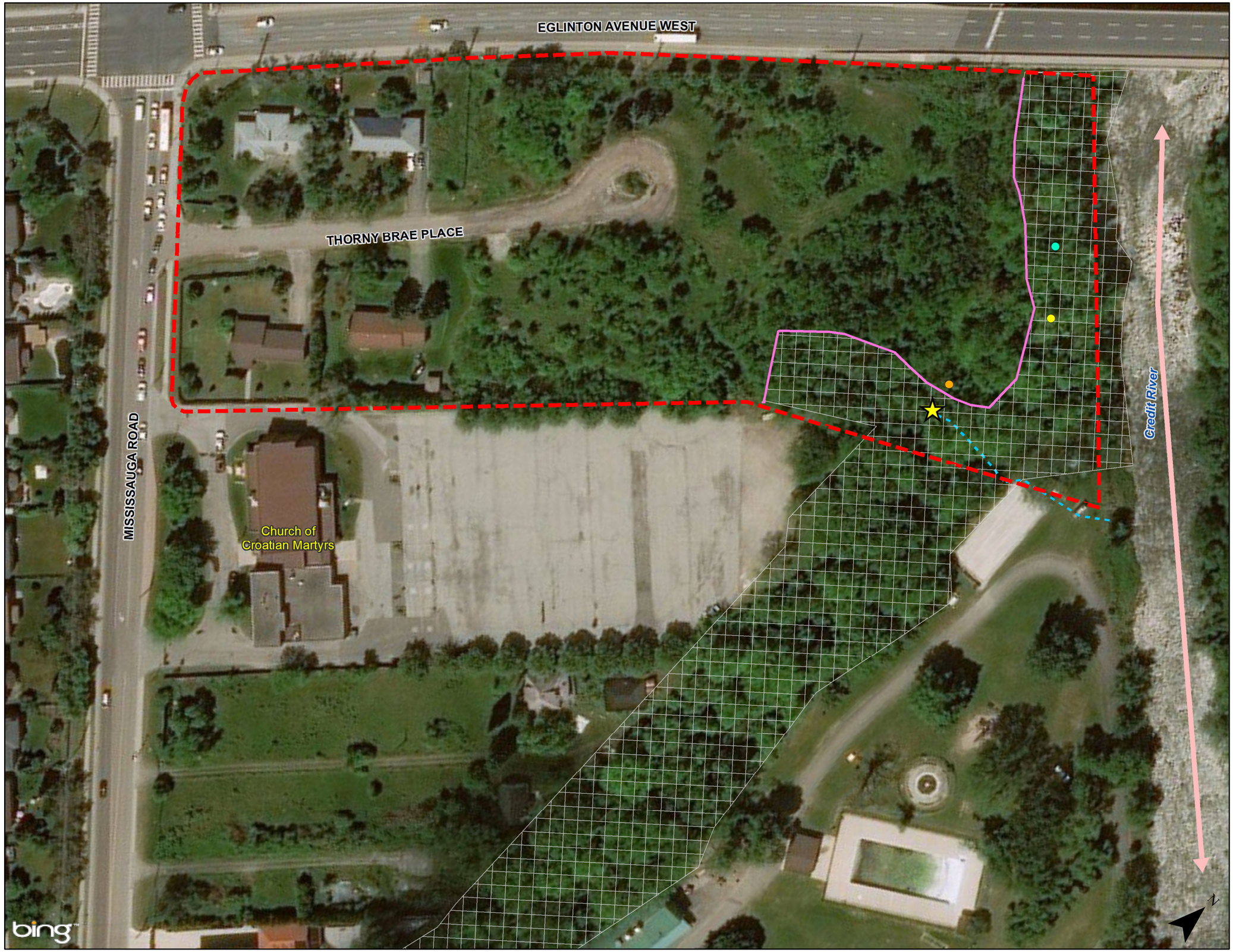
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Figure: 3
Project No.: 3316536
Date Created: 27/10/2016
Date Modified: 07/03/2017
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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1745-1775 Thorny Brae Place,
Mississauga
EIS

FIGURE 4

WILDLIFE

Legend

- Subject Property
- Existing SWM Outfall Location
- Wildlife Movement Corridor
- Candidate Significant Wildlife Habitat
- Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. Dec. 2016)

Cavity Tree Locations

- Basswood
- Butternut
- Willow

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Figure: 4
Project No.: 3316536
Date Created: 27/10/2016
Date Modified: 03/03/2017
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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1745-1775 Thorny Brae Place, Mississauga EIS

FIGURE 5
DRAINAGE FEATURES

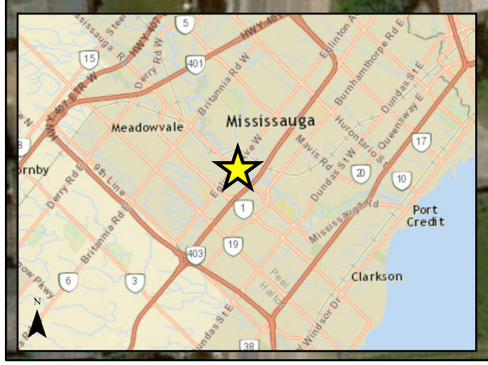
EGLINTON AVENUE WEST

THORNY BRAE PLACE

MISSISSAUGA ROAD

Church of Croatian Martyrs

Credit River



Legend

- Property Boundary
- Existing SWM Outfall Location
- Top of Bank (via CVCA, 2004)
- Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. Dec. 2016)

Drainage Reaches

- Reach 1 - Swale on Tableland
- Reach 1 - Swale on Tableland (Culvert)
- Reach 2 - Ravine Top to SWM Outlet
- Reach 3 - Ravine from SWM to Base of Slope
- Reach 4 - Floodplain from Base of Slope to River
- Natural Hazard (Approximate, City of Mississauga Official Plan, 2012)

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Figure: 5
Project No.: 3316536
Date Created: 27/10/2015
Date Modified: 07/03/2017
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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1745-1775 Thorny Brae Place,
Mississauga
EIS

FIGURE 6
CONSTRAINTS

Legend

Property Boundary

Existing SWM Outfall Location

Cavity Tree Locations

Basswood

Butternut

Willow

Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. Dec. 2016)

LTSSL/ Valley / Core Area 10m Setback

Intermittent Watercourse

EGLINTON AVENUE WEST

THORNY BRAE PLACE

MISSISSAUGA ROAD

Church of
Croatian Martyrs

Credit River

bing™

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Figure: 6
Project No.: 3316536
Date Created: 01/05/2017
Date Modified: 03/03/2017
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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1745-1775 Thorny Brae Place,
Mississauga
EIS

FIGURE 7
PROPOSED WORKS

MISSISSAUGA ROAD
EGLINTON AVENUE WEST
THORNY BRAE PLACE
Unit 1a
CUM1-1
Unit 6a
CUT1-1
Unit 6b
CUW1
Unit 1b
CUM1-1
Unit 2
CUT1-1
Unit 4
FOD7-1
Unit 3
CUT1-5
Unit 5a
FOD7
Unit 5b
FOD7-2
Credit River
Church of
Croatian Martyrs
bing™

Legend

- Property Boundary
- Existing SWM Outfall Location
- Existing Outfall Channel
- Vegetation Community

Cavity Tree Locations

- Basswood
- Butternut
- Willow
- Long-Term Stable Slope Line, LTSSL (Soil Eng. Ltd. Dec. 2016)
- LTSSL/ Valley / Core Area 10m Setback

Proposed Works

- Storm Water Pipe
- Existing Drainage Channel
- Permanent Easement
- Temporary Working Easement

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metres
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Figure: 7
Project No.: 3316536
Date Created: 01/05/2017
Date Modified: 07/03/2017
Coordinate System: NAD 1983 UTM Zone 17N
Source: ESRI Basemaps, MMM, LIO

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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

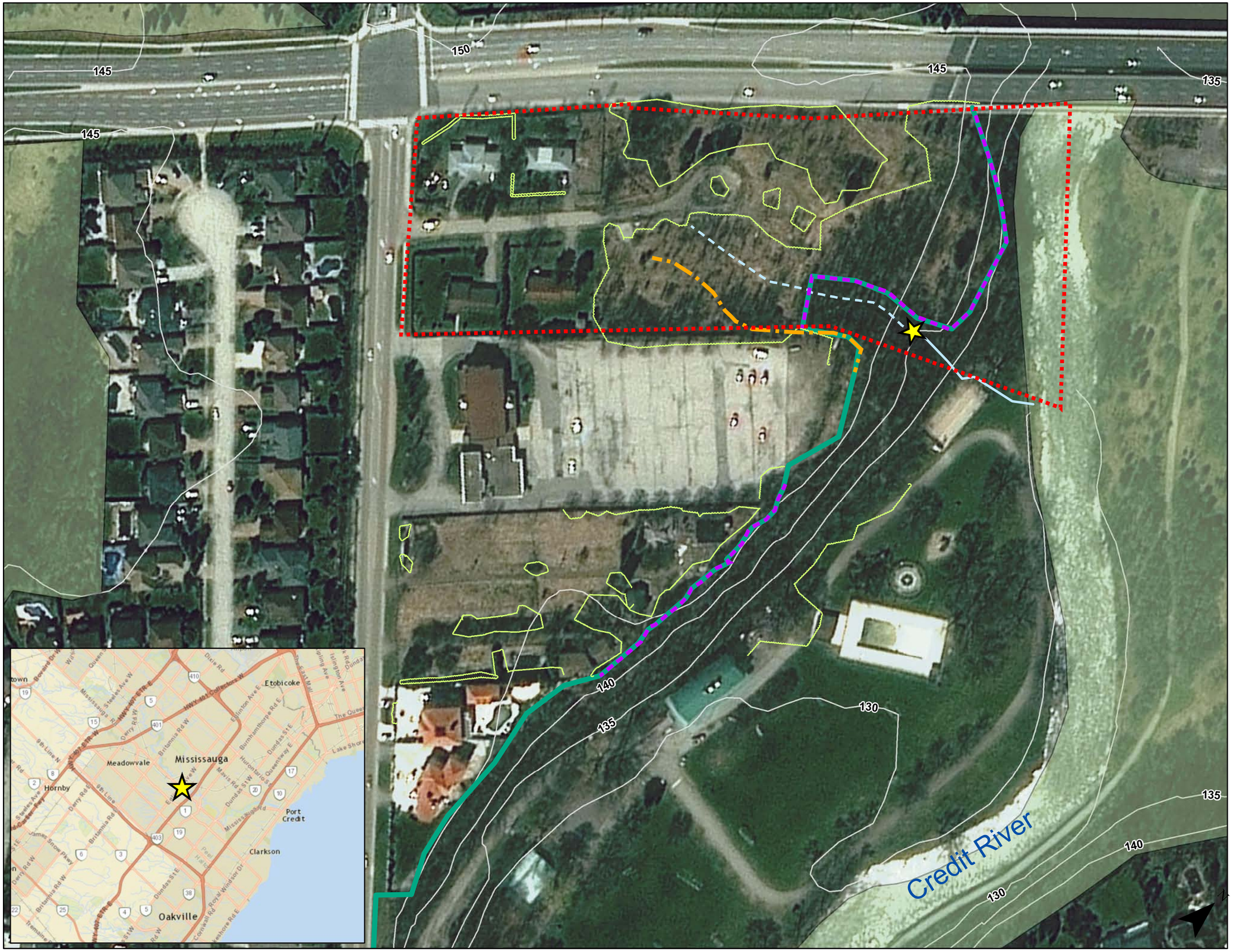
STUDY LOCATION
AND
EXISTING SWM OUTFALL

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

Appendix B: 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
Total # field dates	**9**			
Total # hours	**20.5**			

APPENDIX C

Botanical Inventory

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

Common Name	Scientific Name	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6a	Unit 6b	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

Common Name	Scientific Name	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6a	Unit 6b	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
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
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
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
Garden Bird's-foot-trefoil	*Lotus corniculatus*	x		x	x		x	x	*		GNR	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			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
Kentucky Bluegrass	*Poa pratensis*	x		x	x		x	x	0		G5T5	S5				X	N

Common Name	Scientific Name	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6a	Unit 6b	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
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
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								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 Name	Scientific Name	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6a	Unit 6b	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
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
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 = 105	41	23	40	54	52	38	34									

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.

