



July 2016

NATURAL ENVIRONMENT CONSTRAINTS ASSESSMENT

Lakeshore Connecting Communities Lakeshore Road Transportation Master Plan

Submitted to:

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REPORT



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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by HDR Incorporated (HDR) to complete a desktop-level review and prepare a Natural Environment Constraints Assessment to document the existing natural environment features and potential constraints associated with the Lakeshore Road Corridor. The Natural Environment Constraints Assessment will support the Lakeshore Road Transportation Master Plan (TMP) for the City of Mississauga.

1.1 Background

HDR is undertaking a study to guide the future planning of the Lakeshore Road corridor as well as Royal Windsor Drive (from the west City Limit to the east City Limit). The TMP study will aim to:

- provide a unified and seamless vision that recognizes the different character areas along Lakeshore Road;
- support all modes of transportation, connect people to places, help move goods to market and support existing and future land uses; and
- establish an implementation plan to make the vision a reality.

Instead of promoting Greenfield growth, the City of Mississauga is accommodating growth through infill and redevelopment. The Lakeshore Road corridor is scheduled as an intensification corridor, specifically where it passes through the communities/character areas of Clarkson Village, Port Credit and Lakeview. The corridor design for Lakeshore Road and Royal Windsor Drive (the Project) will need to consider the following objectives:

- a comprehensive transportation modeling exercise, which will account for the intensification in the Clarkson, Port Credit and Lakeview nodes;
- network connectivity for all modes of transportation as well as multi-model integration with key locations (e.g., major transfer points);
- rapid transit east of Hurontario Street and the potential for expansion of rapid transit into the Port Credit area;
- potential options to address severe congestion or shut-down situations on Queen Elizabeth Way;
- potential needs of additional crossing(s) of the Credit River in the vicinity of Lakeshore Road; and
- public realm concept plans to create an animated public realm.



2.0 SITE DESCRIPTION

For the purposes of this assessment, the natural environment study area (study area) is based on the requirements in the Provincial Policy Statement (PPS; MMAH 2014). According to the PPS, the potential for negative impacts of a proposed development must be assessed for both the natural feature and the adjacent lands. Adjacent lands are defined as those lands contiguous to a specific natural heritage feature or area where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands may be recommended by the Province or based on municipal approaches which achieve the same objectives. For this assessment, we have used the distance of 120 metres (m) from the natural feature as the area in which to consider effects on adjacent lands.

The natural environment study area is a 120 m buffer on either side of Lakeshore Drive West/East and Royal Windsor Drive, and is approximately bounded by Winston Churchill Boulevard in the west and Dixie Road in the east (from the west City Limit to the east City Limit) (Figure 1).

Primary land use within the study area is low and medium residential and mixed use, with industrial west of Southdown Road (City of Mississauga 2016). There are several natural areas, including woodlands, parks, watercourses, and valleylands throughout the study area, and are discussed further in Section 5.0.



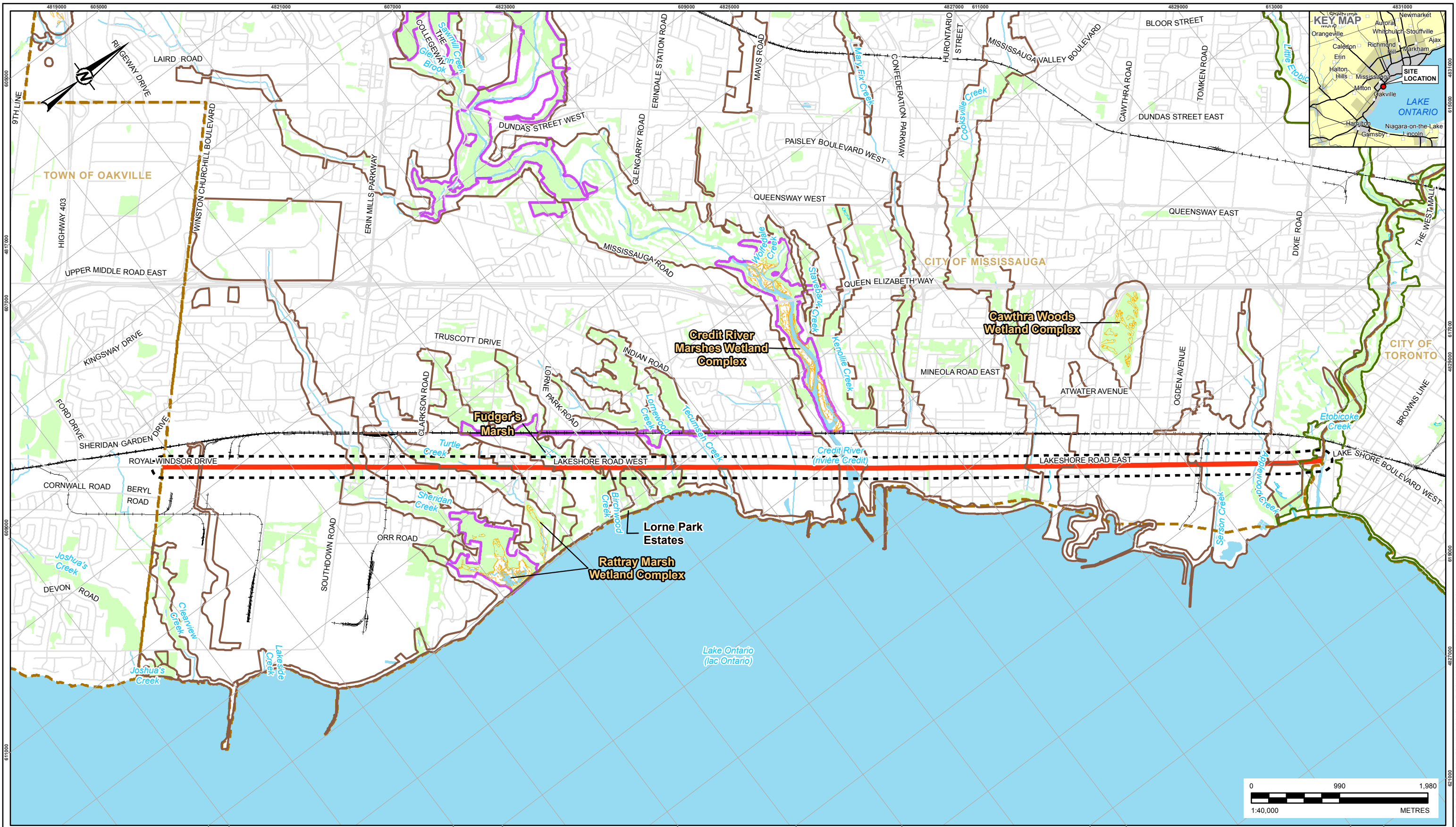
3.0 POLICY CONTEXT

3.1 Provincial Policy Statement (PPS)

The PPS was issued under Section 3 of the *Planning Act*, and came into effect on April 30, 2014 and replaces the PPS issued March 1, 2005.