[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

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.
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 Site Photographs

K:\Projects\2016\33 Ecology\3316536 - Thorny Brae\EIS Oct. 2016\Submitted March 2017\Appendices (pdf)



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

WSP | MMM GROUP

Thorny Brae Place Scoped Environmental Impact Study
REPRESENTATIVE PHOTOGRAPHS

Date: March 2017

Project No: 3316536

Figure No: Appendix D

APPENDIX E

Significant Wildlife Habitat Evaluation

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.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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.
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.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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> Monkarch +	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 were 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** 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. 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.**

		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	Potential habitats such as caves, if they are found in the planning area, should be considered significant.[°]	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 Present** • 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' (Butternut) • All will be retained within protected areas
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.
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.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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.
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.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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: • None of the listed species was recorded during current or previous site surveys.
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 <u>Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E</u> (MNRF January 2015)(i.e., >30ha area with >4ha of interior habitat). **Confirmed SWH is <u>not</u> 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.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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					
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 April 2009, species in this category that occur or have occurred within the Region of Peel or Town of Caledon include: Rapids Clubtail Western Chorus Frog Common Nighthawk Chimney Swift Red-headed Woodpecker Olive-sided Flycatcher 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).	**SWH Not Present** • None of the listed species was recorded during current or previous site surveys.
C2. Species Identified as Special Concern based on Species at Risk in Ontario list that is Periodically updated by OMNR.	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 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).	**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**
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** (subject to caveat below) One Butternut (ranked as S3?) is present in ELC Unit 4. However, that tree was ranked as Category 1 and not subject to the ESA. Hence, consideration as confirmed SWH is not clear.
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.

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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.
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					

		Candidate SWH		Confirmed SWH	
Wildlife Habitat	**Wildlife Species**	**ELC Ecosite Codes**	**Habitat Description**	**Recommended Thresholds**	**Evaluation**
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.

* 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

Species at Risk Habitat Evaluation

Table F.1. Species at Risk Habitat Evaluation

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. Habitat to be removed within the development area is suitable as foraging habitat only and is common in the wider landscape. No potential breeding 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 observed 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 present and not observed 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. Habitat to be removed within the development area is suitable as foraging habitat only and is common in the wider landscape. No potential breeding 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 present and not observed 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 present and not observed 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 present and not observed 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 present and not observed during field surveys.

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
Fish								
Lake Sturgeon (Great Lakes-Upper St. Lawrence) (Acipenser fulvescens)	**THR**	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; habitat unavailable 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; habitat unavailable within study area.	**Minimal** - not present within the subject property. Drainage channel provides contributing habitat to Credit River and potential Northern Brook Lamprey Habitat.
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; habitat unavailable within study area.	**Minimal** - not present within the subject property. Drainage channel provides contributing habitat to Credit River and potential Redside Dace Habitat downstream.
Insects								
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 present and not observed 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 -** Minimal likelihood of presence in the study area. Potential foraging habitat will be removed, which is common the in general area and along the Credit River. There are few large trees to support suitable roosting habitat in the study area.

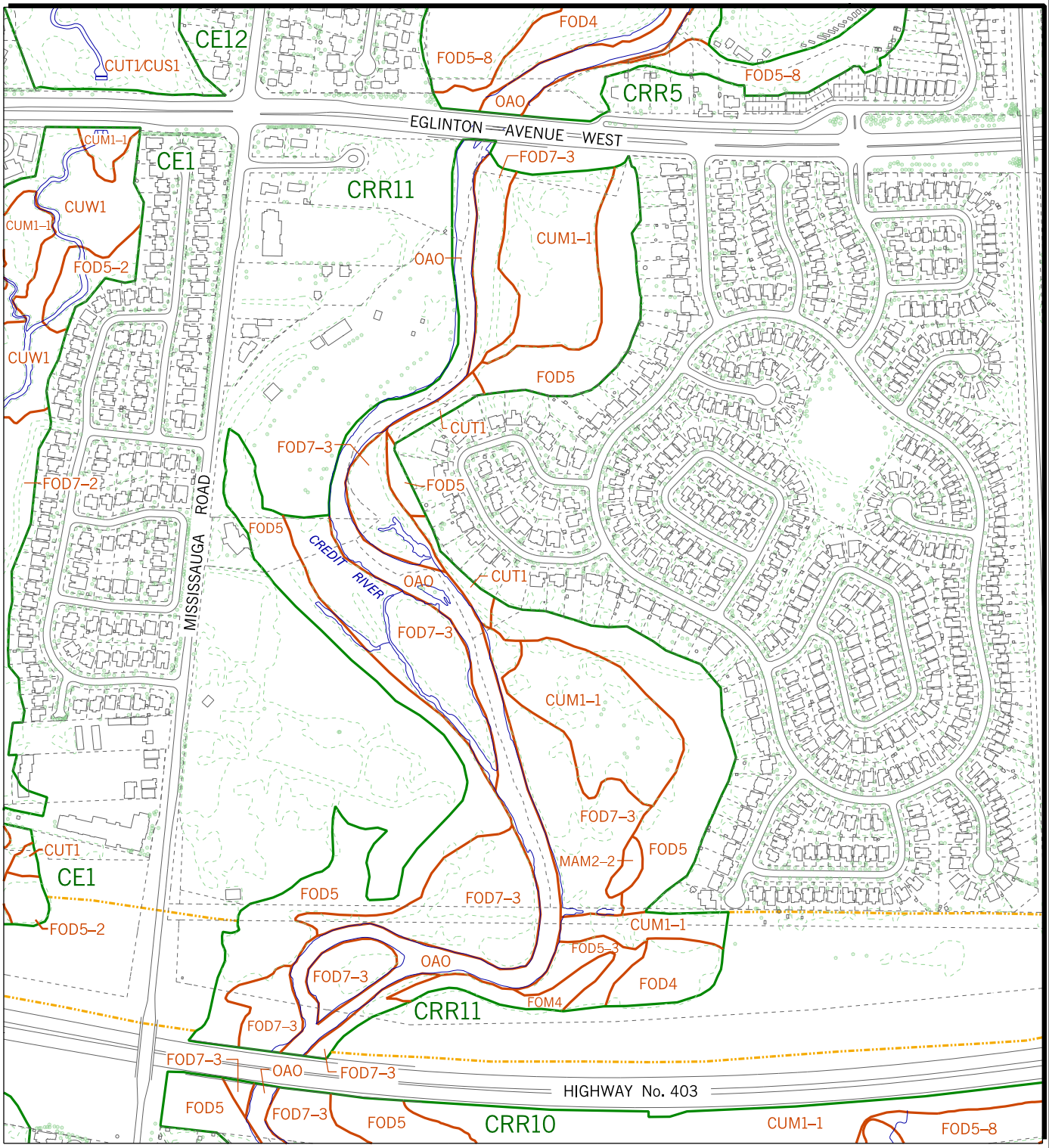
Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence on Subject Property	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Little Brown Bat (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 -** Minimal likelihood of presence in the study area. Potential foraging habitat will be removed, which is common the in general area and along the Credit River. There are few large trees to support suitable roosting habitat in the study 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 -** Minimal likelihood of presence in the study area. Potential foraging habitat will be removed, which is common the in general area and along the Credit River. There are few large trees to support suitable roosting habitat in the study 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 -** Minimal likelihood of presence in the study area. Potential foraging habitat will be removed, which is common the in general area and along the Credit River. There are few large trees to support suitable roosting habitat in the study 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 present and not observed 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 present and not observed 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)	One occurrence in the FOD vegetation unit on the east side of the property, which will be retained. Potential impacts from installation of the modified SWM outlet / channel mitigated through protection and design measures specified herein

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
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 along the woodland edge at Shoreline of Credit River will be retained, with 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 present and not observed during field surveys.
Stinkpot (Eastern Musk Turtle) (Sternotherus odoratus)	**SC**	N/A	MNRF Website (August 2016)	Found in ponds, lakes, marshes and rivers that are generally slow-moving, have abundant emergent vegetation, and muddy bottoms. Nesting is in soil, decaying vegetation and rotting wood close to the water and exposed to direct sunlight (MNRF Species Profile Online 2014).	**None** - No suitable habitat present in study area	General Habitat and incidental wildlife surveys	Not recorded	**None** - No suitable habitat present and not observed 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 present and not observed 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 present and not observed during field surveys.

Species At Risk Designations	
ENDANGERED	
THREATENED	
SPECIAL CONCERN	
EXTIRPATED	

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**

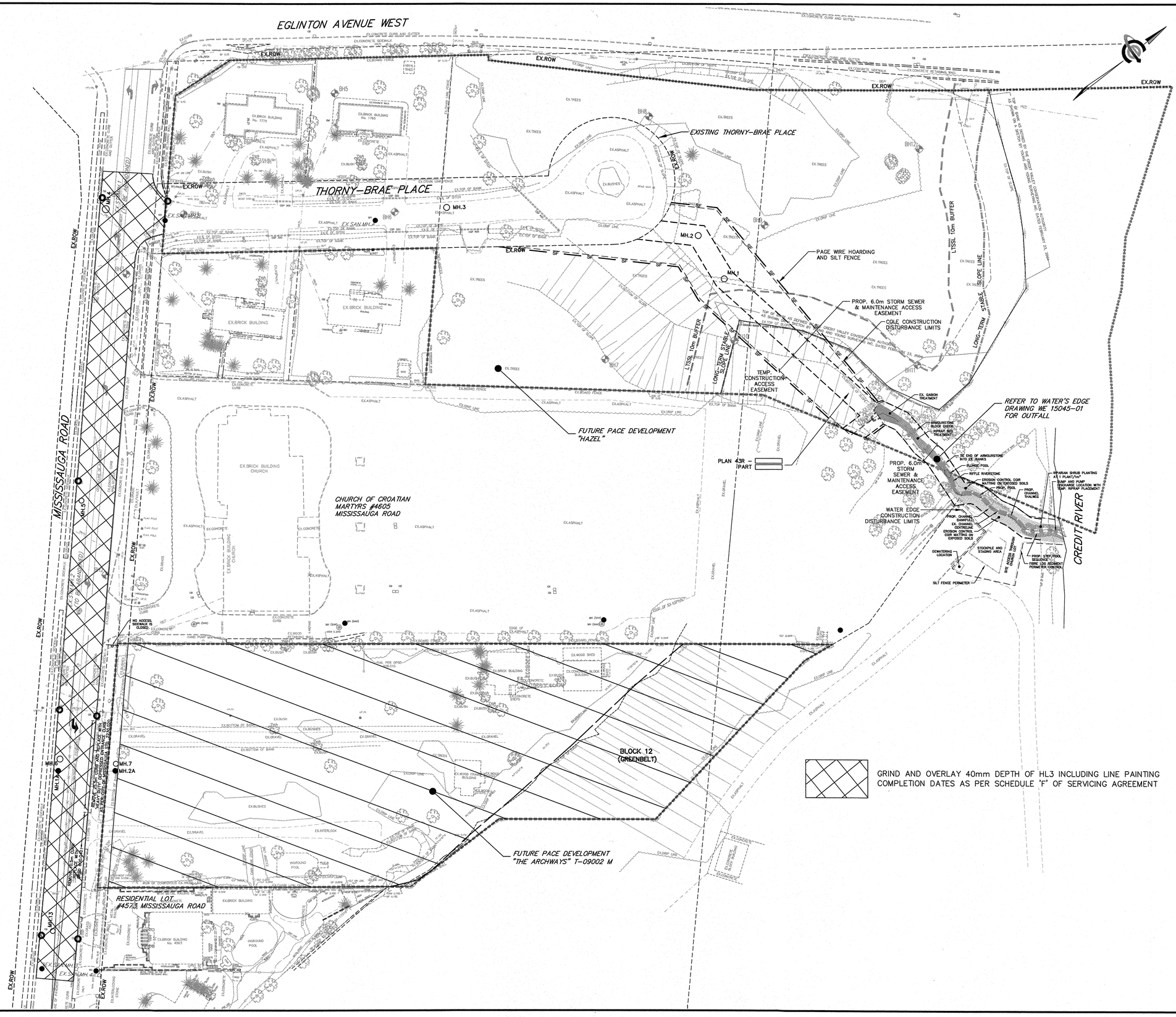
- The City park, Hewick Meadows, is included within this natural area.
- Removal and management for non-native invasive species including Garlic Mustard, Norway Maple and European Buckthorn.