The natural heritage policies of the PPS (MMAH 2014) indicate that:

- 2.1.1 Natural features and areas shall be protected for the long term;
- 2.1.2 The diversity and connectivity of natural features in an area, and the long-term *ecological function* and biodiversity of *natural heritage systems*, should be maintained, restored or, where possible, improved, recognizing linkages between and among *natural heritage features and areas*, *surface water features* and *ground water features*;
- 2.1.3 Natural heritage systems shall be identified in Ecoregions 6E and 7E, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas;
- 2.1.4 *Development* and *Site alteration* shall not be permitted in:
 - a) Significant wetlands in Ecoregions 5E, 6E and 7E; and
 - b) Significant coastal wetlands.
- 2.1.5 Unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and Site alteration shall not be permitted in:
 - a) Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;
 - b) Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
 - c) Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
 - d) Significant wildlife habitat;
 - e) Significant areas of natural and scientific interest; and
 - f) Coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b).



- LEGEND**
- ROAD
 - RAILWAY
 - WATERCOURSE
 - WATERBODY
 - MUNICIPAL BOUNDARY
 - NHIC ELEMENT OCCURENCE 1KM X 1KM GRID

- WOODED AREA
- ANSI, LIFE SCIENCE
- WETLAND
- PROVINCIALY SIGNIFICANT WETLAND
- CREDIT VALLEY CONSERVATION AUTHORITY REGULATED LIMITS
- TORONTO AND REGION CONSERVATION AUTHORITY REGULATED LIMITS

- PROJECT CORRIDOR
- STUDY AREA
- 120 M BUFFER

REFERENCES
 BASE DATA - MNR LIO, OBTAINED 2016
 REGULATED LIMITS - CREDIT VALLEY CONSERVATION AUTHORITY, 2016; TRCA, 2016
 PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2016
 PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
 COORDINATE SYSTEM: UTM ZONE 17

CLIENT
 CITY OF MISSISSAUGA



YYYY-MM-DD	04-05-2016
PREPARED	JR
DESIGN	JR
REVIEW	LD
APPROVED	HM

PROJECT
 LAKESHORE ROAD TRANSPORTATION MASTER PLAN

TITLE
 PROJECT LOCATION AND NATURAL ENVIRONMENT CONSTRAINTS

PROJECT NO.	CONTROL	REV.	FIGURE
1542241 (1000)	0001	-	1

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25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:



- 2.1.6 Development and Site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements;
- 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; and
- 2.1.8 Development and Site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.3, 2.1.4 and 2.1.5 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.

3.2 Species at Risk

3.2.1 Species at Risk Act (SARA)

At a federal level, species at risk designations for species occurring in Canada are initially determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment, species are added to the federal List of Wildlife Species at Risk (SARA 2002). Species that are included on Schedule 1 as endangered or threatened are afforded protection of critical habitat on federal lands under the *Species at Risk Act* (SARA). On private or provincially-owned lands, only aquatic species listed as endangered, threatened or extirpated and migratory birds are protected under SARA, unless ordered by the Governor in Council.

3.2.2 Endangered Species Act (ESA)

Species at risk designations for species in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of Natural Resources and Forestry, species are added to the provincial *Endangered Species Act* (ESA), which came into effect June 30, 2008 (ESA 2007). The legislation prohibits the killing or harming of species identified as 'endangered' or 'threatened' in the various schedules to the Act. The ESA also provides habitat protection to all species listed as threatened or endangered. As of June 30, 2008, the Species at Risk in Ontario (SARO) List is contained in O. Reg. 230/08.

Subsection 9(1) of the ESA prohibits the killing, harming or harassing of species identified as 'endangered' or 'threatened' in the various schedules to the Act. Subsection 10(1) (a) of the ESA states that "*No person shall damage or destroy the habitat of a species that is listed on the SARO List as an endangered or threatened species*".

General habitat protection is provided by the ESA to all threatened and endangered species. Species-specific habitat protection is only afforded to those species for which a habitat regulation has been prepared and passed into law under the ESA. The ESA has a permitting process where alterations to protected species or their habitats may be considered.

3.3 Fisheries Act

The purpose of the *Fisheries Act* is to maintain healthy, sustainable and productive Canadian fisheries through the prevention of pollution, and the protection of fish and their habitat. In 2012, changes were made to the *Fisheries Act* to enhance Fisheries and Oceans Canada's (DFO) ability to manage threats to Canada's commercial, recreational and Aboriginal (CRA) fisheries.



Projects affecting waterbodies supporting Canada's CRA fisheries must comply with the provisions of the *Fisheries Act*. The proponent is responsible for determining if the project is likely to cause impacts to CRA fish and if these impacts can be avoided or mitigated. The proponent must gather information on the type and scale of impact on the fishery and determine if the impacts will result in *serious harm to fish*. Proponents have a duty to maintain records of self-assessments completed for projects they undertake, and need to provide this information to DFO upon request. Serious harm to fish is defined as: the death of fish; and/or any permanent alteration to, or destruction of, fish habitat. If it is determined that the impacts cannot be avoided or mitigated and will result in serious harm to fish, an application for authorization must be submitted to the DFO. Projects that have the potential to obstruct fish passage or, affect flows needed by fish also require an authorization; even if these occur outside of CRA fishery areas (DFO 2013).

Proponents of projects requiring a Fisheries Act Authorization are required to submit a Habitat Offsetting Plan, which provides details of how the serious harm to fish will be offset, as well as outlining associated costs and monitoring commitments (DFO 2013). Proponents also have a duty to notify DFO of any unforeseen activities that cause serious harm to fish and outline the steps taken to address them.

3.4 Credit Valley Conservation (CVC) and Toronto and Region Conservation Authority (TRCA)

The study area is within the jurisdictions of two separate conservation authorities: Credit Valley Conservation Authority (CVC) and Toronto and Region Conservation Authority (TRCA). Most of the study area is contained within the jurisdiction of the CVC, however the far eastern portion of the site is located in the jurisdiction of the TRCA. Any work proposed within watercourses, wetlands, waterbodies, floodplains, and regulated areas must be in compliance with the regulations of both authorities: O.Reg 160/06 Credit Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses and O.Reg 166/06 Toronto and Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (*Conservation Authorities Act* 1990).

Most of the study area is located within the Credit River watershed. Within this watershed, the study area crosses three subwatersheds: Lake Ontario Shoreline West, Lake Ontario Shoreline East, and Norval to Port Credit (CVC 2016). The far eastern portion of the study area is within the Etobicoke Creek watershed (TRCA 2016).

3.5 Region of Peel

The Project must also comply with the policies of the Region of Peel Official Plan (OP) (Region of Peel 2014). According to the Region of Peel (2014) an Environmental Impact Study (EIS) is required for development and site alteration within and on adjacent lands to the Greenlands System. Designated natural features within the study area, including lands in the Greenlands System, are discussed further in Section 5.1.6.

The Project is located in land zoned as Urban System in the Region of Peel (2014). Lands included in the Urban System include lands identified and protected as part of the natural environment, the Toronto-Lester B. Pearson International Airport, urban growth centres and regional intensification corridors (Region of Peel 2014).



3.6 City of Mississauga

The study area is located within City of Mississauga and the Project must comply with the policies of the Mississauga OP (City of Mississauga 2016). Development and site alteration within or adjacent to designated natural features may be prohibited. In some cases, development and site alteration may be permitted with the completion of appropriate environmental studies, such as an EIS. Designated natural features within the study area are discussed further in Section 5.1.5.