7. **PRINCIPLE REFERENCES**

Ecologistics Limited (1979)
Hanna (1984)

APPENDIX H

Design and Channel Restoration Drawings


EGLINTON AVENUE WEST
EX.ROW
EXISTING THORNY-BRAE PLACE
THORNY-BRAE PLACE
MISSISSAUGA ROAD
EX.SAN.MH.1A
EX.SAN.MH.1
MH.3
MH.2
MH.1
PAGE WIRE HOARDING AND SILT FENCE
PROP. 6.0m STORM SEWER & MAINTENANCE ACCESS EASEMENT
COLE CONSTRUCTION DISTURBANCE LIMITS
LTSSL 10m BUFFER
LONG-TERM STABLE SLOPE LINE
TEMP. CONSTRUCTION ACCESS EASEMENT
FUTURE PACE DEVELOPMENT "HAZEL"
PLAN 43R-
PART
REFER TO WATER'S EDGE DRAWING WE 15045-01 FOR OUTFALL
EX. GABION TREATMENT
ARMOURSTONE BLOCK CHECK RIPRAP INFILTRATION TREATMENT
SE END OF ARMOURSTONE INTO EX. BANKS
RUNOFF POOL
RIFFLE RIVERSTONE
EROSION CONTROL COIR MATTING ON EXPOSED SOILS
PROP. POOL
PROP. CHANNEL THALWEG
RIPARIAN SHRUB PLANTING AS 1 PLANT/m²
SUMP AND PUMP DISCHARGE LOCATION WITH TEMP. RIPRAP PLACEMENT
WATER EDGE CONSTRUCTION DISTURBANCE LIMITS
PROP. CHANNEL BANKFULL
EX. CHANNEL CENTRELINE
DEWATERING LOCATION
STOCKPILE AND STAGING AREA
SITE ACCESS (MAJOR) LOCATION
PROP. STEP POOL SEQUENCE
FENCE LIMIT (CONSTRUCTION PERIMETER ONLY)
SILT FENCE PERIMETER
CREDIT RIVER
EX.BRICK BUILDING CHURCH
CHURCH OF CROATIAN MARTYRS #4605 MISSISSAUGA ROAD
EX.BRICK BUILDING No. 1775
EX.BRICK BUILDING No. 1765
EX.BRICK BUILDING
NO ACCESS, SIDEWALK IS CLOSED
REMOVE EX. CURB AND GUIDE RAIL AND REPLACE
EX.SAN.MH.4
EX.SAN.MH.5
MH.5
MH.6
MH.7
MH.2A
MH.4
MH.13
BLOCK 12 (GREENBELT)
FUTURE PACE DEVELOPMENT "THE ARCHWAYS" T-09002 M
RESIDENTIAL LOT #4573 MISSISSAUGA ROAD
EX.BRICK BUILDING No. 4565
EX.WOOD SHED
EX.BRICK BUILDING
EX.INTERLOCK
INGROUND POOL
EX.GRAVEL
EX.ASPHALT
EX.CONCRETE
EX.TREES
EX.BUSH
EX.BUSHES
EX.ROCK
EX.ROAD FENCE
EX.DRIP LINE
EX.TOP OF BANK
EX.BOTTOM OF BANK
EX.TOP OF SLOPE
EX.BOTTOM OF SLOPE
EX.CONCRETE SIDEWALK
EX.CONCRETE CURB AND GUTTER
EX.CONCRETE RETAINING WALL
EX.HYDRO POLE
EX.GAS POLE
EX.SAN.MH.
EX.CB.
EX.V&C
EX.H&V
EX.CATCHBASIN
EX.VALVE & CHAMBER
EX.HYDRANT & VALVE
EX.STORM MANHOLE
EX.SANITARY MANHOLE
EX.DOUBLE CATCH BASIN
EX.VALVE & BOX
EX.HYDRANT & VALVE
EX.SAN.MH.
EX.STORM

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.

EX.SAN.MH.1A — EX.80.0m-250mmø PVC SAN @ 0.99%

Region of Peel General Notes:

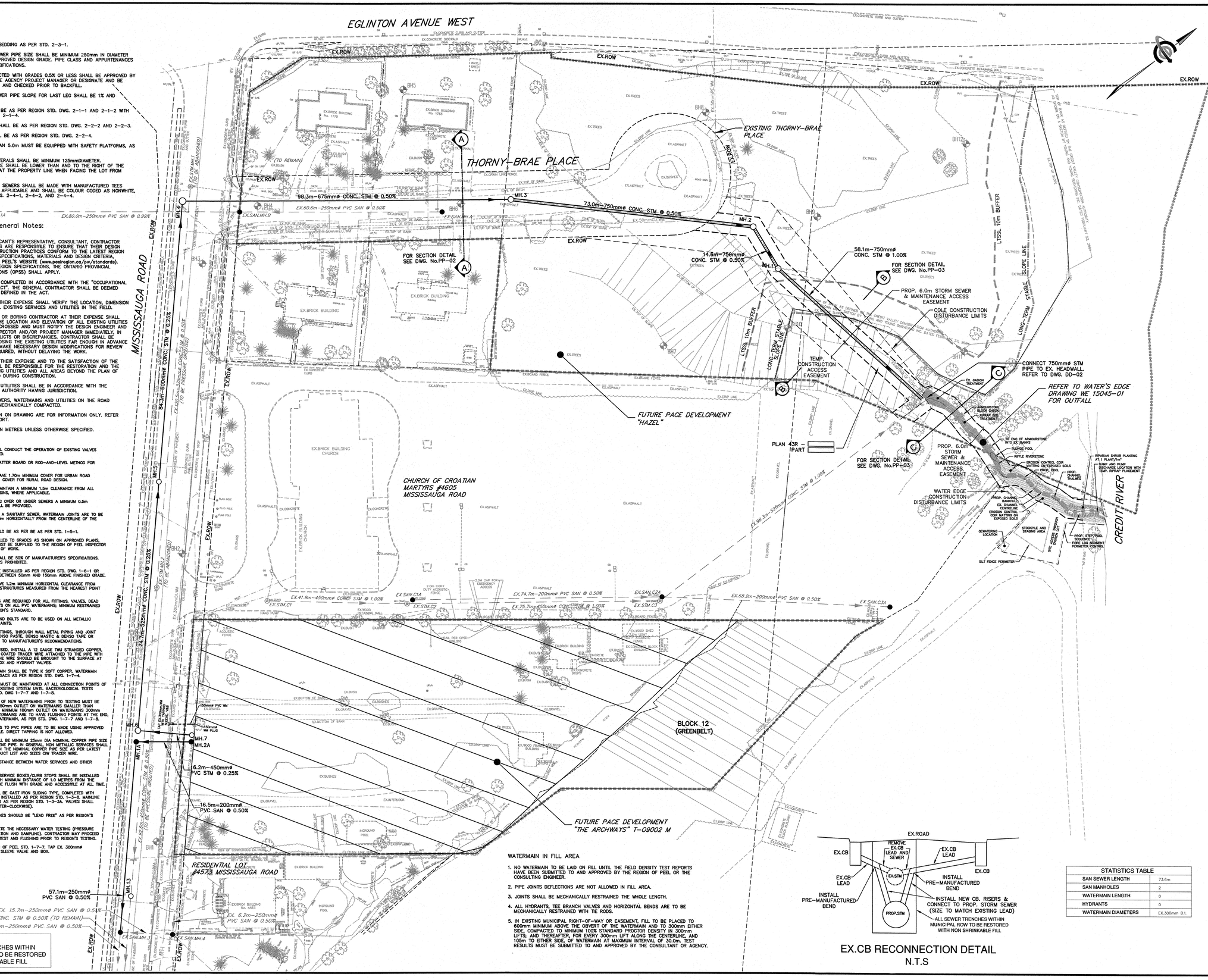
GENERAL

1. THE APPLICANT, APPLICANT'S REPRESENTATIVE, CONSULTANT, CONTRACTOR AND SUB CONTRACTORS ARE RESPONSIBLE 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 CW 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 CW 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 ACCESSRILE AT ALL TIME.
23. VALVE AND BOXES SHALL BE CAST IRON SLIDING TYPE, COMPLETED WITH VALVE GUIDE PLATES AND INSTALLED AS PER REGION STD. 1-5-5. 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

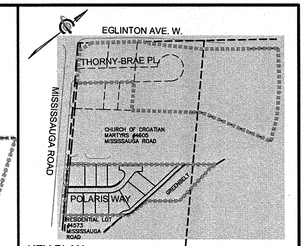


WATERMAIN IN FILL AREA

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

- 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

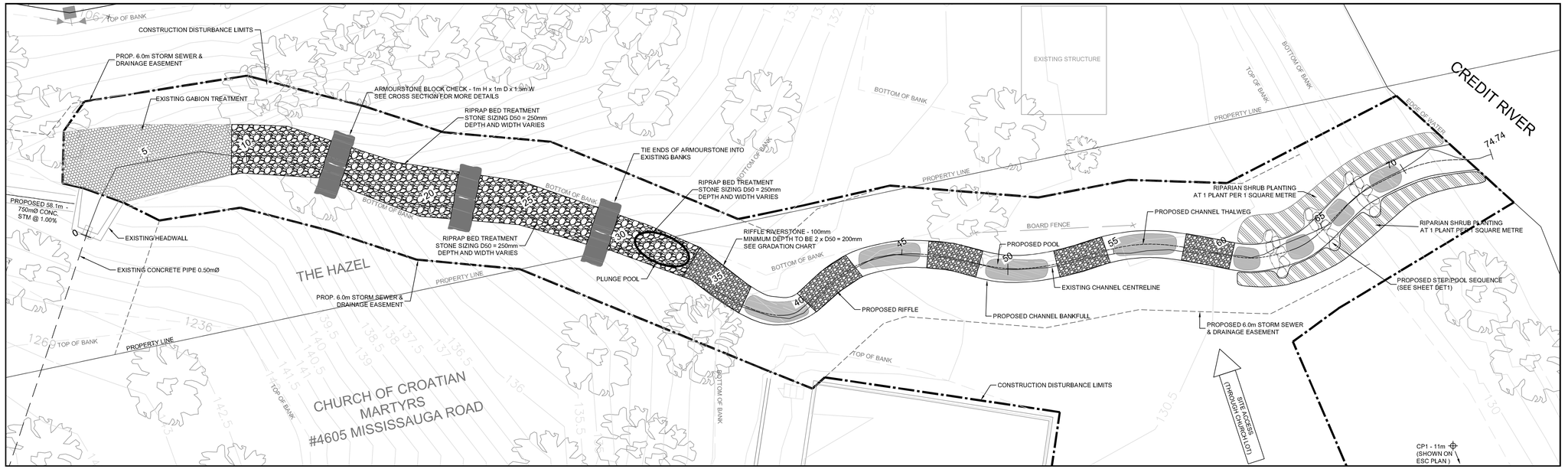
COLE ENGINEERING
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T 416.987.0101 | 905.940.6161 F 905.940.2464

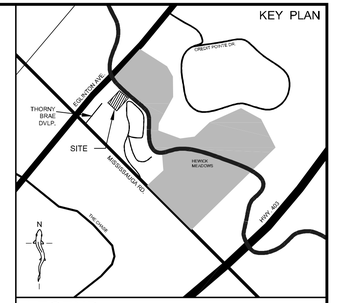
DESIGNED BY: P.F.	DATE: OCTOBER 2015	CHECKED BY: S.G.
DRAWN BY: P.F.	PROJECT No. UD15-0347	APPROVED BY: S.G.
SCALE: 1:500		DRAWING No. GU-01

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S:\2015 Projects\UD\GSM\UD15-0347 PaceDev_Thorkchwys_Mississ\400-CAD\402-Design\Sheets\MUNICIPAL\UD15-0347 GU-01.dwg [GU-01]
Mar 08, 2017 - 10:45am by mpaulson

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:

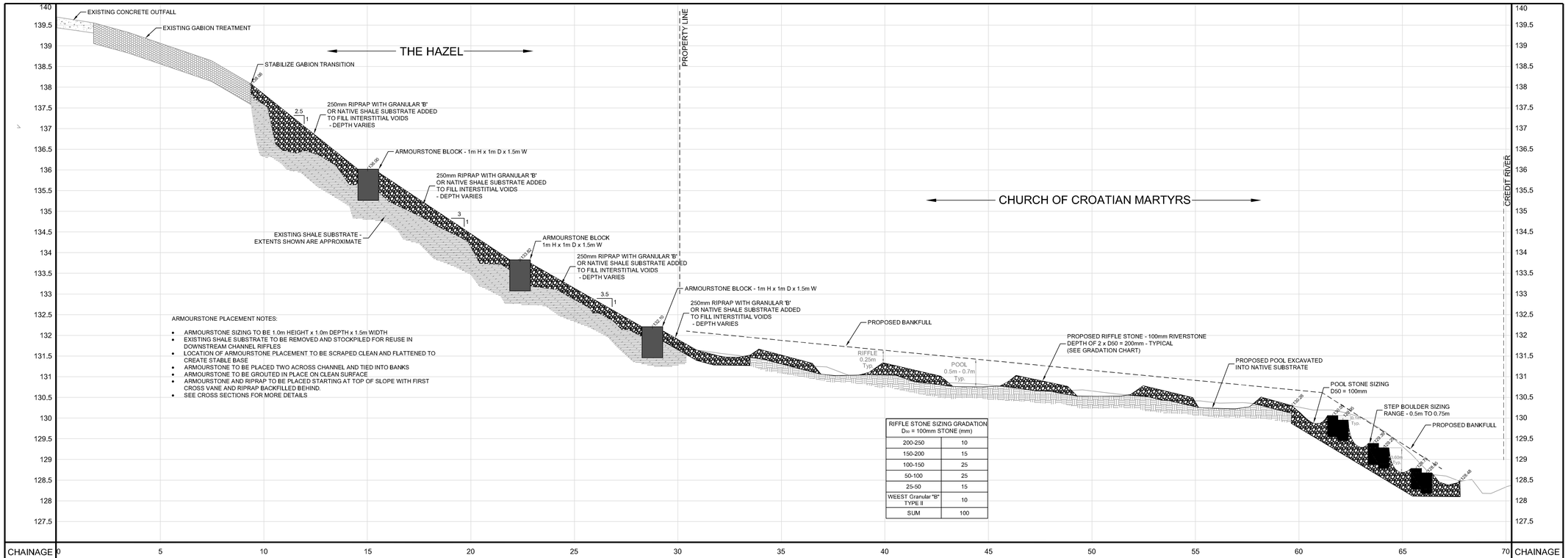
EROSION CONTROL BLANKETS ARE TO BE PLACED TO CONTROL EROSION AFTER SEEDING. ECB TO BE KoirMat 400 OR APPROVED EQUIVALENT AND INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS.

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 605284.687

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: 1:100

DATE: Nov. 4, 2016

CONSULTANT

watersedge 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.

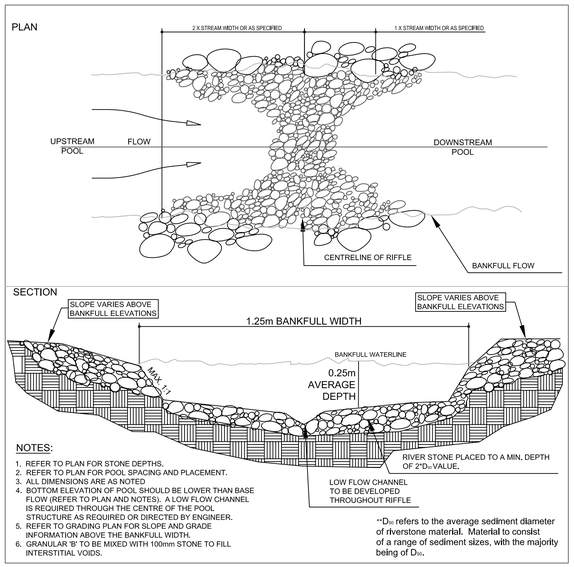
12. STABILIZATION OF ALL SLOPES SHOULD BE COMPLETED AFTER EACH SECTION OF CHANNEL IS COMPLETED, AS NOTED ON PLAN.

13. REMOVE ALL EXCESS MATERIAL STOCKPILED ON SITE.

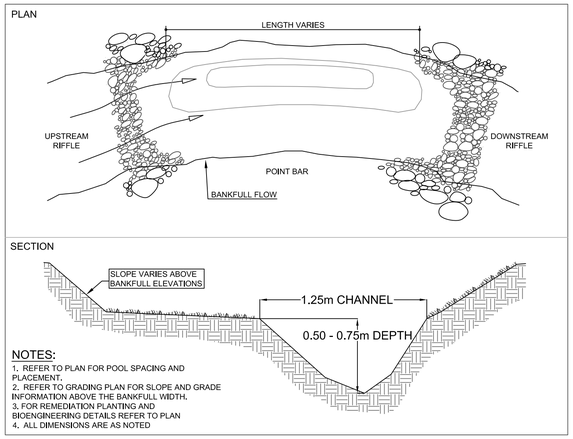
14. REMOVE ANY EROSION AND SEDIMENT CONTROLS ONCE ALL VEGETATION HAS BECOME SUFFICIENTLY ESTABLISHED.

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

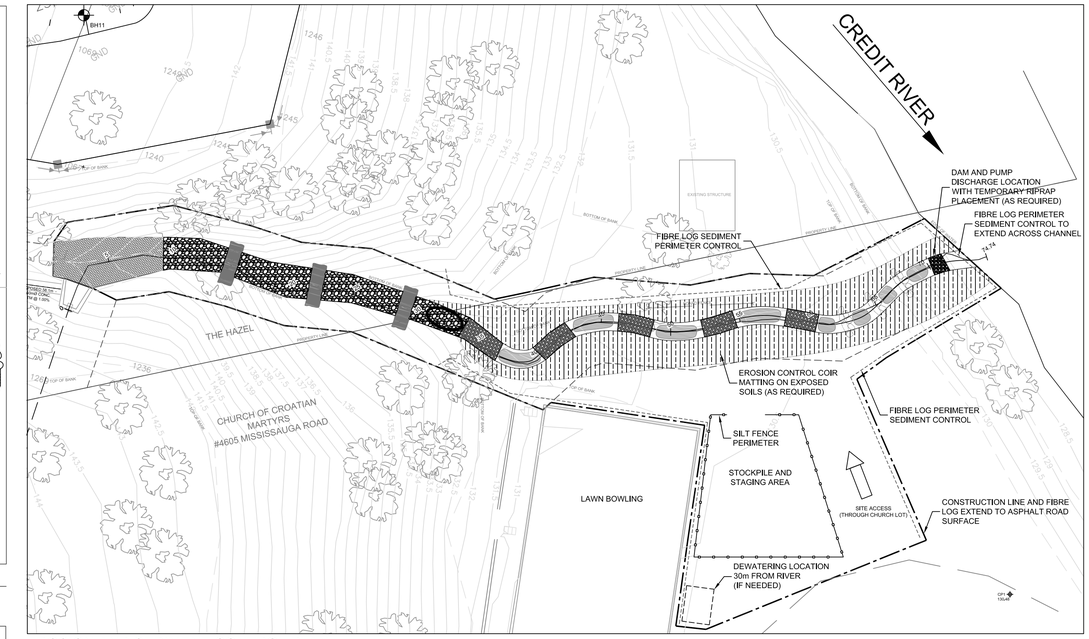
16. CONTRACTOR SHALL ENSURE THAT CHANNEL REMAINS ISOLATED FROM FLOWS UNTIL THE BANK WORK IS COMPLETE.



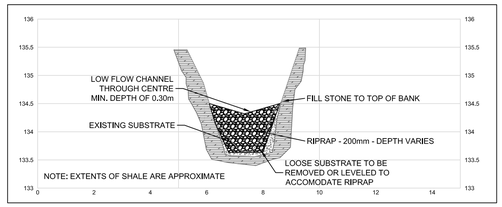
D1 CHANNEL RIFFLE (TYPICAL)
N.T.S.



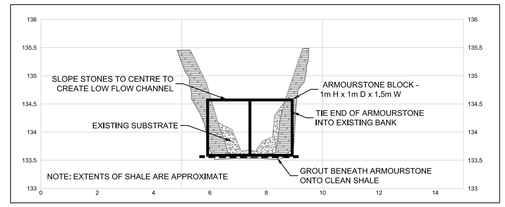
D2 CHANNEL POOL (TYPICAL)
N.T.S.



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.

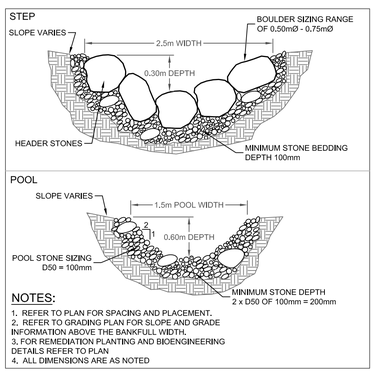
2. UPON COMPLETION OF WORK ANY DISTURBED AREAS ARE TO BE STABILIZED AND RESTORED WITH NATIVE SEED MIX ON 150mm TOPSOIL. SEE BELOW FOR SEED MIX:

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.