Zoning in the far western portion of the Project (Royal Windsor Drive) primarily consists of Business Employment and Industrial land uses (City of Mississauga 2016). Along Lakeshore Drive West and East land uses are varied. Most of the land use is designated as Residential Low Density I and Mixed Use. There are also portions of land along the Lakeshore Drive West and East that are designated as Industrial, Utility, Residential Medium Density, Residential High Density and Public Open Space.



4.0 METHODS

4.1 Background Review

A background information search and literature review to gather data about the study area and provide context for the evaluation of the natural features were completed. As part of the background review, a number of resources were used to evaluate the existing conditions on the site including:

- Natural Heritage Information Centre (NHIC) database maintained by the Ontario Ministry of Natural Resources (MNRF) (NHIC 2016);
- Atlas of Breeding Birds of Ontario (Cadman et al. 2007);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Royal Ontario Museum (ROM) range maps (ROM 2016);
- Bat Conservation International (BCI) range maps (BCI 2016);
- Ontario's Reptile and Amphibian Atlas (Ontario Nature 2016);
- Land Information Ontario (MNRF 2015a);
- City of Mississauga Official Plan (City of Mississauga 2016);
- Region of Peel Official Plan (Region of Peel 2014);
- Credit Valley Conservation Authority (CVC 2016);
- Toronto and Region Conservation Authority (TRCA 2016); and
- Existing aerial imagery.

To develop an understanding of the ecological communities, wildlife habitat and potential natural heritage features that may be affected by the proposed Project, MNRF Land Information Ontario (LIO) data were used to create base layer mapping for the study area. A geographic query of the NHIC database was conducted to identify element occurrences of any natural heritage features, including wetlands, Areas of Natural and Scientific Interest (ANSIs), life science sites, rare vegetation communities, rare, threatened or endangered species and other natural heritage features within the study area.

4.2 Species at Risk Screening

The species at risk (SAR) considered for this report include species listed in under the ESA and SARA, species ranked S1 to S3 (NHIC 2016), and regionally rare species. A desktop assessment was done to determine which SAR had potential habitat in the study area using the sources listed in Section 4.1 and through consultation with the MNRF Aurora District (Kowalyk 2016 pers. comm.). Species with ranges overlapping the study area, or recent occurrence records in the vicinity, were screened by comparing species habitat requirements to habitat conditions in the study area.

The potential for SAR to occur in the study area was determined through a probability of occurrence. A ranking of low indicates no suitable habitat availability for that species in the study area and no specimens were observed. Moderate probability indicates potential for the species to occur, as suitable habitat types were present in the study area, but no occurrence of the species has been recorded. High potential indicates a known species record in the study area (from the background data review) and good quality habitat is present.



5.0 CONSTRAINTS ANALYSIS

An assessment was conducted to determine if any significant environmental features, species at risk, or other significant species exist, or have moderate or high potential to exist, in the study area.

5.1 Natural Areas

5.1.1 Conservation Areas

Ratray Marsh Conservation Area is located south of the study area along the shore of Lake Ontario between Bob-O-Link Road and Parkland Avenue (Figure 1).

5.1.2 Areas of Natural and Scientific Interest (ANSI)

In Ontario, ANSIs are designated according to standardized evaluation procedures and are ranked by the MNRF as being either provincially or regionally significant. There are no ANSIs located in the study area. Ratray Coastal Marsh, a provincial Life Science ANSI, is located approximately 800 m south of the Project (Figure 1). Credit River Marshes, a provincial Life Science ANSI, is located approximately 400 m north of the Project.

5.1.3 Significant Valleylands

The designation of significant valleylands is deferred to local planning authorities. General guidelines for determining significance of this feature are presented in the Natural Heritage Reference Manual (NHRM) for Policy 2.3 of the PPS (MNR 2010).

The Region of Peel does not recognize significant valleylands outside of the Oak Ridges Moraine Conservation or Greenbelt Plan Areas, which are not included in the study area for the Project. Instead, the Region of Peel OP identifies core valley and stream corridors, which include the main branches, major tributaries, and other tributaries associated with the Credit River and Etobicoke Creek.

The City of Mississauga identifies significant valleylands as those valleylands associated with tributaries and watercourse corridors that drain directly to Lake Ontario, including the Credit River and Etobicoke Creek (City of Mississauga 2016). Significant valleylands are considered a Significant Natural Area.

In the study area, significant valleylands and core valley and stream corridors of the Greenlands System are valleylands associated with the Credit River and Etobicoke Creek. Development and site alteration within these features is prohibited, with some exceptions including essential infrastructure authorized under the EA process (Region of Peel 2014). Development or site alteration within significant valleylands is permitted only if negative impacts can be avoided or mitigated (City of Mississauga 2016). Development or site alteration within or adjacent to other valleylands and stream corridors is permitted with use of appropriate buffers to erosion hazards and with approval of the CVC (City of Mississauga 2016). Any work proposed within a valley or stream corridor requires a permit from the CVC.

5.1.4 Significant Woodlands

The designation of significant woodlands is deferred to local planning authorities. General guidelines for determining significance of this feature are presented in the NHRM for Policy 2.1 of the PPS (MNR 2010).



The City of Mississauga's OP (City of Mississauga 2016) defines significant woodlands as woodlands that are:

- equal to or greater than 4 hectares (ha) in size (excluding cultural savannahs);
- equal to or greater than 2 ha and less than 4 ha in size (excluding cultural savannahs and cultural woodlands);
or
- greater than 0.5 ha and supports old growth trees, supports a significant linkage function, is within 100 m of another Significant Natural Area and supports a significant ecological relationship between the two features, is within 30 m of a watercourse or significant wetland, or supports significant species or communities.

The Region of Peel's OP (Region of Peel 2014) defines significant woodlands as woodlands that are:

- ecologically important in terms of features such as species composition, age of trees and stand history;
- functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or
- economically important due to Site quality, species composition, or past management history.

Draft criteria outlined in a study by the Region of Peel define significant woodlands as any woodland greater than 4 ha in size, and/or any woodland that supports provincially or globally rare species, or species designated by COSEWIC or COSSARO as threatened, endangered, or special concern (North-South Environmental Inc. et al. 2009).

The following areas are larger than 4 ha and so are designated as Significant Woodlands:

- the Residential Woodland in Lorne Park Estates (Figure 1);
- the woodland that is between Whittier Crescent and Balboa Drive, just west of Lorne Park Estates and south of Lakeshore Road West;
- the woodland that contains Sheridan Creek, south of Lakeshore Road West, and connects to the Rattray Conservation Area;
- the woodland north and south of Lakeshore Road West that contains Fudger's Marsh; and
- the woodland that is adjacent to (southwest) Etobicoke Creek.

Other woodlands less than 0.5 ha that support old growth trees or woodlands that support significant species or communities may be present in the study area; the presence of these woodlands may be verified with field surveys, if necessary.