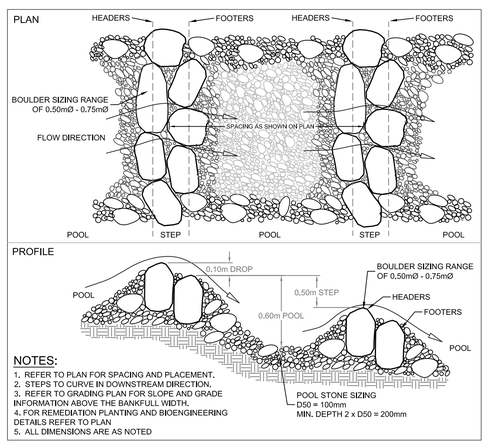
- Blackeyed Susan (Rudbeckia hirta) 10%
- Blue Wood (Heart Leaved Aster) (Aster cordifolius) 1%
- Canada Anemone (Anemone canadensis) 1%
- Canada Goldenrod (Soldigado canadensis) 2%
- Common Milkweed (Asclepias syriaca) 2%
- Evening Primrose (Oenethera biennis) 25%
- Grass Leaved Goldenrod (Euthamia graminifolia) 1%
- Meadow/Open Field 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



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



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

No.	DATE	BY	REVISIONS
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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* and *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)
Woodlands

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 *woodland* 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 4, 5a, 5b, 6b): ~0.93ha. ○ Total contiguous woodland area (incl. valley slope to the south): ~1.9ha • 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 4, 5a, 5b, 6b): ~0.93ha. ○ Total contiguous woodland area (incl. valley slope to the south): ~1.9ha • 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. Unit 4 (FOD7-1) is within 100m of the Credit River but does not support a significant ecological relationship between the 2 features. • Proximity. Not in proximity; within a significant valleyland (Credit River). • Surface Water Quality. A portion of the woodland (i.e., Veg. Units 5a and 5b) is within 30m of the Credit River. • SS&C: One S3 / Endangered species was recorded (Butternut). **Conclusion**: the valleyland portion of the woodland (i.e., the valley portions of Veg. Units 5a and 5b) meets 3 criteria (linkage, surface water quality, significant species and communities)

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	• Size ○ Site is in an urban area ○ CUW area on subject property (Unit 6b): ~0.39ha. No CUS is present. • Age. Immature; no older growth present on subject property and no late successional characteristics. Does not meet size threshold. • Linkage. No linkage function. Former farmstead adjacent to vacant residential lands, with no natural features to the north / west. Does not meet size threshold. • Proximity. Within 100m of the Credit River valley, but below the size threshold and does not support a significant ecological relationship between the features. Does not meet size threshold. • Surface Water Quality. Not within 30m of the Credit River and below the size threshold. Does not meet size threshold. • SS&C. No significant species or communities present. Does not meet size threshold. **Conclusion**: does not meet any criteria
	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 I.2. Criteria and Thresholds for the Identification of Core Valley and Stream Corridors

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; Dec. 2016).
▪ 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	▪ 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; Dec. 2016). ▪ It is contiguous with the Credit River valley, but does not provide a linkage to other natural heritage features due to major road barriers and development. ▪ This feature does provide habitat for an endangered species: Butternut **Conclusion**: associated un-named tributary ravine 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
Deanne Christie BLA.OALA.CSLA

Suite 300
8501 Mississauga Road
Brampton ON L6Y 5G8

Tel: (905) 453.9398
E: tba@bakerturner.com
www.bakerturner.com

2462357 Ontario Inc.
Attn: Peter Sciavilla
30 Wertheim Court, Bldg A unit 3
Richmond Hill, ON

March 8, 2017

Re: 1745-1775 Thorny Brae – Tree Inventory & Preservation Plan

Baker Turner Inc completed a tree inventory for lands at 1745-1775 Thorny Brae in support of a proposed residential infill development (application pending) and in support of an external servicing permit submission (required to support the construction of a new storm water management pipe on site). 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).

There is no guarantee of survival for trees to be preserved during construction that are subject to injury however this report recommends a tree preservation plan for the proposed stormwater works. 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.

At present, a tree inventory was completed on all trees within and adjacent to the intended construction zone however trees downstream of the stormwater outfall have not yet been surveyed by an Ontario Land Surveyor. Field notes have been included to identify the number and status (health assessment) of these trees but they are not currently shown on the tree inventory plan. A survey is scheduled for completion and a final plan including all trees will be submitted shortly. A copy of field notes including the general location of trees and their status is included for your review; as identified above, these field notes will be used to update the final tree inventory following receipt of updated survey information.

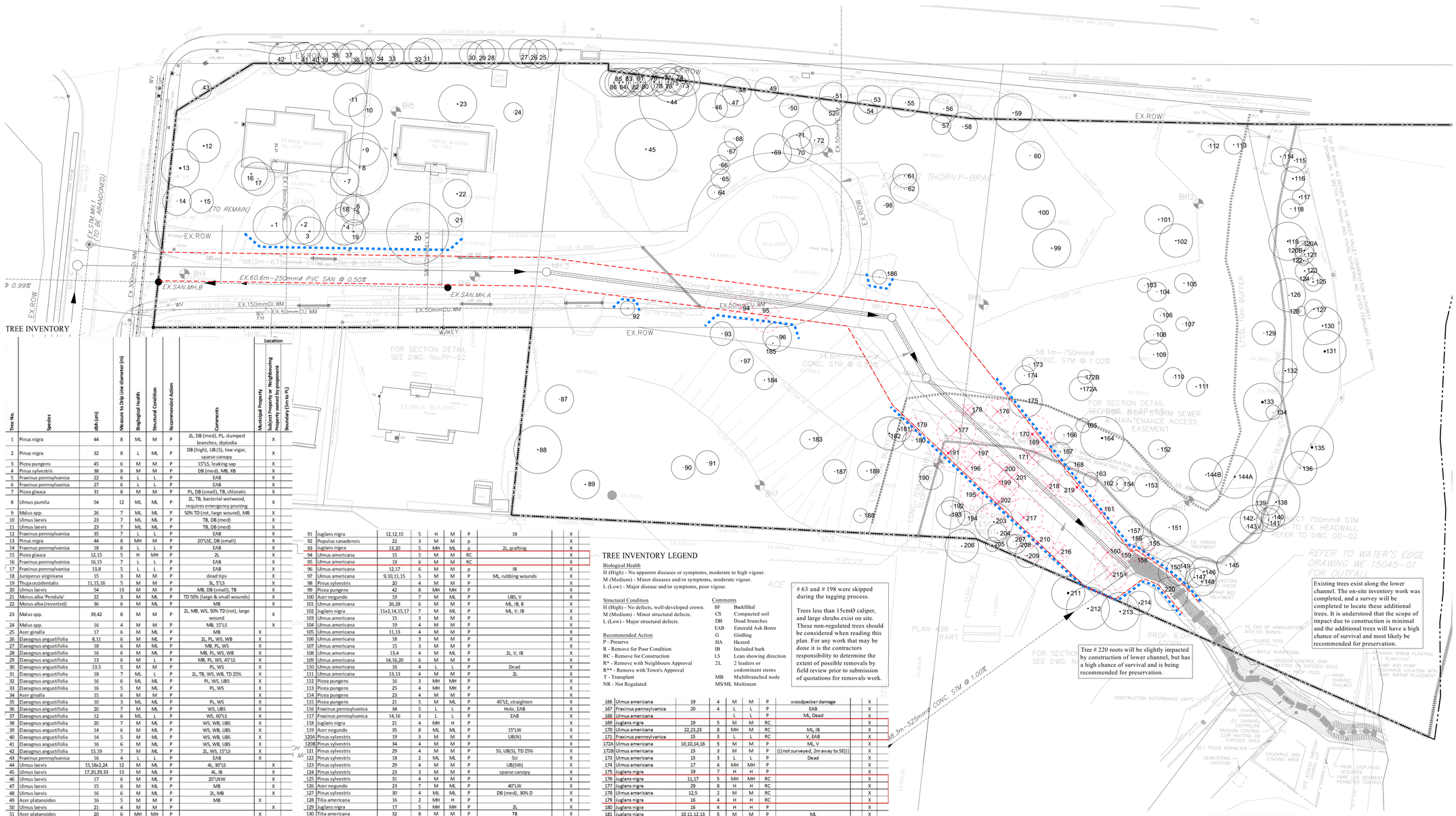
In total twenty-seven (27) trees are recommended for removal due to construction. Of these trees, ten (10) are Ash Trees including nine (9) that are dead or hazardous and one (1) that is in low health.

Following communications with the design engineers it is understood that minimal impact will be had on trees downstream of the headwall however, the root system of tree #220 may be slightly impacted by construction of the lower channel but has a high chance of survival and is being recommended for preservation.





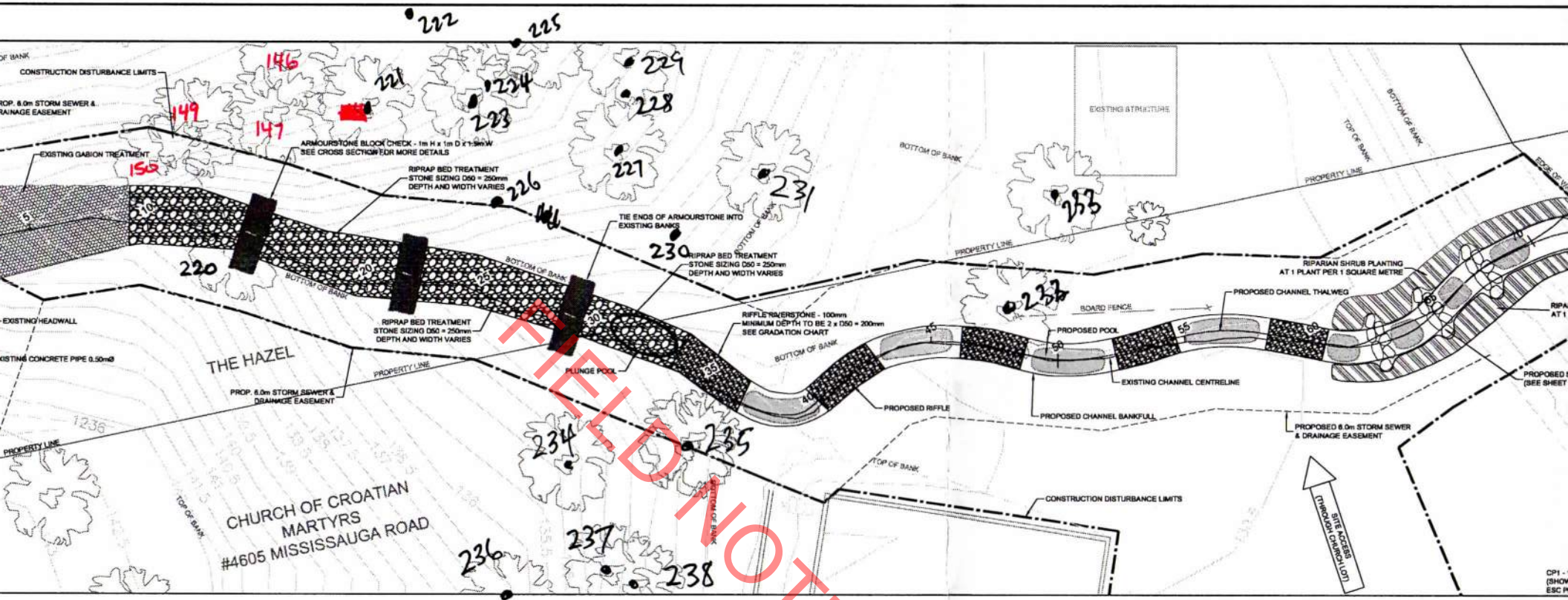
Nick Taylor
Baker Turner Inc.
ISA Certified Arborist, ON-2068A


EX.ROW
EX.STM.MH.1 (TO BE ABANDONED)
EX.SAN.MH.B
EX.SAN.MH.A
EX.60.6m–250mmø PVC. SAN @ 0.50%
98.3m–675mmø CONC. STM @ 0.50%
74.0m–450mmø CONC. STM @ 0.50%
14.6m CONC. STM @ 0.50%
58.1m–750mmø CONC. STM @ 1.00%
35.3m–525mmø CONC. STM @ 1.00%
EX.150mmDI.WM
EX.50mmCU.WM
EX.300mmDI.WM
SW.CHANNEL EX.2
SW.CHANNEL EX.3
(TO REMAIN)
THORNY–BRAE PLACE
FOR SECTION DETAIL SEE DWG. No.PP–02
FOR SECTION DETAIL SEE DWG. No.PP–03
STORM SEWER MAINTENANCE ACCESS EASEMENT
EX.BRICK BUILDING No. 1775
EX.BRICK BUILDING No. 1765
EX.GABION TREATMENT
EX.RIPRAP BED TREATMENT
REFER TO WATER'S EDGE DRAWING WE 15045–01 FOR OUTFALL
REFER TO DWG. DD–02
TOP OF BANK AS REFERED BY THE CREDIT VALLEY CONSERVATION AUTHORITY AS SHOWN ON A SKETCH BY YOUG AND YOUNG ENGINEERING INC. DATED FEBRUARY 23, 2004
EX. 50mmCU.WM
EX. 300mmDI.WM
EX. 150mmDI.WM
EX. 50mmCU.WM
EX. 200mmDI.WM
EX. 250mmSAN.MH
EX. 300mmSTM.MH
EX. 1200mmSTM.MH
EX. 1500mmSTM.MH
EX. 1800mmSTM.MH
EX. 2400mmSTM.MH
EX. 3000mmSTM.MH
EX. 3600mmSTM.MH
EX. 4200mmSTM.MH
EX. 4800mmSTM.MH
EX. 5400mmSTM.MH
EX. 6000mmSTM.MH
EX. 6600mmSTM.MH
EX. 7200mmSTM.MH
EX. 7800mmSTM.MH
EX. 8400mmSTM.MH
EX. 9000mmSTM.MH
EX. 9600mmSTM.MH
EX. 10200mmSTM.MH
EX. 10800mmSTM.MH
EX. 11400mmSTM.MH
EX. 12000mmSTM.MH
EX. 12600mmSTM.MH
EX. 13200mmSTM.MH
EX.

SURVEY COMPLETED MARCH 3, 2017

Tree No.	Species	dbh [cm] (total for multistem trees)	Measure to Drip Line diameter [m]	Bioglogical Health	Structural Condition	Recommended Action	Comments
221	Fraxinus pennsylvanica	47	8	L	L	R	EAB, 20°L south
222	Fraxinus pennsylvanica	37	7	L	L	R	EAB
223	Prunus serotina	28	6	M	M	P	SU, 50% Dead
224	Fraxinus pennsylvanica	20	5	L	L	R	SU, 75% Dead, large ripping wound at 4m.
225	Prunus serotina	33	10	M	MH	P	med. DBs, offset canopy to south
226	Prunus serotina	18	4	M	M	R	50% Dead
227	Crataegus sp.	22	7	M	M	P	small DBs and BBs, large wound at 1m
228	Crataegus sp.	19	6	M	M	P	small wound at base, large BB
229	Prunus serotina	20	5	M	MH	P	SU, med DBs, large wound at base
230	Crataegus sp.	15	6	M	M	P	small holes
231	Fraxinus pennsylvanica	37	10	L	L	R	EAB
232	Juglans nigra	43	9	M	M	R	Canopy mostly west side, very large and poorly executed pruning wounds, rot is showing through cracks in one location.
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
234	Fraxinus pennsylvanica	29	7	L	L	R	EAB, vine
235	Quercus macrocarpa	27	7	MH	H	P	vine
236	Fraxinus pennsylvanica	28	7	L	L	R	EAB
237	Prunus serotina	40	8	M	MH	P	large DBs, 25% Dead
238	Juglans nigra	28	9	MH	MH	P	growing through canopy of #237, canopy offset to south
239	Ulmus pumila	19	5	H	H	P	vine
240	Ulmus americana	17, 20	5	MH	MH	P	vine, ML

FIELD NOTES ONLY
(to be updated on Tree Inventory Following Survey)



CLUDING ACCESS ROUTES, STAGING AREAS AND WORK ZONES ARE TO BE STRUCTION.
E TO BE RE-SODDED AND NATURALIZED AREAS ARE TO BE SEEDED WITH 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.

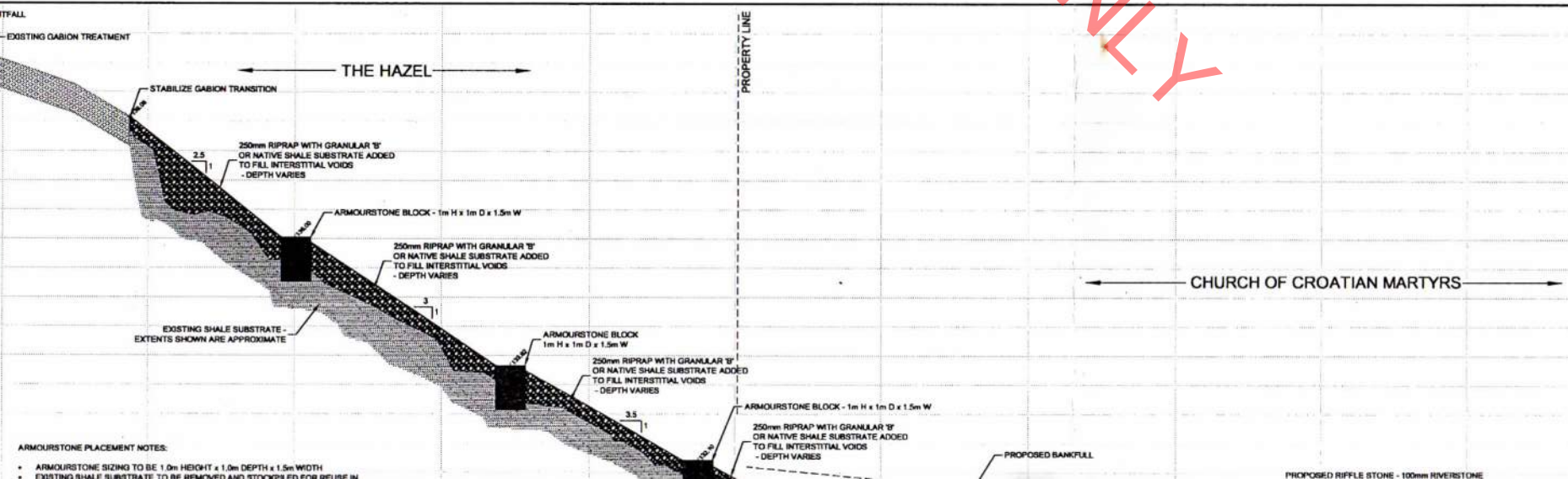
AREA STABILIZATION:

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

FISHERIES TIMING WINDOW:

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

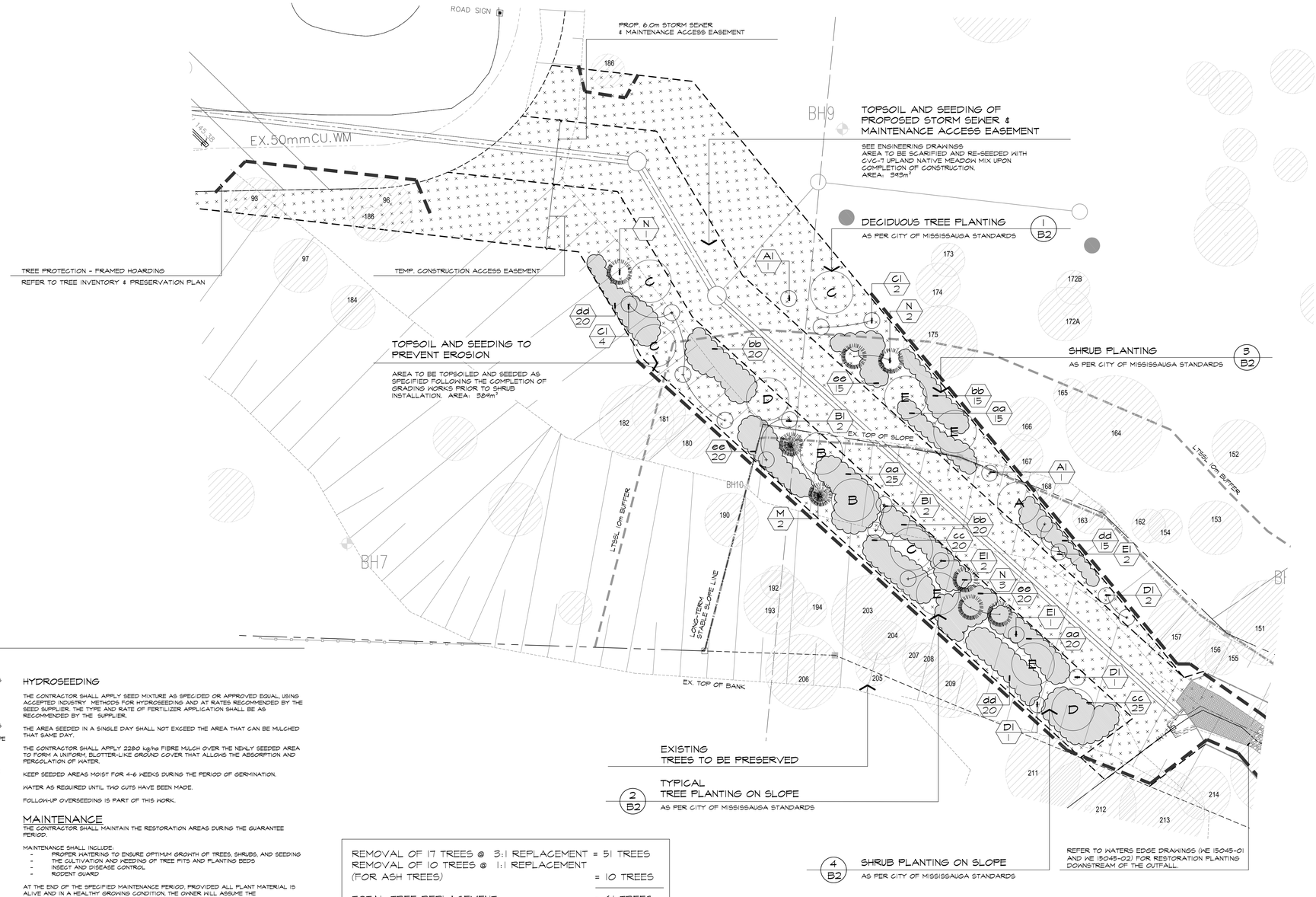
FOR ABOVE THE HIGH WATER MARK, STANDARD CONSTRUCTION MITIG
SHOULD BE USED TO PREVEN ENTRY OF SEDIMENT INTO THE CREDIT R
RIPARIAN AND FLOODPLAIN AREAS. THE TIMING RESTRICTION NEED NO



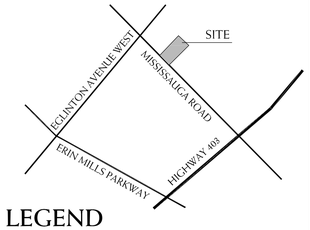
FIELD NOTES ONLY

APPENDIX K

Restoration Landscape Plan



KEY PLAN



LEGEND

- EXISTING TREE TO BE PRESERVED
- DECIDUOUS TREE PLANTING
- CONIFEROUS TREE PLANTING
- SHRUB PLANTING
- TERRASEEDING
- TREE PROTECTION - FRAMED HOARDING BY OTHERS