5.1.5 Credit Valley and Toronto and Area Conservation Authorities

The Project intersects CVC regulation areas, specifically, the valleylands and riparian habitat of Sheridan Creek, Turtle Creek, Birchwood Creek, Lornewood Creek, Tecumseh Creek, Credit River, Serson Creek and Applewood Creek. The Project also intersects CVC regulation areas that are not associated with watercourses. One of these areas is the parcel of land that contains multi-use trails that connect to Douglas Kennedy Park and A.E. Cookes Park. Another CVC regulation area that will be intersected by the Project and is not associated with a watercourse is the parcel of land between Birchwood Creek and Parkland Avenue that contains the multi-use trail from Jack Darling Memorial Park and part of the trail from Rattray Marsh.



The far eastern portion of the Project intersects the Valleylands and riparian habitat of Etobicoke Creek. Not Yet Named Park P-358 is owned by the TRCA and contains Valleylands and riparian habitat on the west bank of Etobicoke Creek.

5.1.6 Region of Peel Official Plan – Natural Features

According to the Region of Peel's OP (Region of Peel 2014), portions of the study area are designated as a Core Area of the Regional Greenlands System. In particular, the valleylands and riparian habitat of the Credit River, Sheridan Creek, Turtle Creek, Tecumseh Creek, Lornewood Creek, Birchwood Creek and Etobicoke Creek. Development is prohibited within the Core Areas of the Greenlands System, with some exceptions. Exceptions include essential infrastructure authorized under the EA process. When permitted, development exceptions must comply with any other provincial or federal legislation or policies (e.g., *Endangered Species Act*). Furthermore, Core Areas are not to be damaged or destroyed, and in the event that they are, the Region of Peel will require replacement or rehabilitation of the ecological features, functions and/or landforms.

5.1.7 City of Mississauga Official Plan – Natural Features

The study area is within the municipal Green System in the City of Mississauga. The City of Mississauga's Greenland System generally coincides with the boundaries of the Region of Peel's Greenlands System. In particular, the valleylands and riparian habitat of the Credit River, Sheridan Creek, Turtle Creek, Tecumseh Creek, Lornewood Creek, Birchwood Creek, Serson Creek, Applewood Creek, Etobicoke Creek, and other unnamed tributaries are designated as part of the Green System (Figure 1). The Green System includes all Natural Heritage Systems, the Urban Forest, Natural Hazard Lands, and Parks and Open Spaces (City of Mississauga 2016).

The Natural Heritage System includes Significant Natural Areas, Natural Green Spaces, Linkages, Special Management Areas and Residential Woodlands. Of these five categories, all but Natural Green Spaces are located within the study area. Development and site alteration is prohibited within or adjacent to Natural Heritage System features unless it is demonstrated that no negative impacts will occur or appropriate federal and provincial permitting requirements are met (City of Mississauga 2016).

There are several designated Significant Natural Areas in the study area, including valleylands of the Credit River, Etobicoke Creek and other watercourses. Brueckner Rhododendron Gardens Special Management Area (PC1) is south of Lakeshore Road West, between Crozier Court and Godfrey's Lane (City of Mississauga 2016).

The following four features in the study area are designated as Linkages (Figure 1):

- The section of land between Birchwood Creek and Parkland Avenue south of Lakeshore Road West;
- The section of Sheridan Creek that connects to Rattray Marsh north and south of Lakeshore Road West;
- The section of Applewood Creek that connects Natural Areas north and south of Lakeshore Road East; and
- The Etobicoke Creek valleylands that are on the southwest side of the Creek, south of Lakeshore Road East.

Wooded areas within the Natural Heritage System and individual trees on public and private property are considered part of the Urban Forest and all Natural Heritage System policies apply. Any development or site alteration within the Urban Forest must demonstrate no negative impacts will occur, and an arborist report and tree inventory is also required. Any tree removal must also comply with the City of Mississauga's Private Tree Protection By-law 254-12.



Valleylands of the Credit River, Sheridan Creek, Turtle Creek, Tecumseh Creek, Serson Creek and Etobicoke Creek are Natural Hazard Lands and are designated as part of the municipal Greenlands System (Figure 1). Piped services and related facilities for water, wastewater and stormwater are permitted within the municipal Greenlands System provided that an Environmental Assessment (EA) is completed (City of Mississauga 2016).

There are several designated Parks and Open Spaces throughout the study area. This includes the Residential Woodland between the Sheridan Creek Linkage and Whittier Crescent and the Brueckner Rhododendron Gardens Special Management Area. Other Parks and Open Spaces in the study area include Jack Darling Park, Richard's Memorial Park, Rattray Marsh, and Birch Glen Park. Although there are no specific restrictions on development or site alteration within public open spaces or parks, the OP states that where designated Open Space overlaps or abuts with the Natural Areas System, the policies for the Natural Areas System will apply (City of Mississauga 2016). There are also several public parks immediately adjacent to the Natural Areas System in the study area. A park access permit is required prior to development within a City of Mississauga owned park or greenbelt.

Policies related to the Greenlands System within the City of Mississauga OP may be more restrictive than the policies described in the Region of Peel's OP, and in that case, the more restrictive policies apply.

5.2 Wildlife and Wildlife Habitat

5.2.1 Species at Risk

Based on the desktop assessment, the following 42 species at risk have been historically observed within 1 kilometre (km) of the Lakeshore Road Corridor (NHIC 2016; Kowalyk pers. comm. 2016) and are considered to have high or moderate potential to occur in the study area (Appendix A):

- Two (2) arthropods (Mottled Duskywing and Lilypad Clubtail);
- Eight (8) birds (Barn Swallow, Bank Swallow, Bobolink, Chimney Swift, Common Nighthawk, Henslow's Sparrow, Northern Bobwhite and Peregrine Falcon);
- Seven (7) fishes (American Eel; Shortnose Cisco, Redside Dace, Upper Great Lakes Kiyi, Lake Sturgeon, Deepwater Sculpin and Greater Redhorse);
- Six (6) reptiles (Northern Map Turtle, Snapping Turtle, Eastern Musk Turtle, Eastern Ribbonsnake, Eastern Milksnake and Blanding's Turtle); and
- Nineteen (19) vascular plants (Northern Hawthorn, Kansas Hawthorn, Butternut, Virginia Bluebells, Schreber's Wood-Aster, Cleland's Evening-Primrose, Bushy Cinquefoil, Fall Crabgrass, Sundial Lupine, Tall Nutrush, White Wood Aster, Southern Slender Ladies'-Tresses, White-haired Panic Grass, Stiff Gentian, Yellow Stargrass, Bowman's-root, American Gromwell, Woodland Flax and Biennial Gaura).

Based on species ranges and habitat requirements, there is moderate or high potential for the following additional seven species at risk to occur in the study area (COSSARO 2016; Kowalyk pers. comm. 2016) (Appendix A):

- Two (2) mammals (Little Brown Myotis and Northern Myotis);
- One (1) arthropod (Rusty-patched Bumblebee); and
- Four (4) birds (Cerulean Warbler, Eastern Meadowlark, Least Bittern and Loggerhead Shrike).



The majority of potentially suitable habitat for these species is concentrated in the west end of the study area, within woodlands, wetlands and valleylands of watercourses. East of Hurontario Street, habitat is focused mainly within the valleyland and/or riparian habitat of watercourses and public parks.

The ESA (2007) also prohibits damaging or destroying habitat of endangered and threatened species. The MNRF can issue a permit under the ESA that allows for activities that will destroy or damage habitat of threatened and endangered species, provided certain requirements are met. According to the PPS (MMAH 2014), development or site alteration is prohibited within habitat of species listed as threatened or endangered under the ESA. Policies of the Mississauga OP (City of Mississauga 2016) prohibit development or site alteration within habitat of species listed as threatened or endangered under the ESA. Under the Region of Peel's policies (Region of Peel 2014), development or site alteration is permitted within significant habitat of threatened or endangered species only for essential infrastructure approved through the EA process. Development or site alteration on lands adjacent to habitat of threatened or endangered species is permitted if it is demonstrated through an EIS that no negative impacts will occur (MMAH 2014; City of Mississauga 2016).

5.2.2 Significant Wildlife Habitat

Significant wildlife habitat (SWH) is one of the more complicated natural heritage features to identify and evaluate. The NHRM includes criteria and guidelines for designating SWH. There are two other documents, the Significant Wildlife Habitat Technical Guide (SWHTG) and the Significant Wildlife Habitat Mitigation Support Tool (SWHMiST) (MNR 2000; MNRF 2014), that can be used to help decide what areas and features should be considered significant wildlife habitat. These documents were used as reference material for this study. SWH should be evaluated in the context of the entire planning authority's jurisdiction, and only the best examples are considered significant. SWH Ecoregion Criteria Schedules (MNRF 2015b) identifies the specific types of SWH that occur within each of the seven provincial ecoregions.

There are four general types of significant wildlife habitat: movement corridors, seasonal concentration areas, rare or specialized habitats, and habitat for species of conservation concern.

According to the PPS (MMAH 2014) and Mississauga OP (City of Mississauga 2016), development or site alteration is prohibited within significant wildlife habitat, unless it is demonstrated through an EIS that no negative impacts will occur.

Potential SWH present in the study area include, but are not limited to, the following:

- Credit River (movement corridor);
- Etobicoke Creek (movement corridor);
- Fudger's Marsh (habitat for species of special concern); and
- Woodlands supporting amphibian breeding ponds (specialized habitat).

Potential SWH may be confirmed with field surveys, if necessary.



5.3 Aquatic Features and Fish

5.3.1 Surface Water

There are several aquatic features in the study area. The proposed Project is anticipated to cross Credit River, Sheridan Creek, Turtle Creek, Tecumseh Creek, Birchwood Creek, Lornewood Creek, Serson Creek, Applewood Creek and Etobicoke Creek, as well as some unnamed tributaries (Figure 1).

Development or site alteration adjacent to watercourses, or within the floodplain, must meet slope stability and erosion study standards (City of Mississauga 2016), as well as comply with the policies of relevant conservation authorities (i.e., CVC, TRCA).

5.3.2 Significant Wetlands

The MNR designates provincially significant wetlands (PSWs). Provincially significant wetlands are determined based on a scientific point-based ranking system known as the Ontario Wetland Evaluation System (OWES). Evaluated wetlands that score 600 or more points, or 200 or more points in either the biological or special features component, are considered provincially significant (MNR 2010).

There are no PSWs in the study area. Rattray Marsh and Turtle Creek Reed Swamp are PSWs that are located just south of the study area along the shore of Lake Ontario (Figure 1). The Credit River Marshes is also a PSW complex and is located north of the Canadian National Railway tracks (approximately 400 m from the Project). Cawthra Woods is also a PSW and is located north of the study area at the corner of Queen Elizabeth Way and Cawthra Road (approximately 1 km from the Project).

5.3.3 Other Wetlands

'Other wetlands' are wetlands not yet evaluated by the OWES process or do not score enough points under the OWES to qualify as a PSW but are considered by municipalities as significant at the local scale. 'Other wetlands' that occur in the study area are Fudger's Marsh (a locally significant wetland) and wetlands within the valleylands of Etobicoke Creek (Figure 1).

According to the City of Mississauga (2016), 'other wetlands' greater than 0.5 ha in size are considered a Significant Natural Area and development or site alteration is prohibited within the feature unless it is demonstrated no negative impacts will occur. Buffers around 'other wetlands' are determined on a site specific basis as part of an EIS and should include consultation with the City of Mississauga, the CVC and the TRCA. The Region of Peel (2014) requires an EIS for development or site alteration within all 'other wetlands', regardless of size.

5.3.4 Fish Habitat

The Mississauga OP (City of Mississauga 2016) defers to the definition of fish habitat as provided in the *Fisheries Act*, as spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly to carry out life processes. The Credit River and Etobicoke Creek are considered areas of fish habitat. Development and site alteration is prohibited within fish habitat except in accordance with provincial or federal requirements (MMAH 2014; City of Mississauga 2016). In addition, any required setbacks adjacent to fish habitat must be determined through an EIS and must conform with approved fisheries management plans.



Within the Credit River watershed, almost 60 species of fish are known to occur, including Northern Pike (*Esox Lucius*), White Sucker (*Catostomus commersoni*), Common Shiner (*Luxilus cornutus*), Fathead Minnow (*Pimephales promelas*), Creek Chub (*Semotilus atromaculatus*) and Rainbow Darter (*Etheostoma caeruleum*). Within the study area, watercourses support mainly warmwater and mixed cool/warmwater fish communities (MNR and CVC 2002).

Redside Dace (*Clinostomus elongatus*) and Shortnose Cisco (*Coregonus reighardi*) are known to occur within the Credit River watershed (MNR and CVC 2002; DFO 2013). Redside Dace and Shortnose Cisco are designated endangered under the ESA (2007).

The Etobicoke Creek watershed is dominated by warmwater fish communities and supports more than 25 species of fish. The most common species include White Sucker, Blacknose Dace, Fathead Minnow, Bluntnose Minnow (*Pimephales notatus*) and Creek Chub (TRCA 1998). Many watercourses within this watershed have been channelized as part of flood and erosion control.

If construction limits extend within the high water mark of a waterbody, a Fisheries and Oceans Canada (DFO) self-assessment for impacts must be conducted. If impacts are unavoidable, a DFO Project Review is required.



6.0 CONCLUSION

The Project has been assessed at a desktop level for potential natural environment constraints under the Provincial Policy Statement, the policies of the City Mississauga, the Region of Peel, CVC, TRCA and County, as well as other relevant legislation, including the ESA.

Based on the background review and SAR screening, the following natural constraints are known to occur within the study area:

- Core valley and stream corridors of the Credit River and Etobicoke Creek;
- Significant Valleylands;
- Special Management Areas;
- Public Open Spaces and Parks;
- Natural Hazard Lands;
- Locally significant wetlands ('other wetlands');
- Significant Woodlands; and
- Fish habitat.

The following natural constraints have potential to occur in the study area and may be confirmed with a field reconnaissance and/or species-specific surveys, if necessary:

- Habitat for species at risk; and
- Significant Wildlife Habitat.