BASE INFORMATION OBTAINED ELECTRONICALLY FROM COLE ENGINEERING GROUP LTD. (TEL. 905-940-6161)

SEED MIXTURE SPECIFICATIONS

INSTALL SEED MIXTURE WITH NURSE CROP AS SPECIFIED, IN AREAS NOTED ON PLAN

CVC-7 UPLAND NATIVE MEADOW MIX

BLACKEYED SUSAN (RUDBECKIA HIRTA)	10%
BLUE WOOD (HEART LEAVED ASTER) (ASTER CORDIFOLIUS)	1%
CANADA ANEMONE (aNEMONE CANADENSIS)	1%
CANADA GOLDENROD (SOLIDAGO CANADENSIS)	2%
COMMON MILKWEED (ASCLEPIAS SYRIACA)	2%
EVENING PRIMROSE (OENETHERA BIENNIS)	25%
GRASS LEAVED GOLDENROD (EUTHANIA GRAMINIFOLIA)	1%
MEADOW/OPEN FIELD SEDGE (CAREX GRANULARIS)	15%
NEW ENGLAND ASTER (ASTER NOVAE-ANGLIAE)	1%
RIVERBANK WILD RYE (ELYMUS RIPARIUS)	40%
VIRGINS BOWER (CLEMATIS VIRGINIANA)	1%
WILD BERGAMOT (MONARDA FISTULOSA)	1%

A NURSE CROP OF ANNUAL RYE GRASS (LOLIUM MULTIFLORUM) APPLIED AT A RATE OF 20lbs / acre

SPECIFICATIONS

GENERAL

THESE SPECIFICATIONS ARE TO BE READ IN CONJUNCTION WITH THE GENERAL CONDITIONS OF THE CONTRACT AS PREPARED BY AND AVAILABLE AT THE OFFICE OF ALEXANDER BUDREVICIS & ASSOCIATES LTD.

PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL:

1. FAMILIARIZE HIMSELF WITH THE PLANS, DETAILS, AND SPECIFICATIONS OF THIS PROJECT.
2. VISIT THE SITE TO ASCERTAIN AND TAKE ACCOUNT OF EXISTING CONDITIONS AND ANY DEVIATIONS FROM THE PLANS IN WORK BY OTHERS, AND
3. FINALIZE ALL DESIGN ALTERNATIVES IN CONSULTATION WITH THE LANDSCAPE ARCHITECT.

PRIOR TO EXCAVATING, THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES. IN THE EVENT OF A CONFLICT BETWEEN A PROPOSED TREE LOCATION AND AN UNDERGROUND SERVICE, THE EXACT LOCATION OF THE TREE SHALL BE DETERMINED ON SITE BY THE LANDSCAPE ARCHITECT.

THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, REPAIR ANY DAMAGE TO EXISTING UTILITIES, STRUCTURES, FACILITIES, ETC. DONE IN THE PERFORMANCE OF HIS WORK.

ALL SITE WORK SHALL CONFORM TO THE CANADIAN NATIONAL MASTER CONSTRUCTION SPECIFICATIONS. A COPY OF WHICH CAN BE OBTAINED FROM CONSTRUCTION SPECIFICATIONS CANADA.
Tel. (416) 777-2198, Fax. (416) 777-2197, Email. info@csc-dcc.ca. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE THOROUGHLY FAMILIAR WITH THESE SPECIFICATIONS AND THEIR IMPLICATIONS FOR THIS PROJECT.

SOFT LANDSCAPING

PLANT MATERIALS

ALL PLANTS SHALL BE INSTALLED TRUE TO SPECIFIED NAMES, SIZES, GRADES, ETC. AND SHALL CONFORM TO THE STANDARDS OF THE CANADIAN NURSERY TRADES ASSOCIATION.

ALL PLANTS SHALL BE NURSERY GROWN.

IN THE EVENT OF A DISCREPANCY IN PLANT QUANTITY BETWEEN THE PLANTING PLAN AND THE PLANT LIST, THE PLANTING PLAN SHALL GOVERN.

THE CONTRACTOR SHALL MAKE PLANTS AVAILABLE FOR INSPECTION BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION. MATERIAL NOT CONFORMING TO THE SPECIFICATIONS SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR.

PLANT SUBSTITUTIONS MUST BE APPROVED IN WRITING BY THE OWNER OR THE LANDSCAPE ARCHITECT PRIOR TO DELIVERY OF THE MATERIAL ON SITE.

THE LANDSCAPE ARCHITECT MAY, UPON COMPLETION OF THE WORK AND NOTWITHSTANDING PRIOR APPROVAL AT SOURCE, REJECT PLANT MATERIAL NOT CONFORMING TO THE SPECIFICATIONS.

THE CONTRACTOR SHALL USE STANDARD INDUSTRY METHODS FOR PLANTING TREES. TREES SHALL BE TURNED TO GIVE THE BEST APPEARANCE; THEY SHALL ALSO BE GUYED AND STAKED IMMEDIATELY AFTER PLANTING AND AS DETAILED ON THE DRAWINGS.

BED PREPARATION

THE CONTRACTOR SHALL BACKFILL TREE PITS AND PLANTING BEDS TO SPECIFIED DEPTHS WITH EITHER PRE-MIXED TOPSOIL (VIZ., "TRIPLE-MIX") OR A MIXTURE COMPRISED OF:

- 6 PARTS SANDY LOAM
- 1 PART FINELY PULVERIZED CANADIAN PEAT MOSS
- 1 PART WELL-ROTTED FARM MANURE, WITH "AGRIFORM" 20-10-5 TABLETS (OR APPROVED EQUAL) ADDED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

THE CONTRACTOR SHALL CONSTRUCT TREE PITS AND SHRUB BEDS WITH SOIL SAUCERS, MULCH, AND SUBSURFACE DRAINAGE AS DETAILED.

THE CONTRACTOR SHALL CONSTRUCT SHRUB BEDS IN CONTINUOUS FORMS, THE SHAPE OF WHICH SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT AND/OR OWNER. ON SLOPES, SHRUB BEDS SHALL BE FASHIONED TO ALLOW FOR PROPER DRAINAGE.

TOPSOIL & FINE GRADING

THE CONTRACTOR SHALL PLACE 50mm OF RICH TOPSOIL ON APPROVED SUBGRADES. TOPSOIL SHALL BE IMPORTED WHERE REQUIRED. 10-6-4 FERTILIZER SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AT A RATE OF 7.32 kg/100m² FOR SODDED AREAS. THE MIXTURE AND RATE OF APPLICATION SHALL BE ADJUSTED FOR SEEDED AREAS.

MINOR GRADE DEFICIENCIES AND IRREGULARITIES SHALL BE ELIMINATED PRIOR TO SODDING.

HYDROSEEDING

THE CONTRACTOR SHALL APPLY SEED MIXTURE AS SPECIFIED OR APPROVED EQUAL USING ACCEPTED INDUSTRY METHODS FOR HYDROSEEDING AND AT RATES RECOMMENDED BY THE SEED SUPPLIER. THE TYPE AND RATE OF FERTILIZER APPLICATION SHALL BE AS RECOMMENDED BY THE SUPPLIER.

THE AREA SEEDED IN A SINGLE DAY SHALL NOT EXCEED THE AREA THAT CAN BE MULCHED THAT SAME DAY.

THE CONTRACTOR SHALL APPLY 2280 kg/ha FIBRE MULCH OVER THE NEWLY SEEDED AREA TO FORM A UNIFORM, BLOTTER-LIKE GROUND COVER THAT ALLOWS THE ABSORPTION AND PERCOLATION OF WATER.

KEEP SEEDED AREAS MOIST FOR 4-6 WEEKS DURING THE PERIOD OF GERMINATION.

WATER AS REQUIRED UNTIL TWO CUTS HAVE BEEN MADE.

FOLLOW-UP OVERSEEDING IS PART OF THIS WORK.

MAINTENANCE

THE CONTRACTOR SHALL MAINTAIN THE RESTORATION AREAS DURING THE GUARANTEE PERIOD.

MAINTENANCE SHALL INCLUDE:

- PROPER WATERING TO ENSURE OPTIMUM GROWTH OF TREES, SHRUBS, AND SEEDING
- THE CULTIVATION AND WEEDING OF TREE PITS AND PLANTING BEDS
- INSECT AND DISEASE CONTROL
- RODENT GUARD

AT THE END OF THE SPECIFIED MAINTENANCE PERIOD, PROVIDED ALL PLANT MATERIAL IS ALIVE AND IN A HEALTHY GROWING CONDITION, THE OWNER WILL ASSUME THE RESPONSIBILITY OF MAINTAINING THE LANDSCAPE WORK.

PERFORMANCE ACCEPTANCE (SUBSTANTIAL COMPLETION)

WRITTEN NOTICE OF PERFORMANCE ACCEPTANCE BY THE LANDSCAPE ARCHITECT FOR SUBSTANTIAL COMPLETION OF THE PROJECT LANDSCAPE WORKS SHALL MARK THE START OF THE GUARANTEE PERIOD.

SHOULD LOCAL LAW REQUIRE MUNICIPAL ACCEPTANCE, THE LANDSCAPE ARCHITECT WILL SUBMIT THE SUBSTANTIAL COMPLETION CERTIFICATE TO THE MUNICIPALITY SO THAT THEY MAY PROCEED TO INSPECT THE WORK, ISSUE THEIR PERFORMANCE ACCEPTANCE CERTIFICATE, AND REDUCE THE AMOUNT OF SECURITIES.

GUARANTEE

ALL PLANT MATERIAL SHALL BE GUARANTEED FOR TWO (2) YEARS FROM THE DATE ON THE PERFORMANCE ACCEPTANCE CERTIFICATE ISSUED BY THE LANDSCAPE ARCHITECT. PLANTS THAT EXPIRE OR OTHERWISE FAIL TO THRIVE DURING THE GUARANTEE PERIOD SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR.

SIMILARLY, ALL OTHER LANDSCAPE WORK PERFORMED UNDER THIS CONTRACT SHALL BE FULLY GUARANTEED FOR ONE (1) YEAR FROM THE DATE OF PERFORMANCE ACCEPTANCE BY THE LANDSCAPE ARCHITECT.

FINAL ACCEPTANCE

ALL WORK SHALL BE INSPECTED AT THE END OF THE GUARANTEE PERIOD BY THE LANDSCAPE ARCHITECT. ANY DEFICIENCIES SHALL BE RECTIFIED BY THE CONTRACTOR TO THE SATISFACTION OF THE LANDSCAPE ARCHITECT AND THE OWNER. THE LANDSCAPE ARCHITECT WILL THEN ISSUE A FINAL ACCEPTANCE CERTIFICATE.

SHOULD LOCAL LAW REQUIRE MUNICIPAL ACCEPTANCE, THE LANDSCAPE ARCHITECT WILL SUBMIT THE FINAL ACCEPTANCE CERTIFICATE TO THE MUNICIPALITY SO THAT THEY MAY PROCEED TO INSPECT THE WORK, GIVE FINAL APPROVAL AND RELEASE ALL OUTSTANDING LANDSCAPE SECURITIES.

REMOVAL OF 17 TREES @ 3:1 REPLACEMENT = 51 TREES
REMOVAL OF 10 TREES @ 1:1 REPLACEMENT (FOR ASH TREES) = 10 TREES

TOTAL TREE REPLACEMENT: = 61 TREES

RESTORATION PLAN PROVIDES FOR 61 TREES BY PLANTING 43 TREES AND 270 SHRUBS.
270 SHRUBS = 18 TREES (1 TREE = 15 SHRUBS)

TREES IN MAINTENANCE ACCESS AND TEMPORARY CONSTRUCTION EASEMENT TO BE REMOVED ARE:

#94, #95, #158, #159, #160*, #161*, #169, #170, #171*, #176, #177, #178, #179, #191, #195, #196*, #197, #199, #200, #201*, #202, #210*, #215, #216*, #217*, #218* AND #219*.