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Report Signature Page

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APPENDIX A

Species at Risk (SAR)

**APPENDIX A
Species At Risk**

Common Name	Scientific Name	Species at Risk Act, Schedule 1 List of Wildlife SAR Status ¹	Endangered Species Act, Reg. 230/08 SARO List Status ²	COSEWIC Status ³	Provincial Rarity Rank ⁴	Ontario Habitat Descriptions	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
Lilypad clubtail	<i>Arigomphus furcifer</i>	—	—	—	S3	This species can be found at ponds, lakes, and slow streams with floating and submergent vegetation and low brushy shores (Wisconsin Odontata Survey 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Mottled duskywing	<i>Erynnis martialis</i>	—	END	END	S2	In Ontario, the mottled duskywing is found in the same habitat as its food plant <i>Ceanothus</i> spp.: open or partially open, dry, sandy areas, or limestone alvars. These habitats are relatively uncommon and include dry open pine and pine oak woodland, other open dry woodlands, alvars, savannah and other dry open sandy habitats. Usually seen nectaring on wildflowers, or on wet sandy roads in the company of other duskywing species (Linton 2015).	Moderate	Species has been historically observed in the study area (NHIC 2016). Potential habitat is likely uncommon in the study area.
Rusty-patched bumble bee	<i>Bombus affinis</i>	END	END	END	S1	In Ontario, rusty-patched bumble bee is found in areas from the southern Great Lakes – St. Lawrence forest region southwards into the Carolinian forest. It is a habitat generalist, but it is typically found in open habitats, such as mixed farmland, savannah, marshes, sand dunes, urban and lightly wooded areas. It is cold –tolerant and can be found at high elevations. Most recent sightings in Ontario have been in oak savannah habitat with well-drained, sandy soils and moderately open canopy. It requires an abundance of flowering plants for forage. This species most often builds nests underground in old rodent burrows, but also in hollow tree stumps and fallen dead wood (Colla and Taylor-Pindar 2011). The only recent sightings in Ontario are from the Pinery Provincial Park.	Moderate	Species range overlaps the study area. Potential habitat may be present in the study area.
Bank swallow	<i>Riparia riparia</i>	—	THR	THR	S4B	In Ontario, the bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and river banks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999).	High	Species has been historically observed in the study area (Kowalyk pers. comm. 2016). Potential habitat may be present in the study area.
Barn swallow	<i>Hirundo rustica</i>	—	THR	THR	S4B	In Ontario, barn swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared right-of-ways, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused (Brown and Brown 1999).	High	Species has been historically observed in the study area (Kowalyk pers. comm. 2016). Potential habitat may be present in the study area.
Bobolink	<i>Dolichonyx oryzivorus</i>	—	THR	THR	S4B	In Ontario, bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation (Gabhauer 2007). Bobolink prefers grassland habitat with a forb component and a moderate litter layer. They have low tolerance for presence of woody vegetation and are sensitive to frequent mowing within the breeding season. They are most abundant in established, but regularly maintained, hayfields, but also breed in lightly grazed pastures, old or fallow fields, cultural meadows and newly planted hayfields. Their nest is woven from grasses and forbs. It is built on the ground, in dense vegetation, usually under the cover of one or more forbs (Martin and Gavin 1995).	High	Species has been historically observed in the study area (Kowalyk pers. comm. 2016). Potential habitat may be present in the study area.

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Cerulean warbler	<i>Setophaga cerulea</i>	SC	THR	END	S3B	In Ontario, breeding habitat of cerulean warbler consists of second-growth or mature deciduous forest with a tall canopy of uneven vertical structure and a sparse understory. This habitat occurs in both wet bottomland forests and upland areas, and often contains large hickory and oak trees. This species may be attracted to gaps or openings in the upper canopy. The cerulean warbler is associated with large forest tracks, but may occur in woodlots as small as 10 ha (COSEWIC 2010). Nests are usually built on a horizontal limb in the mid-story or canopy of a large deciduous tree (Buehler et al. 2013).	Moderate	Species range overlaps the study area. Potential habitat may be present in the study area.
Chimney swift	<i>Chaetura pelagica</i>	THR	THR	THR	S4B, S4N	In Ontario, chimney swift breeding habitat is varied and includes urban, suburban, rural and wooded sites. They are most commonly associated with towns and cities with large concentrations of chimneys. Preferred nesting sites are dark, sheltered spots with a vertical surface to which the bird can grip. Unused chimneys are the primary nesting and roosting structure, but other anthropogenic structures and large diameter cavity trees are also used (COSEWIC 2007).	High	Species has been historically observed in the study area (Kowalyk pers. comm. 2016). Potential habitat may be present in the study area.
Common nighthawk	<i>Chordeiles minor</i>	THR	SC	THR	S4B	These aerial foragers require areas with large open habitat. This includes farmland, open woodlands, clearcuts, burns, rock outcrops, alvars, bog ferns, prairies, gravel pits and gravel rooftops in cities (Sandilands 2007)	High	Species has been historically observed in the study area (Kowalyk pers. comm. 2016). Potential habitat may be present in the study area.
Eastern meadowlark	<i>Sturnella magna</i>	—	THR	THR	S4B	In Ontario, the eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2003). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970)	Moderate	Species range overlaps the study area. Potential habitat may be present in the study area.
Henslow's sparrow	<i>Ammodramus henslowii</i>	END	END	END	SHB	In Ontario, Henslow's sparrow breeds in large grasslands with low disturbance, such as lightly grazed and ungrazed pastures, fallow hayfields, grassy swales in open farmland, and wet meadows. Preferred habitat contains tall, dense grass cover, typically over 30 cm high, with a high percentage of ground cover, and a thick mat of dead plant material. Henslow's sparrow generally avoids areas with emergent woody shrubs or trees, and fence lines. Areas of standing water or ephemerally wet patches appear to be important. This species breeds more frequently in patches of habitat greater than 30 ha and preferably greater than 100 ha (COSEWIC 2011).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Northern bobwhite	<i>Colinus virginianus</i>	END	END	END	S1	In Ontario, the northern bobwhite breeds in early successional habitats. This species requires a combination of three habitat types: woody cover, cropland and grassland. Croplands provide foraging habitat, grassland and fields are used for nesting, and dense brush provides both winter forage and year round cover. These birds nest on the ground in a shallow depression lined with grasses and other dead vegetation (Brennan 1999).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.