* ASH TREES.

CVC NOTES:

1. ALL GARBAGE AND DEBRIS WITHIN THE NATURAL FEATURE IS TO BE REMOVED OFF-SITE.
2. ANY TREE AND VEGETATION REMOVALS DONE FOR THE DEVELOPMENT ARE TO BE CONDUCTED OUTSIDE OF THE MAY 1st TO JULY 31st WINDOW FOR BREEDING BIRDS IN ORDER TO AVOID CONTRAVENING THE MIGRATORY BIRD CONVENTION ACT. NOTE THAT CERTAIN BIRDS ARE PROTECTED UNDER THE ACT REGARDLESS OF THE TIMING WINDOW.
3. WORKS ASSOCIATED WITH THE REMOVAL AND REPLACEMENT OF THE OUTFALL DEADWALL SHOULD BE DONE WITHIN THE WARM WATER FISHERIES TIMING WINDOW: JULY 1 TO MARCH 31 IN ORDER TO PREVENT IMPACTS TO FISH AND FISH HABITAT IN THE ADJACENT CREEK.

PLANT LIST FOR CREDIT VALLEY CONSERVATION AUTHORITY

In the event of a discrepancy between the planting plan and the plant list quantities, the planting plan shall govern.

KEY	QUANTITIES	BOTANICAL NAME	COMMON NAME	CALIPER	HEIGHT	SPREAD	ROOT	REMARKS	SPACING
DECIDUOUS TREES									
A	1	ACER SACCHARINUM	SILVER MAPLE	40mm	2500mm	1000mm	B.B.	EQUAL FORM	- - - -
AI	2	ACER SACCHARINUM	SILVER MAPLE	- - - -	1500mm	- - - -	WHIP	EQUAL FORM	- - - -
B	2	ULMUS AMERICANA	AMERICAN ELM	40mm	2500mm	1000mm	B.B.	EQUAL FORM	- - - -
BI	4	ULMUS AMERICANA	AMERICAN ELM	- - - -	1000mm	- - - -	WHIP	EQUAL FORM	- - - -
C	4	POPULUS TREMULOIDES 'EUGENEI'	CAROLINA POPLAR	40mm	2500mm	1000mm	B.B.	EQUAL FORM	- - - -
CI	6	POPULUS TREMULOIDES 'EUGENEI'	CAROLINA POPLAR	- - - -	2000mm	- - - -	WHIP	EQUAL FORM	- - - -
D	2	QUERCUS ALBA	WHITE OAK	40mm	2500mm	1000mm	B.B.	EQUAL FORM	- - - -
DI	5	QUERCUS ALBA	WHITE OAK	- - - -	1500mm	- - - -	WHIP	EQUAL FORM	- - - -
E	4	TILIA AMERICANA	BASSWOOD	40mm	2500mm	1000mm	B.B.	EQUAL FORM	- - - -
EI	5	TILIA AMERICANA	BASSWOOD	- - - -	1500mm	- - - -	WHIP	EQUAL FORM	- - - -
CONIFEROUS TREES									
M	2	PICEA GLAUCA	WHITE SPRUCE	- - - -	1500mm	1000mm	B.B.	SPECIMEN	- - - -
N	6	PINUS STROBUS	EASTERN WHITE PINE	- - - -	1500mm	1000mm	B.B.	SPECIMEN	- - - -
DECIDUOUS SHRUBS									
aa	60	AMELANCHER LAEVIS	ALLEGHENY SERVICEBERRY	- - - -	400mm	- - - -	POTTED	MIN. 10 STEMS	1000mm
bb	59	DIERVILLA LONICERA	NORTHERN BUSH-HONEYSUCKLE	- - - -	600mm	- - - -	POTTED	MIN. 10 STEMS	1000mm
cc	45	RHUS TYPHINA	STAGHORN SUMAC	- - - -	400mm	- - - -	POTTED	MIN. 10 STEMS	1000mm
dd	55	RUBUS ODORATUS	FLOWERING RASPBERRY	- - - -	600mm	- - - -	POTTED	MIN. 10 STEMS	1000mm
ee	55	VIBURNUM ACERIFOLIUM	MAPLELEAF VIBURNUM	- - - -	400mm	- - - -	POTTED	MIN. 10 STEMS	1000mm

NOTE: * IF PLANTING IS DONE IN THE SPRINGTIME, ALL SHRUBS & TREE WHIPS MAY BE PLANTED BARE ROOT

no.	date	version	by
1.	MAR 07 2017	ISSUED FOR 2nd SUBMISSION	SI
0.	SEPT 30 2016	ISSUED FOR 1st SUBMISSION	LH/SG

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ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — MONICA E. CLARKE — OALA MEMBER

ALEXANDER BUDREVICIS
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project

THE ARCHWAYS

4583-4601 MISSISSAUGA ROAD
MISSISSAUGA, ONTARIO

2462357 ONTARIO INC.
C/O PACE DEVELOPMENT

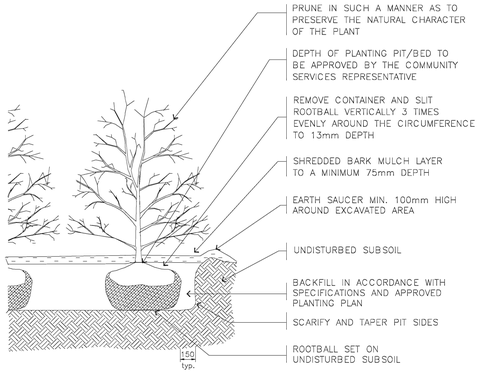
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RESTORATION LANDSCAPE PLAN

date: NOVEMBER 19, 2015	drawn: LH
scale*: 1:200	file: 3022 B1 R1-1700307
direction	project no.: 3022
	sheet no.: B1

*NOTED SCALE IS APPLICABLE ONLY WHEN PRINTED ON ARCH D (24"x36") SIZE SHEET

TYPICAL CONTINUOUS SHRUB PLANTING BED



NOTES:

1. ALL PLANTING SHALL BE DONE UNDER THE DIRECTION AND SUPERVISION OF PERSONNEL WITH AT LEAST 5 YRS HORTICULTURAL AND PLANTING EXPERIENCE AND CONFORM TO BEST HORTICULTURAL PRACTICES.
2. SAMPLES OF MULCH, TOP SOIL AND TREE ACCESSORIES MUST BE SUBMITTED TO COMMUNITY SERVICES FOR APPROVAL.
3. PLANTING OF PLANT MATERIAL PRIOR TO COMMUNITY SERVICES APPROVAL WILL BE AT THE CONTRACTORS RISK. COMMUNITY SERVICES RESERVES THE RIGHT TO REJECT PLANT MATERIAL THAT DOES NOT CONFORM TO PLANTING PLAN SPECIFICATIONS.
4. ONLY USE IMPORTED TOPSOIL WHEN TOPSOIL FROM SITE HAS BEEN DEPLETED OR IS UNACCEPTABLE TO COMMUNITY SERVICES.
5. PLANTS SHALL BE SOUND HEALTHY, VIGOROUS AND WELL BRANCHED. THEY SHALL BE FREE OF INSECT PESTS' EGGS AND LARVAE AND SHALL HAVE HEALTHY WELL DEVELOPED ROOT SYSTEMS
6. KEEP ALL PLANTS WATERED FROM TIME OF PLANTING UNTIL ACCEPTANCE

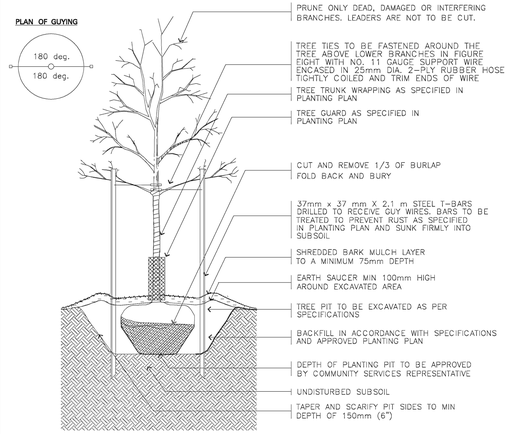
NO.	REVISION	DATE

MISSISSAUGA Community Services

SCALE: N.T.S.
DATE: JANUARY 2001
DRAWN BY: P & D
NUMBER: 02950-4

3 SHRUB PLANTING — NTS
CITY OF MISSISSAUGA STANDARD

TYPICAL DECIDUOUS TREE PLANTING (60mm CAL.+)



NOTES:

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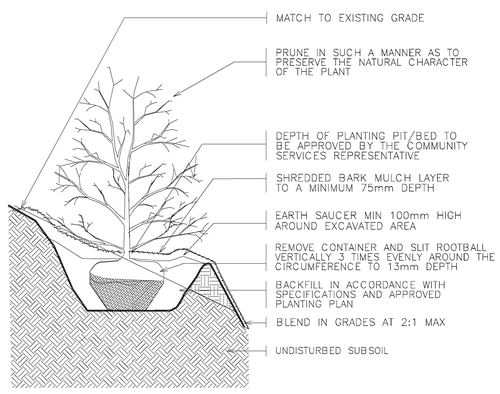
NO.	REVISION	DATE

MISSISSAUGA Community Services

SCALE: N.T.S.
DATE: JANUARY 2001
DRAWN BY: P & D
NUMBER: 02950-1

1 DECIDUOUS TREE PLANTING DETAIL — NTS
CITY OF MISSISSAUGA STANDARD

TYPICAL SHRUB PLANTING ON SLOPE



NOTES:

1. ALL PLANTING SHALL BE DONE UNDER THE DIRECTION AND SUPERVISION OF PERSONNEL WITH AT LEAST 5 YRS HORTICULTURAL AND PLANTING EXPERIENCE AND CONFORM TO BEST HORTICULTURAL PRACTICES.
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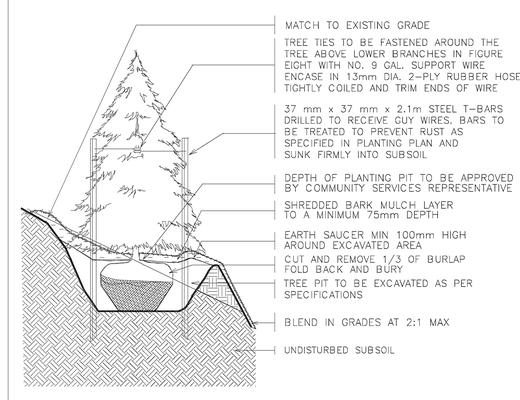
NO.	REVISION	DATE

MISSISSAUGA Community Services

SCALE: N.T.S.
DATE: JANUARY 2001
DRAWN BY: P & D
NUMBER: 02950-6

4 SHRUB PLANTING ON SLOPE DETAIL — NTS
CITY OF MISSISSAUGA STANDARD

TYPICAL TREE PLANTING ON SLOPE



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NO.	REVISION	DATE

MISSISSAUGA Community Services

SCALE: N.T.S.
DATE: JANUARY 2001
DRAWN BY: P & D
NUMBER: 02950-7

2 TYPICAL TREE PLANTING ON SLOPE DETAIL — NTS
CITY OF MISSISSAUGA STANDARD

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drawing

PLANTING DETAILS

date	NOVEMBER 19, 2015
scale*	AS SHOWN
drawn	LH
file	3022 B2 R1-1700307
direction	
project no.	3022
sheet no.	B2

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