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Least bittern	<i>Ixobrychus exilis</i>	THR	THR	THR	S4B	In Ontario, the least bittern breeds in marshes, usually greater than 5 ha, with emergent vegetation, relatively stable water levels and areas of open water. Preferred habitat has water less than 1 m deep (usually 10 – 50 cm). Nests are built in tall stands of dense emergent or woody vegetation (Woodliffe 2007). Clarity of water is important as siltation, turbidity, or excessive eutrophication hinders foraging efficiency (COSEWIC 2009).	Moderate	Species range overlaps the study area. Potential habitat may be present in the study area.
Loggerhead shrike	<i>Lanius ludovicianus (migrans subsp)</i>	END	END	END	S2B	In Ontario, the loggerhead shrike breeds in open country habitat characterized by short grasses with scattered shrubs or low trees. Unimproved pasture containing scattered hawthorns (<i>Crataegus</i> spp.) on shallow soils over limestone bedrock is the preferred habitat. Preferred nest sites include isolated hawthorns or red cedar. Males defend large territories of approximately 50 ha (Chabot 2007)	Moderate	Species range overlaps the study area. Potential habitat may be present in the study area.
Peregrine falcon (anatum subspecies)	<i>Falco peregrinus anatum</i>	SC	SC	SC	S3B	In Ontario, peregrine falcon breeds in areas containing suitable nesting locations and sufficient prey resources. Such habitat includes both natural locations containing cliff faces (heights of 50 - 200 m preferred) and also anthropogenic landscapes including urban centres containing tall buildings, open pit mines and quarries, and road cuts. Peregrine falcons nest on cliff ledges and crevices and building ledges. Nests consist of a simple scrape in the substrate (COSEWIC 2007).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
American eel	<i>Anguilla rostrata</i>	—	END	THR	S1?	In Ontario, the American eel is native to the Lake Ontario, St. Lawrence River and Ottawa River watersheds. Their current distribution includes lakes Huron, Erie, and Superior and their tributaries. The Ottawa River population is considered extirpated. The preferred habitat of the American eel is cool water of lakes and streams with muddy or silty substrates in water temperatures between 16 and 19°C. The American eel is a catadromous fish that lives in fresh water until sexual maturity then migrates to the Sargasso Sea to spawn (Eakins 2012; Burridge et al. 2010).	High	Species has been historically observed in the study area (Kowalyk pers. comm. 2016). Potential habitat may be present in the study area.
Deepwater sculpin - Great Lakes/Western St.Lawrence Population	<i>Myoxocephalus thompsoni</i>	SC	—	SC	S4	In Ontario, deepwater sculpin are found in Lakes Huron, Ontario, and Superior, as well as in scattered inland lakes. This fish species prefers cold, deep water (usually between 60-150 m in lakes), with soft substrates. Spawning takes place year-round, but peaks in August and early September. Its lifespan is 7 years, with females maturing at 3 years and males at 2 years (DFO 2011).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Greater redhorse	<i>Moxostoma valenciennesi</i>	—	—	—	S3	In Ontario, greater redhorse are found in southeastern Ontario. This fish species prefers lakes, moderate to swift current riffles, runs and pools of medium to large rivers with clear water and substrates of gravel, cobble, or boulder. Greater redhorse spawn in the spring in waters of 13 to 19°C (Ontario Freshwater Fishes Life History Database 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Lake sturgeon - Great Lakes / upper St.Lawrence Population	<i>Acipenser fulvescens</i>	—	THR	THR	S2	In Ontario, the lake sturgeon, a large prehistoric freshwater fish, is found in all the Great Lakes and in all drainages of the Great Lakes and of Hudson Bay. This species typically inhabits highly productive shoal areas of large lakes and rivers. They are bottom dwellers, and prefer depths between 5-10 m and mud or gravel substrates. Small sturgeons are often found on gravelly shoals near the mouths of rivers. They spawn in depths of 0.5 to 4.5 metres in areas of swift water or rapids. Where suitable spawning rivers are not available, such as in the lower Great Lakes, they are known to spawn in wave action over rocky ledges or around rocky islands (Golder Associates Ltd. 2011).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.

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Redside dace	<i>Clinostomus elongatus</i>	—	END	END	S2	In Ontario, the redbase dace, a small coolwater species common in the USA but less so in Canada, is found in tributaries of western Lake Ontario, Lake Erie, Lake Huron and Lake Simcoe. They are found in pools and slow-moving areas of small headwater streams with clear to turbid water. Overhanging grasses, shrubs, and undercut banks, are an important part of their habitat, as are instream boulders and large woody debris. Preferred substrates are variable and include silt, sand, gravel and boulders. Spawning occurs in shallow riffle areas (Redside Dace Recovery Team 2010).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Shortnose cisco	<i>Coregonus reighardi</i>	END	END	END	SH	In Ontario, the shortnose cisco species was last reported in Georgian Bay in 1985 and Lake Ontario in 1964. It prefers clear, deep waters and water temperatures between 2 and 10°C (COSEWIC 2005).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Upper Great Lakes kiyi	<i>Coregonus kiyi kiyi</i>	SC	SC	SC	S3	In Ontario, kiyi occurs in Lake Superior. The kiyi was last seen in Lake Ontario in 1964 and Lake Huron in 1973. It is a species of freshwater whitefish. The kiyi is a coldwater species that prefers temperatures between 3.7 and 4.6°C and depths ranging from 35 to 200 m; however, it is rarely found in waters less than 108 m deep. Kiyi have been collected over lake bottoms of clay and mud substrates. Spawning generally occurs in the late fall at depths greater than 100 m (COSEWIC 2005).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Little brown myotis	<i>Myotis lucifugus</i>	END	END	END	S4	In Ontario, this species range is extensive and covers much of the province. It will roost in both natural and man-made structures. They require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. May form nursery colonies in the attics of buildings within 1 km of water. Caves or abandoned mines may be used for hibernaculum, but high humidity and stable above freezing temperatures are required.	Moderate	Species range overlaps the study area. Potential habitat may be present in the study area.
Northern myotis	<i>Myotis septentrionalis</i>	END	END	END	S3	In Ontario, this species range is extensive and covers much of the province. It will usually roost in hollows, crevices, and under loose bark of mature trees. Roosts may be established in the main trunk or a large branch of either living or dead trees. Caves or abandoned mines may be used for hibernaculum, but high humidity and stable above freezing temperatures are required.	Moderate	Species range overlaps the study area. Potential habitat may be present in the study area.
Blanding's turtle - Great Lakes/St.Lawrence population	<i>Emydoidea blandingii</i>	THR	THR	THR	S3	In Ontario, Blanding's turtle will use a range of aquatic habitats, but favor those with shallow, standing or slow-moving water, rich nutrient levels, organic substrates and abundant aquatic vegetation. They will use rivers, but prefer slow-moving currents and are likely only transients in this type of habitat. This species is known to travel great distances over land in the spring in order to reach nesting sites, which can include dry conifer or mixed forests, partially vegetated fields, and roadsides. Suitable nesting substrates include organic soils, sands, gravel and cobble. They hibernate underwater and infrequently under debris close to water bodies (COSEWIC 2005).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Eastern milksnake	<i>Lampropeltis triangulum</i>	SC	SC	SC	S3	In Ontario, milksnake uses a wide range of habitats including prairies, pastures, hayfields, wetlands and various forest types, and is well-known in rural areas where it frequents older buildings. Proximity to water and cover enhances habitat suitability. Hibernation takes place in mammal burrows, hollow logs, gravel or soil banks, and old foundations (COSEWIC 2014).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Eastern ribbonsnake - (Great Lakes population)	<i>Thamnophis sauritius</i>	SC	SC	SC	S3	In Ontario, eastern ribbonsnake is semi-aquatic, and is rarely found far from shallow ponds, marshes, bogs, streams or swamps bordered by dense vegetation. They prefer sunny locations and bask in low shrub branches. Hibernation occurs in mammal burrows, rock fissures or even ant mounds (COSEWIC 2012).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.

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Northern map turtle	<i>Graptemys geographica</i>	SC	SC	SC	S3	In Ontario, the northern map turtle prefers large waterbodies with slow-moving currents, soft substrates, and abundant aquatic vegetation. Ideal stretches of shoreline contain suitable basking sites, such as rocks and logs. Along Lakes Erie and Ontario, this species occurs in marsh habitat and undeveloped shorelines. It is also found in small to large rivers with slow to moderate flow. Hibernation takes place in soft substrates under deep water (COSEWIC 2012).	Moderate	Species range overlaps the study area. Potential habitat may be present in the study area.
Snapping turtle	<i>Chelydra serpentina</i>	SC	SC	SC	S3	In Ontario, snapping turtle utilizes a wide range of waterbodies, but shows preference for areas with shallow, slow-moving water, soft substrates and dense aquatic vegetation. Hibernation takes place in soft substrates under water. Nesting sites consist of sand or gravel banks along waterways or roadways (COSEWIC 2008).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Stinkpot or Eastern musk turtle	<i>Sternotherus odoratus</i>	THR	SC	SC	S3	In Ontario, eastern musk turtle is very rarely out of water and prefers permanent bodies of water that are shallow and clear, with little or no current and soft substrates with abundant organic materials. Abundant floating and submerged vegetation is preferred. Hibernation occurs in soft substrates under water. Eggs are sometimes laid on open ground, or in shallow nests in decaying vegetation, shallow gravel or rock crevices (COSEWIC 2012).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
American gromwell	<i>Lithospermum latifolium</i>	—	—	—	S3	American gromwell is found in shaded dry to mesic hardwood forests along sandstone ridges, gentle slopes, ravines, and edges of swampy depressions (NatureServe 2015).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Biennial gaura	<i>Oenothera gaura</i>	—	—	—	S3	Biennial gaura is typically found in human-disturbed areas, meadows, and fields (New England Wild Flower Society 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Bowman's-root	<i>Gillenia trifoliata</i>	—	—	—	SX	Bowman's-root is found in dry to moist, upland woods and rocky banks. They are shade-tolerant species that require well-drained, rich, rocky, acid soil (Lady Bird Johnson Wildflower Center 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Bushy cinquefoil	<i>Potentilla supina ssp. paradoxa</i>	—	—	—		Found along Lake Ontario and Lake Erie shorelines, including cobble bars, shale outcrops, and sandy beaches (Young et al. 2016)	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Butternut	<i>Juglans cinerea</i>	END	END	END	S3?	In Ontario, butternut is found along stream banks, on wooded valley slopes, and in deciduous and mixed forests. It is commonly associated with beech, maple, oak and hickory (Voss and Reznicek 2012). Butternut prefers moist, fertile, well-drained soils, but can also be found in rocky limestone soils. This species is shade intolerant (Farrar 1995).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Cleland's evening-primrose	<i>Oenothera clelandii</i>	—	—	—	S1	Cleland's evening-primrose is found in sand barrens in full sun (Ohio Department of Natural Resources 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Fall crabgrass	<i>Digitaria cognata</i>	—	—	—	S1	Fall crabgrass is found in sandy fields, roadsides, railroads, grasslands, and other open, dry, sandy areas. This species has an affinity for human-disturbed habitats (New England Wild Flower Society 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Kansas hawthorn	<i>Crataegus conccinoides</i>	—	—	—	S2	Prefers dry thickets and calcareous hills. Can be found in man-made and disturbed areas, forest edges, meadows, and fields (New England Wild Flower Society 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Northern hawthorn	<i>Crataegus dissona</i>	—	—	—	S3	Prefers sandy open upland forests as well as richer forested banks, stream borders, forested hills, river bluffs; roadsides, fencerows, fields, meadows and pastures.	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Schreber's aster	<i>Eurybia schreberi</i>	—	—	—	S2S3	Grows in dry-mesic to mesic forests and woodlands especially the edges, on non-weedy open road banks, and occasionally on stream banks (Weldy et al. 2013).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.

**APPENDIX A
Species At Risk**

Common Name	Scientific Name	Species at Risk Act, Schedule 1 List of Wildlife SAR Status ¹	Endangered Species Act, Reg. 230/08 SARO List Status ²	COSEWIC Status ³	Provincial Rarity Rank ⁴	Ontario Habitat Descriptions	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
Southern slender ladies'-tresses	<i>Spiranthes lacera var. gracilis</i>	—	—	—	S1	Southern slender ladies'-tresses have one known location south of Niagara-on-the-Lake. General distribution of this species is the Great Lakes region. This species is found in open old fields, road shoulders, and dry, lightly shaded openings under conifer trees (Orchid Society of the Royal Botanical Garden 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Stiff gentian	<i>Gentianella quinquefolia</i>	—	—	—	S2	Stiff gentian is found in semi-open woodlands, savannahs, prairies, meadows, swamps, marshes, and lakeshores (Evergreen 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Sundial lupine	<i>Lupinus perennis</i>	—	—	—	S3	Sundial lupine is found in sand hills, clearings, and open woods. They generally require soils with good drainage but are adaptable to other soil conditions (Lady Bird Johnson Wildflower Center 2016b).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Tall nutrush	<i>Scleria triglomerata</i>	—	—	—	S1	Tall nutrush typically grows in full sun on disturbed sites. Historically it has been found in wet pine barrens, coastal salt marshes, wet meadows, and pastures (Clark 2004).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Virginia bluebells	<i>Mertensia virginica</i>	—	—	—	S3	Virginia bluebells are found in moist woods, clearings, and river bottoms. They prefer rich, moist soils but can also be found in areas with rocky soil (Lady Bird Johnson Wildflower Center 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
White wood aster	<i>Eurybia divaricata</i>	THR	THR	THR	S2	In Ontario, white wood aster grows in open, dry to moist, deciduous woodlands with well-drained soils. It seems to grow along trails in forests dominated by sugar maple and American beech, with associates such as red, white, and black oak, shagbark hickory, and basswood (COSEWIC 2002).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
White-haired panic grass	<i>Dichanthelium ovale ssp. praecocius</i>	—	—	—	S3	White-haired panic grass has been found in bur oak native prairie remnants in Ontario (Northern Ontario Plant Database 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Woodland flax	<i>Linum virginianum</i>	—	—	—	S2	Woodland flax is found in semi-open woodlands, savannahs, forest edges, and riparian areas. This species requires acidic clay, sand, or loam soils (Evergreen 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.
Yellow stargrass	<i>Hypoxis hirsuta</i>	—	—	—	S3	Hypoxis hirsuta grows in wet to dry prairies and meadows and in dry, open sandy woods (Evergreen 2016).	High	Species has been historically observed in the study area (NHIC 2016). Potential habitat may be present in the study area.

Notes:

¹ Species at Risk Act (SARA), 2002. Schedule 1 (Last amended 17 Dec 2014); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)

² Endangered Species Act (ESA), 2007 (O.Reg 242/08 last amended 10 Dec 2015 as O.Reg 387/15). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 31 Mar 2015 as O.Reg 66/15, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

³ Committee on the Status of Endangered Wildlife in Canada (COSEWIC) <http://www.cosewic.gc.ca/>

⁴ Provincial Ranks (SRANK) are Rarity Ranks assigned to a species or ecological communities, by the Natural Heritage Information Centre (NHIC). These ranks are not legal designations. SRANKS are evaluated by NHIC on a continual basis and updated lists produced annually. SX (Presumed Extirpated), SH (Possibly Extirpated - Historical), S1 (Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not Applicable), S#S# (Range Rank), S? (Not ranked yet), SAB (Breeding Accident), SAN (Non-breeding Accident), SX (Apparently Extirpated). Last assessed August 2011.

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